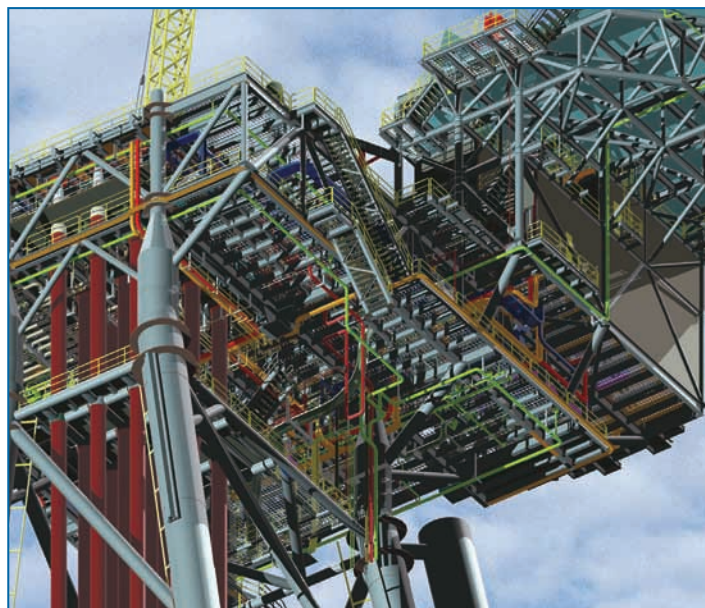
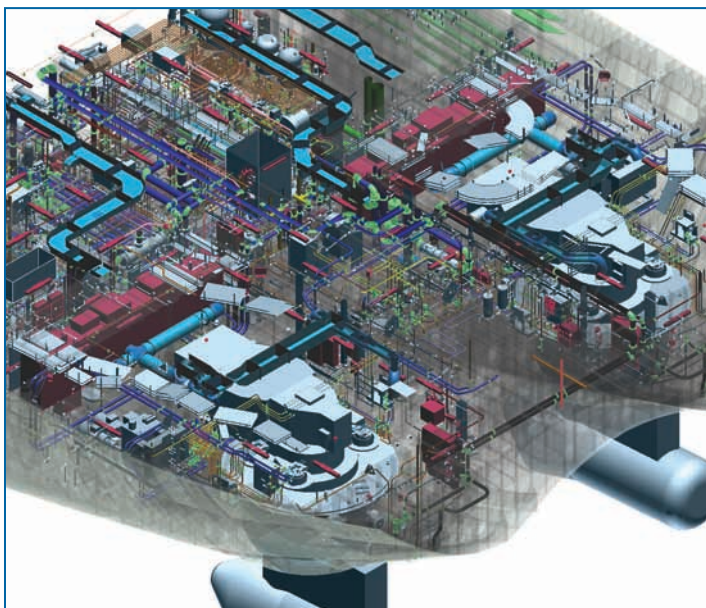


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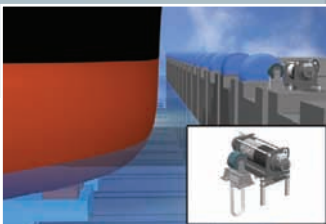
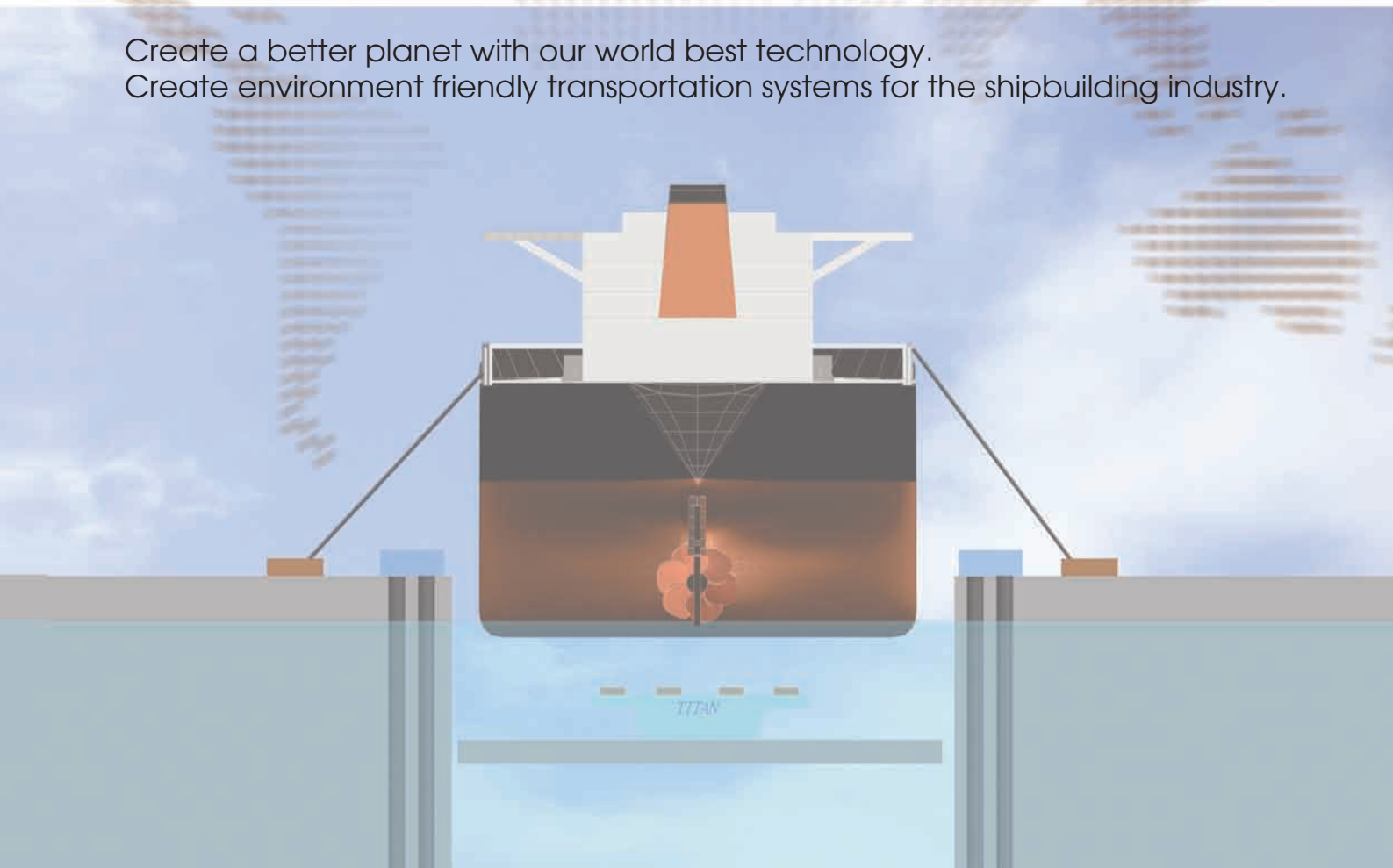
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(Korea International Shipbuilding and Marine Exhibition)



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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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Motor	HP	125 ~ 20,000						
Discharge Pressure	BarA	4.5 ~ 25						
Dimension(W x L x H)	M	1.5x2.6x1.9	2.1x4.4x2.1	2.1x4.7x2.2	2.2x5.2x2.1	2.3x5.8x2.6	4.4x8.0x4.3	6.5x13x7.0
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HHI launches Korea's third 7,600 ton class Aegis destroyer

Hyundai Heavy Industries (HHI) launched Korea's third 7,600-ton class Aegis destroyer, the Ryu Sung-ryong, at its Ulsan Headquarters on March 24.

The launch ceremony was attended by Minister of Defense Kim Kwan-jin, Chief of Naval Operations Kim Sung-chan, HHI president & CEO Lee Jae-seong, and other officials from government and military

authorities.

The Aegis destroyer was named after a scholar-official of Joseon Dynasty of Korea, Ryu Sung-ryong, who was in charge of military operations during the Imjin War, 1592-1598.

The destroyer, measuring 165.9m long, 21m wide and 49m deep, is equipped with an Aegis combat system. The system

includes the SPY-1D radar, capable of detecting and tracking 1,000 targets and attacking 20 of those targets simultaneously. The destroyer also has a wide-ranging anti-ship, anti-aircraft, and anti-submarine defense system.

The Ryu Sung-ryong destroyer is due for final delivery to the Republic of Korea Navy by August 2012 after sea trials. As a cornerstone of Korea's

defense industry, HHI's technology has been used for all Korean Aegis destroyers, two of which have been built in Ulsan.

Since constructing and delivering the first Korean-built frigate Ulsan-ham in 1980, HHI has grown as a leading naval ship builder by delivering 56 naval ships including the first Korean Aegis destroyer Sejong the Great, 3 KDX-II destroyers, 4 frigates, 3 submarines, and 24 patrol/salvage ships.

HHI has also exported various naval ships including supply ship and high-speed ships to navies in New Zealand, Bangladesh and Venezuela.

HHI builds the best ships in the world and is an integrated heavy industries company with business divisions specializing in ship-building, marine engines and machinery, offshore and engineering, industrial plant and engineering, electro electric systems, green energy, and construction equipment.



Korea's third 7,600 ton class Aegis destroyer, the Ryu Sung-ryong

Doosan Heavy Industries & Construction and Scotland join hands to develop a wind farm

Doosan Power Systems (DPS), a U.K.-based subsidiary of Doosan Heavy Industries & Construction, and Scottish Enterprise held a ceremony at Doosan Babcock R&D Center in Renfrew, U.K. on March 22 (local time) to announce investment in relation to the wind farm project cooperation.

The ceremony was attended by Scotland's First Minister Alex Salmond, Scottish Enterprise' Chief Executive Lena Wilson, DPS's Chief Strategy Officer Mok Jin-won and others.

According to the announcement, DPS will consider the fund injection following the

R&D associated with the wind farm in Scotland, and the Scottish Enterprise will provide active support including the disbursement of government subsidies.

Once the Memorandum of Understanding (MOU) is entered into, DPS will participate in the construction of offshore wind farm and be well positioned to tap into the wind power market around the North Sea where a massive new offshore wind farm with a power capacity of around 40GW will be completed by 2020.

In addition, DSP plans to develop large-size wind turbines of over 6MW-class which can gain ground in the European

market by 2013, and proceed with the commercial production following the pilot testing phase by 2015.

DPS's CEO Jean-Michel Aubertin said, "Scotland decided to build a large-scale offshore wind farm to create jobs and strengthen the industrial foundation, and finally selected DPS as partner although we had negotiated with other companies such as U.S. GE and Spanish Gamesa, etc. It will be a good opportunity to raise the brand value of Doosan in the European wind power market."

STXOS join forces with TORP for LNG project

STX Offshore & Shipbuilding (STXOS) entered into a strategic partnership agreement with Terminal Offshore Regas Plant (TORP) LNG AS, a Norway-based LNG solution provider, to jointly carry out LNG transfer and regasification project.

Hwang Seung-chan, Senior Director of STXOS, and Lars Odeskaug, President of TORP LNG, entered into a Memorandum of Understanding (MOU) for the aforesaid project in a signing ceremony held on March 22 (local time) during the GASTECH 2011, a global gas conference and exhibition held in Amsterdam, Netherlands.

TORP LNG possesses the proprietary technology related to the transfer and regasification of LNG and has actively pushed forward with the development of LNG transfer and regasification projects worldwide based on its technology.

Both companies plan to expand bilateral cooperation, including the exchange of information to better cope with the challenges in the fast-growing LNG markets, joint bidding and construction.

STXOS will carry out EPC (Engineering, Procurement & Construction) work which encompasses the design, material procurement, construction in collaboration with TORP.

This strategic alliance is expected to create a maximum synergic effect in delivering a suite of services to LNG project markets through the combination of the TORP LNG's proprietary technology related to LNG transfer/regasification and STXOS's excellent construction expertise and ability. An official from STXOS said, "This strategic partnership will help STXOS gain upper

hand over competitors in the LNG market which is expected to grow in leaps and bounds in the period ahead. We will build up experience with large-scale projects through our cooperation with TORP LNG and expand our capabilities to carry out projects independently in the upcoming period."

POSCO completed a plant with an annual production capacity of 2 million tons of steel plates in Gwangyang

POSCO completed a steel plate plant with the annual production capacity of 2 million tons in its Gwangyang Steel Works on March 28.

Thus, POSCO became the world's largest producer of steel plates with the total annual production capacity of 7 million tons combined with the 5 million-ton annual production capacity of its Pohang plant. Also, the new plant is expected to significantly alleviate the short supply of steel plates for industries such as shipbuilding industry, heavy industry, steel pipe industry, etc.

Until last year, Japan's JFE had the world's largest annual production capacity which reached 5.5 million tons, followed by Nippon Steel with 5.2 million tons and Shanghai Baosteel Group with 4.8 million.



Steel plate factory of POSCO in Gwangyang

Meanwhile, the opening ceremony on the same day was attended by POSCO Chairman Jung Joon-yeong, high-ranking government officials such as Vice-Minister of Knowledge Economy Ahn Hyun-ho, delegation of customer companies including Hyundai Samho Heavy Industries (HSI), Samsung Heavy Industries (SHI), STX Offshore & Shipbuilding (STXOS), and about 300 employees of constructors such as POSCO E&C, SME (Germany), CFHI (China), MCK (Japan), etc.

POSCO Chairman Jung Joon-yeong said, "With the completion of new steel sheet plant in the Gwangyang Steel Works, POSCO became the world's no. 1 steel plate maker capable of manufacturing world's largest ultra-wide steel plates. Now, we can help resolve the steel plate shortage facing domestic industries such as shipbuilding industry and supply the world's best steel plates in a timely fashion."

The steel plates to be manufactured in this new plant will be used for shipbuilding, marine rescue operations and production of API steel pipes, etc. Specifically, the new steel plate plant will churn out and supply a vast array of steel plate products, including the world's largest 5,300mm ultra-wide steel plates in a timely manner, thereby helping strengthen competitiveness of industries using the steel plates.

The domestic demand for steel plate stood at around 11 million tons and 4 million tons of which were imported in 2010. However, the new steel plate factory in POSCO's Gwangyang Steel Works will curtail the import to about 2.7 million tons in 2011, and as a result, the annual import substitution effect is expected to reach KRW 1 trillion.



SHI had its female inspector of quality christen a supersize container ship

Samsung Heavy Industries (SHI) held a naming ceremony held on April 8 at its Geoje shipyard for the newbuild 12,600TEU container ship of German-based Peter Doehle, in which an employee named Choi Ah-reum (aged 24) attracted the attention from the shipbuilding industry as she took on the role of the ship's sponsor.

On the same day, Choi Ah-reum who is in charge of ship quality inspection stuck it lucky when she christened the ship which she had inspected.

The ship christened by Choi Ah-reum is the 4th out of the 8 container ships ordered to SHI by the German shipping line Peter Doehle and was named 'MSC FILLIPPA' on that day.

Meanwhile, Peter Doehle drew wide attention when it sent 32,000 bottles of wine to all employees of SHI as Christmas gift at the end of last year, specially made to mark the long-lasting and cooperative partnership based on the construction of the world's best quality ships.



Choi Ah-reum christens the ship as SHI President Roh In-sik is watching.



Onsan plant of Hyundai Mipo Dockyard

HMD completed its Onsan plant

Hyundai Mipo Dockyard (HMD) held an opening ceremony on April 5 for its Onsan plant put into a full-scale operation, the 4th external plant of HMD.

The ceremony was attended by about 100 people, including HMD CEO Choe Weon-gil and trade union chairman Kim Won-base. The ceremony featured the appreciation plaque award, a ritual wishing for safety, a commemorative tree-planting event and others.

The Onsan plant of HMD located in Ijin-ri, Onsan-eup, Ulju-gun is equipped with various production facilities such as hull block assembly shop, material offloading facilities, 4 painting shops, 2 blasting shops, and was built over around 10 months on a 260,051m² land purchased in July 2010. HMD secured its 4th external plant, followed by its Jangsaengpo plant, Mohwa plant in Gyeongju, and Daebul plant in South Jeolla Province, overcoming the land shortage problem. Furthermore, HMD's Onsan plant will effectively handle the ever-increasing shipbuilding volumes (86 vessels are expected to be built in 2011, up from 60 vessels in 2010).

The Onsan plant will be staffed with about 200 workers, including the employees of 4 contractors, and carry out the hatch cover integration and painting works. In addition, the Onsan plant will expand the production facilities, including the painting inspection shop, all-weather and mobile shelter house, etc, one after another.

HMD CEO Choe Weon-gil said in the opening ceremony on the same day, "Onsan located in the vicinity of the Headquarters is well positioned for off-shore block transport, which is a significant advantage. I expect that the Onsan plant will create jobs and play a key role in adding vitality to the regional economy, as well as boost sales, based on its expanded production capacity."

ABB Korea's Cheonan plant acquired OHSAS18001 Certification

ABB Korea's Cheonan plant acquired OHSAS18001 Certification (Occupational Health and Safety Management System), an international standard for managing health and safety at work, from Bureau Veritas Certification (BVCL) late March. OHSAS18001 Certification is the internationally recognized assessment specification for occupational health and safety management systems, jointly developed by the leading 13 international standards and certification bodies of Norway, UK, and other European countries. It is an international certification for enterprise-wide management system designed to prevent



OHSAS18001 Certification that ABB Korea's Cheonan plant acquired

risks and hazards that may lead to occupational accident, etc., and ensure systematic control of risks and hazards and achieve continuous improvement in safety at workplace.

In order to acquire OHSAS18001 Certification, companies must undergo the review and due diligence process to validate efficient allocation and management of material and human resource based on the organizational structures, responsibilities, procedures set forth in accordance with their objectives designed for effective maintenance and improvement of workers' health and safety necessary to prevent industrial accidents and create pleasant working environment.

ABB Korea's achievement of OHSAS 18001 Certification attests to the fact that ABB Korea takes the workplace health and safety of members as top priority with an emphasis on the forecast and prevention of possible risks and hazards, an endeavor

engaging all related employees including the Chief Executive Officer, not confined to the safety management personnel. Thus, ABB Korea will institutionally manage the creation of profit and safety of workers.

ABB Korea's Cheonan plant, completed in 1998, has already been recognized for its excellent safety records as demonstrated by zero incidence rate since December, 1999.

OHSAS18001 Certification acquired this time covers all machinery handled at ABB Korea's Cheonan plant, such as power boards, transformers, breakers, power generators, drives, motors, low voltage products, measuring instruments, industrial robots, control systems and others.

Having acquired this certification, ABB Korea will effectively identify risks and hazards arising from entire processes such as design, production, assembly, quality control, warehousing, release, etc., in respective phases, establish countermeasures and procedures in compliance with domestic Occupational Health and Safety Act and a series of related Enforcement Ordinances and acquire international standards in relation to what are applicable to works, and these efforts will help increase trust with customers.

ABB Korea's acquisition of this certification paves the way for ensuring more systematic and effective health and safety management in view of safety/health considerations from the perspective of business strategy, addressing a variety of potential risks/hazards continuously, and increasing productivity based on the reduced incident rate and loss.

In addition, this certification will be instrumental in making the advanced health and safety management system take root in ABB Korea and serve as stepping stone to

build trust externally and evolve into a company with outstanding safety records.

KMERI acquired accreditation as test agency of DNV

Korea Marine Equipment Research Institute (KMERI) obtained the accreditation as test agency for electric apparatus, electromagnetic waves, environment, sound, vibration test from the Norwegian classification society Det Norske Veritas (DNV) late March.

The accreditation covers DNV Standard for Certification No. 2.4, IEC 61000-4-X, and IEC 60529.

Therefore, companies that need to undergo official test/evaluation for DNV's type approval certificate of shipbuilding/marine equipments can use the testing and certification service of KMERI conveniently at lower cost as the tests are carried out without the presence of observers from related classification societies.

KMERI plans to acquire accreditation as test agency for 7 major classification societies such as U.K. classification society Lloyd's Register (LR) and Japanese classification society Nippon Kaiji Kyokai (NK) and expand the scope of testing and certification in a bid to improve testing and certification services for shipbuilding and marine equipment manufacturers.

Accredited as test agency of DNV, KMERI was also designated as test agency of Korean Register of Shipping (KR), French classification society Bureau Veritas (BV) and U.S. classification society American Bureau of Shipping (ABS) (confined to the testing/certification in the field of fire protection).



The provincial government of South Jeolla will foster about 1,800 shipbuilding technicians

The provincial government of South Jeolla in the southwest of South Korea has recently announced a plan to build a collaboration system - involving industries, university, government - in tandem with free education/training to foster technical manpower. This endeavor aims to address the imbalance in manpower supply and ensure stable supply of labor as the demand for technical manpower has increased in line with the growth of new-building orders in shipbuilding and offshore plant sectors.

On April 5, the provincial government of South Jeolla held a council (led by chairman Park Jong-hwan, professor at Mokpo National University) that revolved around the support of shipbuilding industry in South Jeolla province. The items on the agenda included the timely supply of technical manpower to equipment manufacturers in Daebul Industrial Complex, manpower demand of companies, job guarantee, and education/training in cooperation with Korea Polytechnique V, Technical Training Center of Hyundai Samho Heavy Industries (HSHI), Institute of Technical Education at Daehan Shipbuilding, etc.

The provincial government of South Jeolla estimates the number of new technical manpower at around 2,500 and plans to foster roughly 1,800 technicians specializing in welding and blasting this year.

Besides, the provincial government of South Jeolla plans to foster about 1,600 technicians in Technical Training Center of HSHI and the Institute of Technical

Education at Daehan Shipbuilding through the National Human Resource Development Consortium under the Ministry of Labour and Employment, and cultivate about 200 technicians in Mokpo Polytechnique V by earmarking approximately KRW 700 million to projects designed to support businesses in South Jeolla province/South Jeolla TP.

To resolve the shortage of 700 workers, the provincial government of South Jeolla plans to retain corps of skilled indigenous manpower generated in the existing 1st to 2nd phase (technicians from 2005 to 2009, about 1,940 persons) in South Jeolla province, facilitate the employment of those from vocational schools (270 persons) and graduates of specialty high schools (270 persons), and expand the recruitment of foreign workers.

Financial support will be also provided from the project driven forward by the provincial government of South Jeolla to promote fosterage of technical manpower. Trainees will be allowed KRW 200,000 a month, in addition to free tuition and board. Trainees will be recruited by shipbuilding-related companies or equipment manufacturers located inside the province, including Hyundai Samho Heavy Industries, Daehan Shipbuilding, etc after completing the 3-month training. Thus, the project will play pivotal role in creating jobs, specifically for unemployed young population.

The KR was designated again as the body to issue ISO 28000 certification for supply chain security

The Korean Register of Shipping (KR) was designated again by the Korean Agency

for Technology and Standards (KATS) under the Ministry of Knowledge Economy (MKE) as the body to issue ISO 28000 certification (supply chain security management system) recently.

KR was designated on April 1, 2008, as the nation's first and sole body to issue ISO 28000 certification and has been dedicated to implementing and promoting supply chain security management system. In addition, KR successfully issued ISO 28000 to 7 prominent companies such as POSCO (Gwangyang), Busan New Port, CJ GLS, Hanjin Corporation, etc, and has gained recognition for its outstanding ability and expertise in certification system/certification and supply chain security management.

An official from KR said, "KR will strive to increase the awareness and understanding across the industries towards supply chain security in our endeavor to drive the spread of ISO 28000 certification for domestic distributors. Particularly, we will facilitate companies to have access to practical experience and expertise if they want to acquire the certification."

ISO 28000 (supply chain security management system), a kind of management system such as ISO 9001 (quality), is an international standard system for establishing internal systems (organization, regulation, procedure, etc) dealing with security assurance in the supply chain.

DSME proceeds with Rev Emotional Management Up campaign

Dawoo Shipbuilding & Marine Engineering (DSME) has launched 'Rev Emotional



Bohemian Singers are performing music in DSME lobby concert and event for employees and team leaders.

Management Up' campaign to bring in a fresh breeze into the shipbuilding industry often characterized by male-dominated corporate culture.

DSME is pushing forward with 'Rev Emotional Management Up' campaign as part of effort to create more pleasant and vibrant organizational culture. It aims to promote 'open management' conducive to the open-minded communication between

DSME held 'DSME lobby concert' on March 28 at the lobby on the first floor of its headquarters in Da-dong, Jung-gu district. The event on that day opened with great fanfare, drawing many employees and citizens. Shin Dong-ho, a world famous tenor, and Bohemian Singers made an appearance on the stage and performed music of various genres, such as classic music, pop songs, etc.

the headquarters in Seoul and Okpo shipyard, between employees and ordinary citizens, and between office workers and site workers by offering a variety of events.

As a first step,

An employee who participated in that event said, "I could hardly find time to go to a concert because of frequent business trip and overtime work. Now, I feel happy to listen to high quality music in this event."

In addition, on March 2 and 3, DSME invited about 130 people including those working at its Okpo shipyard and their spouses, and took them on a tour to Seoul for 1 night and 2 days.

This tour was provided to the employees and team leaders of each department at the shipyard. They traveled by bus offered by DSME from Geoje island to Seoul with their spouses and spent a pleasant time exploring tourist attractions such as Gyeongbok Palace, Insa-dong, Cheonggye Stream, etc.

DSME plans to take about 1,300 employees including the team leaders and their wives on a tour to Seoul 10 times until late October this year.

HMD delivered 25 ships in the 1st quarter, meeting 29% of its annual delivery target

Hyundai Mipo Dockyard (HMD) has recently delivered 3 ships in a row, continuing

smooth sailing towards its target. HMD has delivered a total of 25 ships so far, meeting 29% of its target of 86 vessels.

HMD delivered no. 8051, a 18,000-ton Ro-Ro vessel, to the ship owner on March 31.

No. 8051, delivered on that day, is the 6th out of 10 units of 18,000-ton Ro-Ro vessels ordered by the Italian ferry giant Grimaldi Lines and

was christened 'Eurocargo Venezia' in a naming ceremony held on February in parallel with that for no. 8050.

On April 5, HMD delivered 2 product carriers one after the other. No. 2293 which was delivered on the same day is the 7th out of the 12 units of 74,000-ton product carriers commissioned by Singapore ST and was christened 'SCF Prime' by the ship owner.

Following that, HMD handed no. 2301 christened 'Adara' - the 2nd out of the 6 units of 37,000-ton product carriers ordered by the France-based Socatra - over to the ship owner.



The hand-over ceremony of 'SCF Prime', a product carrier, held on April 5

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Mission Statement

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

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

Technology

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

Special Focus

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

Company & Comments

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

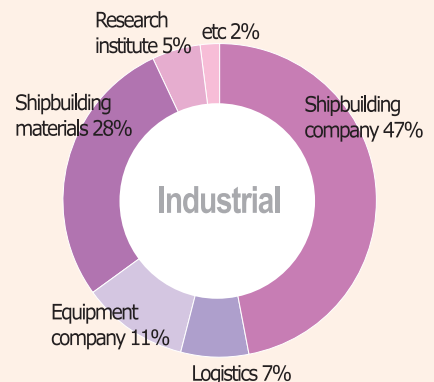
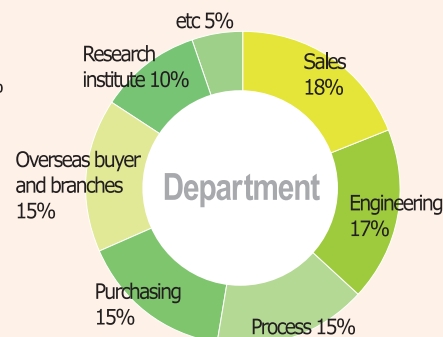
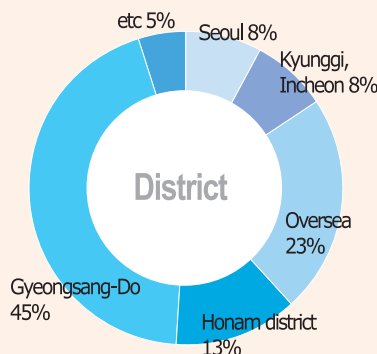
Product

New shipbuilding industry products overview

Business News

Issues and news articles from global shipbuilding companies and organizations

Detailed area breakdown



see at WE'VE CHANGED THE WAY YOU night



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Major domestic shipyards enjoy strong tailwind of green growth in the wind power market (1)

Hyundai Heavy Industries (HHI) won an order last month to build a wind farm in Finland with a combined capacity of 16MW and has become the first domestic company that successfully entered the European market. Subsequently, it has added fresh momentum to its advancement into Chinese market, the world's largest wind market.

Daewoo Shipbuilding & Marine Engineering (DSME) is also making steady progress into the wind power market as DeWind, its subsidiary, clinched an order for 5 units of 2MW wind turbines from Wind Energy Institute of Canada (WEICAN), Canada's largest research institute dedicated to the wind power sector.

Major domestic shipyards have expanded into the wind power industry, the future growth engine, since around 2008 and have actively moved ahead with their business, striving to evolve into comprehensive heavy industrial companies.

Key factors behind domestic shipbuilding heavyweights' drive into the wind power market is its tremendous growth potential large enough to eclipse shipbuilding market in future and the inter-connection between the shipbuilding and wind turbine technologies.

Domestic shipyards - which have built strong competitive advantage in offshore facility sector through their several decades of works in shipbuilding and offshore plant construction, etc - are poised to capitalize on new opportunities created in field of offshore wind power recently in the spotlight as effective option to overcome the limit of onshore wind power.

Wind power is the conversion of wind's kinetic energy into a useful form of energy by using wind turbines, etc, for mechanical power etc, to generate electricity.

Wind power is an abundant, endlessly regenerable, and widely distributed energy resource. Thus, wind power is one of the most promising new energy sources which can replace fossil-fuel power source that will be eventually depleted, and has come under the spotlight along with solar power, bio-fuel and others. Furthermore, wind farms emit no greenhouse gases during the energy conversion process.

Wind power industry registered a fast growth rate of 28% over the last 10 years amid the concerns about fossil fuel depletion and the growing need to reduce environmental impact. The Global Wind Energy Council (GWEC) estimates the total installed wind energy capacity worldwide at 194.4GW as of late 2010, which is an increase by approximately 22% from 158.7GW installed in 2009. The increased capacity represents an investment worth about USD 65 billion.

The wind energy capacity to be added newly is forecast to reach 40GW in 2011 and the global installed wind power capacity is forecast to more than double to 450GW by 2015. Thus, the wind power industry is expected to tread a high growth path for the time being.

In addition, the ongoing nuclear crisis in Japan in the aftermath of devastating earthquake and tsunami has sparked a heightened interest in the development of renewable energies, including wind power, among countries such as the United States, Germany, China, etc, that have suspended or reviewed their plans to build nuclear plants.

Domestic shipyards better positioned to win wind power sector

Offshore wind power have been more in the spotlight recently in the wind power market. The higher wind speed at sea means an increased power production from offshore wind farm which can be built on a large scale and have greater efficiency of power generation compared to onshore wind farm. In addition, offshore wind farms have less environmental impact and generate fewer complaints from residents in the vicinity.

The global offshore wind power capacity is only 2.9GW - most of which are installed in Europe - as of 2010, but there is a further 2.6GW currently under construction. The planned offshore wind power capacity around the globe totals 153.9GW, similar to the global onshore wind power capacity

(159GW as of 2009).

Particularly, offshore wind farms are currently under construction in the United States, China, etc, emerging as major markets for wind power, in addition to the European countries that have dominated the global offshore wind power market.

China completed the Asia's first offshore wind farm in October 2010 and plans to expand the offshore wind power capacity to 35GW by 2030. In 2010, the U.S. government gave green light for construction of offshore wind farm (Cape Wind) on the Eastern Coast of the United States, which consists of 130 turbines. The U.S. offshore wind power capacity is expected to increase to 54GW by 2030.

Emerging Energy Research (EER), a global research institute dedicated to the international energy industry, forecast that global offshore wind power market would grow by 31% on the annual average and could be worth up to KRW 160 trillion by 2050.

Wind turbines have become flagship products of all major domestic shipyards that have completely branched into the wind power market with the entry of DSME in 2009 after Hyundai Heavy Industries (HHI) and Samsung Heavy industries (SHI) entered the market.

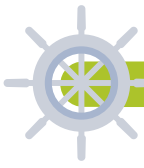
The key drive behind domestic shipbuilders foray into wind power market is its growth potential large enough to eclipse the shipbuilding market in future and the interconnection between the shipbuilding and wind power technologies.

First, wind power market holds such promising prospects that it can replace large markets, like shipbuilding market, as mentioned before. Specifically, the market for offshore wind power which presents a number of advantages to shipbuilders has massive potential for growth.

In addition, shipbuilders have their eyes increasingly on wind power amid the diminishing demand for vessels used to transport fossil fuels such as coal, oil, LNG, which is unavoidable as the wind power market expands.

Second, the wind power industry is closely related to the shipbuilding industry. Wind turbines have the blade (the rotating blade that converts the wind energy into electricity), the core device of wind turbine, which is similar in appearance to the propeller of ship, and the shipbuilding know-how and expertise can be applied to the actuation system, control system, etc, of wind turbines.

In addition, the technologies for offshore facilities - which shipbuilders have amassed during several decades of their works in building ships and offshore plants - can be incorpo-



rated into the production of offshore wind turbines. Basically, offshore wind turbines must be designed to withstand salty sea winds for operating over long periods of time, and major domestic shipbuilders have acquired these technologies through offshore plant projects.

The most prevalent view in the industry is "Large shipbuilders have no choice but to look for new markets as the growth in the shipbuilding market is not as robust as in years past. Wind power turbines, a sort of offshore facilities, are closely related to the shipbuilders' conventional business and therefore can create major new business opportunities for shipbuilders."

As the government will begin to make carbon emission reduction subsidy costs feed through into electricity bills from 2012, domestic shipbuilders are expected to gain benefits in the form of the reduced carbon emissions, energy independence, and advancement of their future-oriented export business.

HHI entered European market for the first time in domestic industry

Hyundai heavy Industries (HHI) advanced into wind power market in 1998. HHI has developed and exported wind turbine parts, such as transformer, converters, etc, to the United States, China, Europe, etc, since it built its first generator for wind turbines in 1988.

In particular, HHI has broadened into the wind power sector fast by harnessing its extensive experience gained within the

shipbuilding industry and its technology in the field of electrical/electronic system.

In September 2009, HHI completed the nation's first wind turbine manufacturing plant in Gunjang National Industrial Complex, located in Gusan, North Jeolla Province, which was built on 132,000m² land with an investment worth a total of KRW 105.7 billion. This plant is capable of manufacturing 1.65MW wind turbines with a combined annual capacity of about 600MW and can also produce 500 units of large wind turbines annually. This plant has the largest production capacity nationwide.

HHI is slated to expand the capacity to 800MW by 2013, while diversifying into the production of both onshore and offshore wind turbines with the capacity ranging from 2.0 to 2.5MW.

Meanwhile, HHI took a first step forward in localizing wind turbines. In November 2009, HHI joined forces with 3 companies (Korea Southern Power, Hyosung, Samhyeop Construction) to jointly install 10 units of 2MW domestically-made wind turbines in Taebaek wind farm. In March 2009, these companies teamed up to push ahead with a joint project to localize 100 wind turbines with a combined capacity of 200MW and jointly set up Taebaek Wind Power in a bid to establish the nation's first wind farm that consists of domestically made wind turbines.

In relation to that, HHI said, "Among approximately 200 wind turbines which have been operated in Korea, only 4 units were made domestically and the remaining units were manu-



Lee Jai-seong, President & CEO of HHI, listens to the explanation while watching the offshore wind turbine model during the China (Shanghai) International Wind Energy Exhibition & Symposium (CWEE 2011) held in Shanghai in April.



A signing ceremony to execute a contract with Finland-based Finnish Power for a 16MW wind farm project, held in the Ulsan headquarters of HHI on April 11

factured by foreign technology or imported. Under these circumstances, it was urgent to localize wind turbines. Significantly, this project is the nation's largest wind farm built with purely domestic technology."

In particular, this project serves as a springboard for HHI to introduce its wind power turbine technology abroad and build a track record for making significant headway into foreign markets at the same time.

Following the aforesaid project, HHI has participated in onshore wind farm projects in Samcheok and Jeongseon in Gangwon province and offshore wind farm projects in Jeju province, Busan, and regions located along the South and Western coast.

Currently, HHI has completed or is currently carrying out wind farm projects in various parts of the country, including Taebaek of Gangwon province (6 wind turbines with a combined capacity of 10MW), Muju of North Jeolla (24 wind turbines with a combined capacity of 40MW), and Jinan/Jangsu of North Jeolla (18 wind turbines with a combined capacity of 30MW).

Meanwhile, HHI has made splendid progress into foreign wind markets. HHI made entry into China, the largest wind power market worldwide, and successfully made foray into Europe, first-ever in the history of domestic wind power industry, beginning with its advancement into the U.S. wind power market in 2009.

In September 2009, HHI entered into a contract with Wave Wind to supply 6 units of 1.65MW wind turbines and began to make full-fledged inroads into the U.S. market. These large wind turbines have blade measuring 77m in diameter and 80m in height. The total 10MW combined power output of these 6 wind turbines is sufficient to power about 5,000 households. They were completely installed in the area adjacent to Milwaukee, Wisconsin, United States in May 2010.

In April 2010, HHI advanced into the Chinese wind power market which has emerged as the world's largest market in the wind power sector. HHI set up a joint venture with Wehai City in China's Shandong province and Datang Shandong Power Generation to construct a wind turbine plant in China.

This plant built on 70,000 pyong (1 pyong is equal to 3.306m²) under the joint venture - established in the north-eastern seashore of Shandong Province in China - will have an annual production capacity of up to 300 units of 2MW wind turbines, capable of producing and selling a combined capacity of 600MW. This plant is slated for completion in late



2.5MW permanent magnet wind turbine, developed by HHI

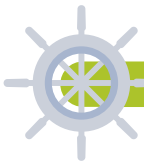
May.

Datang Shandong Power Generation, a provincial subsidiary of Datang Group (China's second largest state-owned power company) produces and supplies power to Shandong province.

An official from HHI said, "China has seen fast growth of wind power market on the back of Chinese government support at policy level. This joint venture will serve as a stepping stone to make full-fledged inroads into Chinese wind market."

The data released recently by American Wind Energy Association (AWEA) suggested that the Chinese wind market would reach 100GW of installed wind power capacity, worth USD 150 billion, by 2020.

In addition, HHI participated in China (Shanghai) International Wind Energy Exhibition & Symposium (CWEE 2011) held from April 8 to 10, 2011, injecting fresh momentum into its efforts to secure firm foothold in Chinese wind power market. HHI showcased its product models of 2MW onshore wind turbines and 5.5MW offshore wind turbines, etc, at its booth occupying 480m², the largest area among all exhibitors. In addition, many executives of HHI attended the trade show, catching a glimpse of the market conditions and trend of technology while actively moving ahead with marketing activities.



HHI's wind turbine plant in Gunsan, Jeonbuk

The industry sources speculate, "HHI has amassed advanced technologies in the field of power generation system manufacturing/installation while carrying out projects related to wind power generation such as generators, transformers, power control and so forth. Furthermore, HHI is expected to make huge success in the Chinese market, considering that HHI can steadily produce gear boxes, the essential parts, based on the technical exchange with Germany's gearbox maker JAKE which was acquired in January."

Along with that, HHI is expected to demonstrate its differentiated technology incorporated into the 5.5MW offshore wind turbines scheduled for installation in late 2012, using its know-how and expertise in the design, manufacturing, and installation of offshore facilities that HHI has accumulated while carrying out about 140 offshore projects around the globe over the last 3 decades.

In April, HHI won a contract to supply a total of 16MW wind turbines for a wind farm in Finland jointly with Hyundai Corporation and became the first domestic company to make entry into European market.

This wind farm project is to install 8 units of 2MW wind turbines with the combined power capacity of 16MW in Hamina, a port city located in southeastern Finland. The construction will commence at the end of this year and completed around in April 2012. HHI will undertake the manufacturing, supply, and commissioning of the wind turbines in this project.

This contract is significant, considering that HHI became the

first domestic company that successively inked a deal to supply wind turbines to Europe where the globally-renowned wind turbine manufacturer is located. This contract will pave the way for HHI to gain recognition for its technology in the global wind power markets, including the European wind power market.

On March 14, HHI entered into a Memorandum of Understanding (MOU) with Kotka-Hamina, Finland, on the collaboration for the wind power industrial complex and the supply of 40 wind turbines during the European Wind Energy Council (EWEA 2011) which was held in March 14 in Brussel, Belgium.

Besides, HHI set up a consortium with Korea Southern Power, Hyundai Engineering, and Hyundai Corporation and completed a project to build 30 units of 1.65MW wind turbines for Pakistan's Yunus Brothers (YB). In addition, HHI has accomplished good results in foreign wind turbine markets. HHI completed the installation of 1.65MW wind turbines in New York for the U.S.-based Zotos and signed a contract with D&C based in Massachusetts, a EPC (Engineer, Procure, Construct) company, at the beginning of this year to supply 2.0MW wind turbines.

An official from HHI said, "HHI beat prominent wind turbine suppliers of Europe and was awarded this contract in recognition of its excellent technology and reliability. We will vigorously proceed with sales operation to seize upon the growing demand in the Europe where new wind farm development has expanded recently."

Meanwhile, HHI establish a new business division called 'Green Energy Division' to focus on developing wind power and solar power, the new growth engine of future, at the beginning of 2011. HHI shifted to 7 division system, adding the new division Green Energy Division, dedicated to the renewable energy business, to its current 6 business divisions, such as the Shipbuilding Division, Offshore & Engineering Division, Industrial Plant & Engineering Division, Engine & Machinery Division, Electro Electric Systems Division, and Construction Equipment Division. Thus, HHI has strengthened its business portfolio as a heavy industrial company.

SHI entered foreign markets earlier than others

Samsung heavy Industries (SHI) launched the wind power business in November 2008 as part of effort to diversify its



Installation of SHI's first wind turbine installed for the first time in Texas, United States, in 2010

business portfolio with a plan to make a full-scale inroads into the wind power market after 2011 by developing 2.5MW onshore wind turbine system and 5MW offshore wind turbine system.

SHI completed development of 2.5MW onshore wind turbine system in cooperation with an U.K.-based engineering company immediately upon launching the wind power business, and unveiled the 2.5MW onshore wind turbine system during the Wind Power 2009 Conference & Exhibition (WIND POWER 2009) held in May in the United States.

Specifically, SHI won an order for 3 units of 2.5MW wind turbines from the U.S.-based Cielo in just 9 months after it made entry into the wind power sector only with its in-house model without any manufacturing plant or mass production mode. In November, SHI delivered its first wind turbine built at its Geoje shipyard, marking the nation's first export of wind turbine.

According to the analysis of SHI, such a remarkable accomplishment is attributed to the fact that the blades, the core parts of wind turbine system, are based on technology similar to that applied to the ship propellers and SHI's shipbuilding expertise amassed over several decades could be used to produce the actuation and control systems.

Particularly, the 2.5MW wind turbine is fitted with permanent magnet generator that provides 10% more efficiency and durability (25 years) 5-year longer than existing U.S.-made products and therefore makes the maintenance easy. Besides, SHI provides one-stop services from the production to the installation.

An official from SHI explained, "SHI has the world's best technology in the field of wind power facilities including the ship



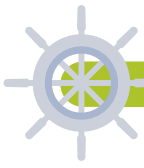
Image of SHI's wind turbine

propellers, noise/vibration analysis, actuation device and control system, etc, and therefore could use these technologies to develop economic wind power facilities."

SHI targeted the U.S. market first in the same context that the Korean shipbuilder successfully gained firm foothold in the global market in years past, unlike companies in the same industry that targeted domestic market prior to the entry into foreign markets. SHI decided to tap into the U.S. market first which is deemed to have promising growth prospects in view of the U.S. government's plan to boost wind energy supply from the current 1% to more than 20% of the nation's electricity needs by 2030.

1 unit of 2.5MW wind turbine can produce electricity sufficient to power about 940 households. Particularly, the first series of wind turbine delivered by SHI are the world's largest, which have the blade measuring 90m in diameter, 80m-high tower, engine room, etc, and weigh 300 tons. They were installed in April 2010 at the wind farm site in Lubbock, Texas, United States and have been fully operational.

An official from SHI explained, "SHI developed wind turbines in just 1 year after it launched wind power business amid a growing number of start-ups in wind power facility sector to capitalize on the renewable energy boom, and furthermore,



View of wind turbine manufacturing plant of SHI, located adjacent to Geoje shipyard



Ceremony to celebrate the completion of SHI's wind turbine manufacturing plant, held in August, 2010

has made inroads into the U.S. market, the largest in the wind power sector worldwide. In that sense, SHI's successful delivery of the first series of wind turbines is significant for proving the feasibility of success in business."

In Korea, SHI installed 1 unit of 2.5MW wind turbine in May 2010 in the domestically-made wind turbine test bed in Yeongheung, Incheon, operated by Korea South-East Power as part of the government-led project, and has recently planned to stall 3 additional units.

SHI set an annual production target of 200 units of 2.5MW onshore wind turbine systems and 5MW offshore wind turbine systems by 2010 with an investment of KRW 600 billion, and aims to join the rank of the world's 7 largest wind power companies by generating KRW 3 trillion from the sales of wind turbine systems and capturing 10% share of wind power market by 2015. For that, SHI plans to increase its workforce from the current 80 (4 teams) to 1,000 by 2015 and establish an assembly plant with an annual production capacity of 1,600 wind turbines.

Furthermore, SHI has mapped out strategy to target the markets in countries with large areas of land such as the United States, China, India, etc, with its 2.5MW onshore wind turbine systems, and increase its share of market in Asia and Europe with its offshore wind turbine systems that provide high power generation efficiency and emit less noise, starting from 2015.

Thus, SHI will establish sales representative office dedicated to servicing clients in relation to the wind turbine systems first in Huston, United States, and then in Portland, United States, and Germany. In addition, SHI plans to start operating distribution and after-sales-service centers in 2011 in a bid to

make full-scale inroads into the markets in the United States and Europe.

An official from SHI said, "Using our expertise that we built during 35 years of works in shipbuilding and construction industry, we will evolve into a leading company in the global wind power market in which the top 6 U.S. and European companies presently have lions share above 90%. We will vigorously develop submarine resource exploitation business as future engine of growth."

In fact, SHI has pushed forward with development of wind turbine carriers using its world's best shipbuilding technology and has been interested in developing wind powered ships and floating wind farms. Last year, SHI began development of offshore wind turbines with the power capacity ranging from 6 to 7MW, aiming to enter the offshore wind power market after 2012.

SHI will establish turnkey solution system to carry out all tasks necessary for building offshore wind farms such as support structure (substructure), installation, ships (Wind Turbine Installation Vessel), etc, in addition to manufacturing offshore wind turbine systems.

Meanwhile, SHI completed its wind turbine production plant with an annual production capacity of over 200 units of 2.5MW wind turbines in August 2010. This plant occupying an area of approximately 32,000m² was built on 15,000m² land and is equipped with assembly shop, machining/painting workshop, material storage, etc. Besides, it has 40 types of mechanical facilities including the assembly equipments for the main shaft of wind turbine.

< to be continued >



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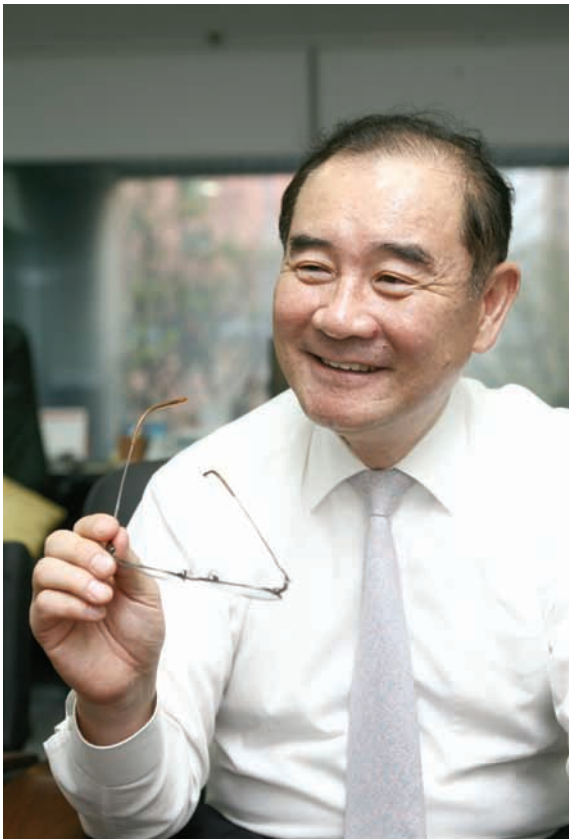
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HIGEN MOTORS, the emerging pioneer of Korean electric motor industry

HIGEN MOTORS, which launched its business in 1963, is one of the big 3 Korean motor manufactures. HIGEN MOTORS savors 48 years legacy in the motor industry as the only motor manufacturer to cover induction motors, servo motors, servo drives and PM motors at the same time.

HIGEN MOTORS Co., Ltd.



Dr. Kim Jae-hak, CEO of HIGEN MOTORS

The legacy of HIGEN dates back to, 1963, 48 years ago, when Gold Star, now renamed LG Electronics, started motor manufacturing business for import substitution and later in 1999, LG Electronics went joint venture with OTIS Elevator, a U.S. based elevator company.

In 2008, HIGEN MOTORS was spun off as an independent corporation specializing in motors and energy transfer solutions.

HIGEN MOTORS specializes in motors and energy transfer solutions such as low voltage motors, high voltage motors, electric vehicle motors, servo drives and servo motors, inverter motors, permanent magnet motors, inverter built-in motors, spindle motors, and related products of industrial grade with power rating of 0.4kW to 1,500kW.

The spirit and meaning of HIGEN

'HIGEN', which is also the brand name of HIGEN MOTORS, was formed by the combination of "Human engineering", "Innovative technology", "Global player", and "Environmental friendly", "New frontier", and embodies the corporate philosophy and vision of HIGEN MOTORS.

Despite the downturn in domestic and international economic conditions, HIGEN MOTORS has been climbing up on a remarkable growth path over the last 3 years since spin off from Otis Elevator.

With the sincere work ethic of employees, HIGEN MOTORS has strived for development of new products, expansion of R&D organization and production facilities, overseas technical cooperation, and exhibitions at major trade fairs at home and abroad (Hannover Messe, PTC Asia in Shanghai).

HIGEN MOTORS has been a leader in the industrial motor market, covering 25% share of domestic market for industrial grade motors. Besides, HIGEN MOTORS has supplied marine motors to major domestic shipyards competing with domestic and overseas rivals in this technology intensive industrial market.

Furthermore, as a member of consortium involving global leaders



Dr. Kim Jae-hak, CEO of HIGEN MOTORS (seated next to Mr. Lee MB., President of Republic of Korea) was invited to brief on current policy issues of Korean EV industry at the presidential economic policy board of the Blue House in October 2009.

in the automotive industry, HIGEN MOTORS has handsomely built up its recognition in electric vehicle motors, the emerging industry of promising future.

In particular, HIGEN MOTORS takes technology based competition strategy as an active industrial leader in Korean servo drive and servo motor motion control market of high growth potential and technological challenge.

A manager, Choi YC at HIGEN MOTORS stressed, "With our research center playing a key role, we have focused on development of servo motors and servo drives essential for automation facilities over the last 10 years. As a result, HIGEN MOTORS, the leader in the domestic high performance controller sector, is very proud of its contribution to higher standard of domestic motion control technologies widely applied to the motion control sector such as semiconductor, LCD, LED, automotive, shipbuilding, machine tool sector, etc. which is still under the strong influence of foreign technology. HIGEN MOTORS has strengthened R&D initiatives to upgrade its technological capability to the international standard to make quality products as a motor manufacturer of global competence.

HIGEN MOTORS for marine application

HIGEN MOTORS provides motors to the major players in the shipbuilding industries such as Hyundai Mipo Dockyard (HMD), Samsung Heavy Industries (SHI), STX Offshore & Shipbuilding (STXOS), Daewoo Shipbuilding & Marine Engineering (DSME), etc. for various applications such as



Factory of HIGEN MOTORS located in Changwon City, South Gyeongsang Province.

Boat Devit, Engine Room Crane, Electric Provision Crane, Monorail Hoist, Steering Gear, and others.

In particular, HIGEN MOTORS' technological capabilities showcased in a rescue mission to lift the ill-fated, Korean Navy battle ship, Cheonan, sunken during the North and South Korean military conflicts of March 2010 in the Yellow Sea. The rescue ship, Samho 2200, an ultra large floating crane, was outfitted with 16 units of 200HP hydraulic pump motors manufactures by HIGEN MOTORS.

Here is the product range of HIGEN MOTORS' covering wide industrial application:

• General purpose motors

- IEC/NEMA standard
- Continuous duty
- Class F insulation system

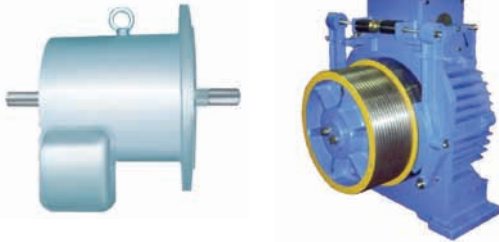


- High starting torque (for crane)
- Water-proof and rust-proof design applied
- IP 56
- Water-proof brake included



•Elevator motors & traction machines

- Class F insulation system
- Dynamic brake
- Variable voltage variable frequency control
- Gearless type traction machines which are outfitted with permanent magnet motor



•Explosion proof motors

- Explosion proof symbol: Ex d
- Group symbol: II B, IIC
- Maximum surface temperature: T4 (T1-T4)
- Envelope and fixing structure: Totally enclosed (TEFC, TEAO, TENV), horizontal (B3), vertical (B5, V1), B3B5
- Ambient conditions: Refrigerant temperature -20-50°C, humidity below 80%
- Hazardous location: Type 1 location, type 2 location
- Indication: Ex d IIB/C T4 certified by ATEX



•High voltage motors

- 3 Phase, 60Hz, 4Pole, 3,300V or 6,600V
- Ins. class F (Temp. rise B class), (Vacuum pressure impregnated with epoxy resin varnish)
- Duty: continuous



•Servo motors & servo drives

- High speed (32 bit) DSP technology
- Rapid position & speed control
- Low noise by IGBT-IPM
- Feed-forward compensation function
- Application
 - *Low inertia: Robot, chip mount, factory - automation*
 - *High inertia: CNC system, transfer machine*



•Spindle motors

- Frameless type
- Wide range of rated output (standard 8,000rpm, special 12,000rpm)
- High response & speed control
- High torque, low inertia
- Low noise & vibration (V5)



The flameproof motors must withstand the pressure from inside explosion and the flames must not be exposed externally. The surface temperature of enclosure must not trigger ignition by combustible gas in the surrounding area when explosion occurs.

Director Kim JH, of HIGEN MOTORS explained, "Our products completely meet these conditions." "If any explosion is caused by explosive gas percolated into the sealed enclosure, it withstands the pressure during the explosion. In addition, the sealed enclosure has the explosion-proof structure to prevent the propagation of flame from the external explosive atmosphere."

HIGEN MOTORS' s main products

Products		Output range
General purpose motors	220-660V	0.1-200kW
		210kW ↑
Elevator motors & traction machine	Geared type, gearless type (Traction machine: 11kW, 27kW, 41kW, 76kW)	5.5-76kW
Flameproof motors	Ex e	0.75kW ↑
	Ex d	
High voltage motors	690-6,600V	55kW ↑
Servo motors & drives	1,000-5,000rpm	0.05kW ↑
Spindle motors	1,500-8,000rpm	3.7-11kW

HIGEN MOTORS has obtained various Quality Assurance Certifications

HIGEN MOTORS, which launched its business in 1963, is one of the big 3 Korean motor manufactures. HIGEN MOTORS savors 48 years legacy in the motor industry as the only motor manufacturer to cover induction motors, servo motors, servo drives and PM motors at the same time.

As a matter of convenience to the customers, the product range of HIGEN MOTORS encompasses quite wide industrial applications i.e. precision control motors for elevator, vector motors for industrial plant process line such as steel industry, motors for onshore/offshore cranes and servo motors/servo drives for factory automation.

Besides, HIGEN MOTORS manages the IT based smart production system in a highly flexible and responsive manner tailored to the needs of customers.

Director Kim JH of HIGEN MOTORS stressed, "As an energy transfer solution provider, HIGEN MOTORS has hi-tech manpower to design and manufacture energy efficient quality products."

HIGEN MOTORS has ISO 9001 certification for all of its product range that includes low voltage motors, high voltage motors, and servo motors. In addition, as a global player, it has obtained international certifications such as KS, CE, UL, and ATEX and IECEx for explosion-proof certifications.

Gaining firm foothold in the shipbuilding and EPC markets

Last year, HIGEN MOTORS recorded USD 71 million in sales, some 24% increase over 2009 sales and the sales for 2011 is targeted at USD 91 million, increasing 28% over the previous year.

To achieve this ambitious sales growth target, HIGEN MOTORS is serious to explore OEM business opportunities with foreign companies especially in shipbuilding, machinery and other strategic industries.

In an effort to bring cost efficiency and high quality competitiveness for the Korean shipbuilding industry, HIGEN MOTORS is sharpening its pencil to outpace the high cost import motors that are still in wide use by the Korean shipbuilding industry of strong global competence and of critical strategic value to the Korean economy.

In October 2011, Busan Korea, HIGEN MOTORS will display its marine motors at 'KORMARINE', the nation's largest shipbuilding & marine equipment trade fair.

In November, Nuremberg Germany, HIGEN MOTORS will exhibit at 'SPS/IPC/DRIVES 2011 (<http://www.mesago.de/en/SPS>)' world's leading exhibition for electric automation.

HIGEN MOTORS plans to list its stock in Korean Stock Exchange sometime mid 2012 and is running a busy way for business globalization in the international market place, tak-



Samho 2200, a floating crane of Samho I&D which hoisted the sunken naval patrol ship Cheonan in 2010, is outfitted with 16 units of HIGEN MOTORS' 200HP hydraulic pump motors.

ing the momentum of the dynamism of Korean shipbuilding companies and Korean EPC (Engineering, Procurement, Construction) contractors.

Gliding into global growth

Over the years, HIGEN MOTORS has expanded R&D manpower and investment to speed up development of new products such as electric vehicle motors, motors with built-in inverters, IPM motor, hoists, etc.

Most remarkably, HIGEN MOTORS enjoys solid market leadership for elevator motors taking more than 60% market share in Korea, and marks the highest market-shares in pumps, reducers, plastic extruders, hydraulic, cooling towers, and air handling machinery markets as well.

HIGEN products are sold not only to the Korean industrial leaders such as POSCO, LG, Samsung, OTIS, WILO, Korea Zinc but also to the foreign customers in approximately 20 countries including U.S., Japan, EU and China.


In the era of low-carbon green growth, HIGEN MOTORS is playing a pioneering role in the electric vehicle motors and exports to US and European EV market.

In October, 2009, Dr. Kim Jae-hak, CEO of HIGEN MOTORS, was invited to give opinion in a government economic strate-

gy session chaired by Mr. Lee Myung-bak, President of Republic of Korea, to handle governmental measures to boost the Korean electric vehicle industry.

President Lee Myung-bak had a test ride on a new electric vehicle model of Hyundai Motor that was powered by a motor developed by HIGEN MOTORS.

HIGEN MOTORS has profound business expertise in the strategic area of electric power driving and control system for transportation vehicles such as elevator, electric vehicle and marine vessels etc.

Kim Jae-hak, CEO of HIGEN MOTORS, unfolds his aspiration, "Currently, POSCO, OTIS, Samsung, Korea Zinc, LG, etc. and global companies, are using our products. HIGEN MOTORS will make a big and challenging stride for a global company that designs and manufactures topnotch industrial motor products of cutting-edge technologies such as EV motors, and motion control, for distribution all over the world." Kim Jae-hak asserts that, "HIGEN MOTORS is fully dedicated to the vision of 'Challenge to the World, Challenge to the Future' as an energy efficient solution provider", and invites the valuable customers in the shipbuilding industry to navigate with HIGEN MOTORS to the World of HIGEN Dream. 

“
Motor Business Since 1963

*LG started it.
OTIS joined it.
HIGEN inspired it.*

”

**HIGEN MOTORS means
HIGH ENERGY efficiency
and reliability
For Shipbuilding Industry.**





Smart ship built on the convergence of shipbuilding and IT technology

Digital shipyards armed with cutting-edge IT technologies are building smart ships in Korea. Recently, Hyundai Heavy Industries (HHI) delivered the world's first smart ship developed jointly with the Electronics and Telecommunications Research Institute (ETRI), flinging open the door to the era of smart ship.

Hyundai Heavy Industries (HHI) has recently unveiled the world's first smart ship that incorporates the remote monitoring and controlling system.

HHI announced on March 25 at its Ulsan headquarters that it successfully built the smart ship. The announcement came during a briefing session on the completion of IT-based total solution for ships, a government project commissioned by the Ministry of Knowledge Economy.

The event that took place on the same day to announce the smart ship

was attended by about 100 people, including Lee Jae-sung, President and CEO of HHI, Cho Seok, Director-General of Growth Engines at the Ministry of Knowledge Economy (MKE), Kim Heung-nam, President of Electronics and Telecommunications Research Institute (ETRI), Park Maeng-woo, Mayor of Ulsan City, Lee Chul, President of Ulsan University, and featured the

briefing session on the completion of project, demonstration, etc.

The 1st smart ship left the dock

HHI's smart ship is the next-generation vessel which enables the operators to monitor the operation status of ship engine, control unit, various engines, etc, in real time via satellite link remotely from onshore and diagnose/control the integrated on-board systems.

The first newbuild outfitted with the smart ship system is a 4,500TEU container ship ordered by Denmark-based AP Moller in 2008 and left on a maiden voyage after its delivery on March 29, 2011.

The key to HHI's smart ship technology lies in building an independent ship monitoring and controlling system called Ship Area Network (SAN) that integrates the Advanced Control and Integration System (ACONIS-DS), Voyage Data Recorder (VDR), Bridge Maneuvering System (BMS) and others.

The data collected, analyzed, and processed through the SAN can be used for raising the economic efficiency of ship operation and linked to enable next-generation ancillary services such as stock control of on-board equipments. In addition, HHI's smart ship has gained the spotlight from related industry as it can provide services throughout its lifecycle from the ship's construction through delivery to scrapping, going beyond merely providing on-board integrated monitoring capability.

As the lifecycle of ship is determined by how the ship is used, the smart ship designed for economic operation is expected to draw even more attention in the period ahead.

In fact, HHI will outfit this smart ship system in the 21 container ships scheduled for construction at the additional request of AP Møller and plans to install the system in 18 container ships to be built at domestic shipyards. Apart from them, HHI entered into contracts with Greek CMM (Consolidated Marine Management) and Atlantic to build 6 smart ships.



The briefing session on the completion of projects for IT-based top-notch shipbuilding technology and demonstrations, held on March 25 at the headquarters of HHI

Anders Boenaes, Vice-President of AP Møller, said, "Smart ship is the next-generation vessel fulfilling the needs of ship owners who put an added emphasis on state-of-art technology and high efficiency of operation, and will set the standard for ships to be built in the upcoming period." Hwang Si-yeong, Vice-President in charge of the Data Processing Department of HHI, stressed, "This accomplishment will serve as a springboard for us to take a leading role in global smart ship technology. The smart ship system will also help boost sales as it can be made available in the form of an independent software that supports economic navigation of ship, etc, in addition to its application to the shipbuilding industry."

The core technology of smart ship built by HHI has also been applied to the standardization project of International Maritime Organization (IMO) which aims to set the standard for ships built worldwide.

Meanwhile, the development of smart ship was completed in 3 years with an injection of funds totalling KRW 27 billion (KRW 13.5 billion from government coffers, KRW 13.5 billion from private-sector) and annual workforce of 133 persons after HHI, ETRI, and Ulsan University embarked on a joint development of the technology in March, 2008.

According to the analysis of HHI, the smart ship technology is expected to bring cost-savings of approximately USD 40 million and improve efficiency in work performance.

IT convergence R&D projects of the MKE

The Ministry of Knowledge Economy (MKE) selected and has vigorously pushed ahead with 75 IT convergence R&D projects, which apply the world's most powerful IT technology, in a bid to inject fresh momentum into the nation's flagship industries such as automotive and shipbuilding



industry since 2008. MKE will pour funds totalling KRW 290.1 into these projects.

The Korean shipbuilding industry, albeit its world's best shipbuilding technology, has recently been under increasing pressure to fend off competition from late-comers such as China and has a heavy reliance on essential parts imported from advanced countries. In response to that, MKE has continuously explored and proceeded with IT convergence R&D projects in the field of shipbuilding industry, which integrate the nation's worldwide leading IT technology (communication, etc), in an endeavor to further advance Korean shipbuilding industry.

In the first place, Digital Shipbuilding Yard Technology was developed which uses wireless communication and electronic tag (RFID) to improve productivity and working environment in shipyards and has been test run by HHI (Fig.1).

Following that, SAN-based smart ship technology - completed and unveiled this time - was developed as a first step forward in digitalizing the ship itself (Fig.2).

Furthermore, projects for integrated management system onboard intelligent digital ships have been carried out to develop standard platform and equipments which can provide capabilities including the support of optimized operation, risk monitoring and response, accident history management, etc, since 2009, laying the cornerstone for localizing ship's essential equipments.

Recently, IT convergence R&D in the field of shipbuilding industry has been expanded in multifaceted ways, including the shipbuilding simulation technology, ship-to-ship wireless maritime communication technology, etc.

The focus of shipbuilding simulation technology is to develop a simulation-based shipbuilding system in shipyard manufacturing process in order to minimize the risks such as the collapse which may result from the introduction of new shipbuilding technique (Fig.3).

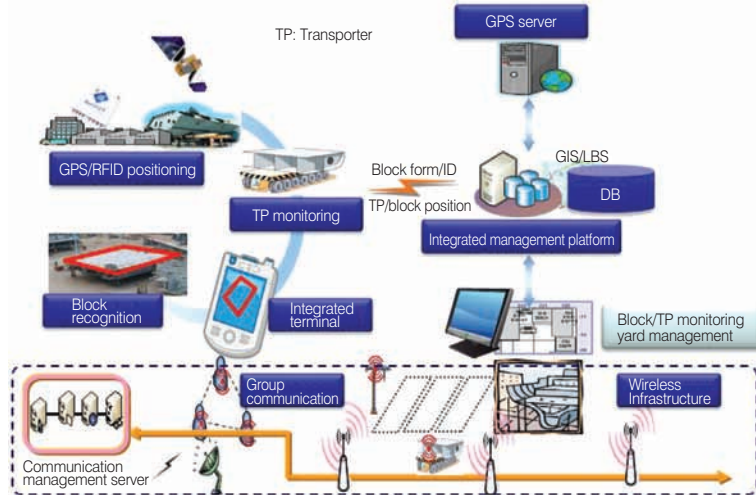


Fig.1 Schematic diagram of Digital Shipbuilding Yard Technology

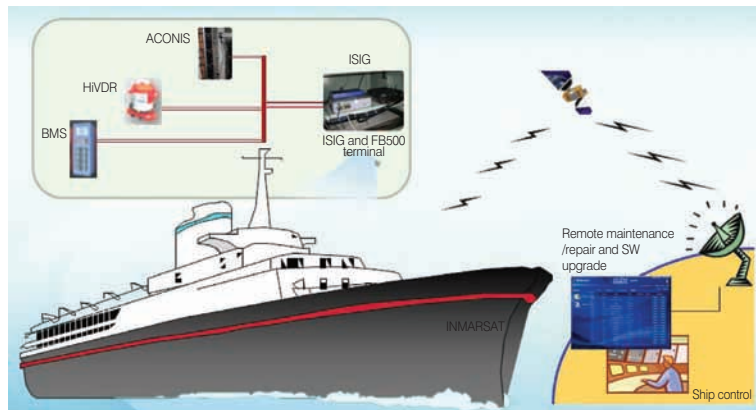


Fig.2 Schematic diagram of SAN-based smart ship technology

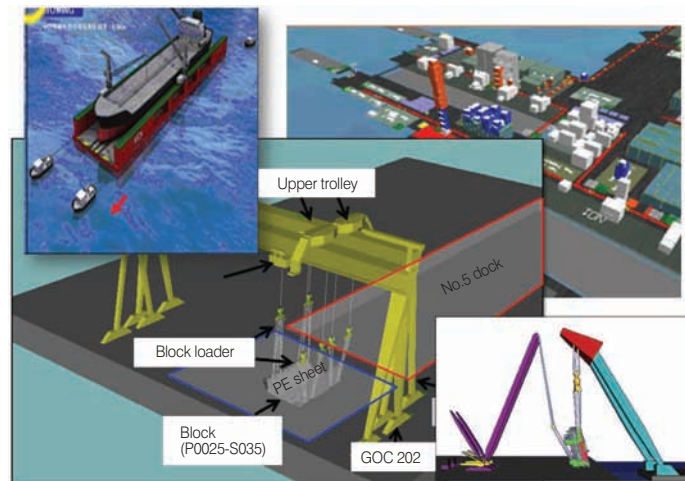


Fig.3 Example of screen for shipbuilding simulation technology development

The ship-to-ship wireless maritime communication technology is required to ensure safe operation of ships in the coastal waters (within 100km) prone to accidents and enables high-speed transmission of data to a site far away via ships in the vicinity.

MKE plans to play supportive role in helping the Korean shipbuilding industry create new value-added in the field of communication and navigation services, as well as the shipbuilding technology, and maintain the top spot in the global shipbuilding industry.

IT-based total solution for ships

The IT-based total solution for ships, developed jointly by ETRI and HHI, embodies the most typical convergence between IT and shipbuilding technology, and generally consists of 'Digital Shipbuilding Yard Technology' for manufacturing and 'Smart Ship Technology' for ship operation. Digital Shipbuilding Yard Technology is the cutting-edge shipbuilding infrastructure technology that connects the yard, the main manufacturing space, and ship under construction through Wi-Bro (Wireless Broadband), a wireless network for efficient distribution and communication among workers.

'Real-time Distribution Monitoring and Control Technology, the component technology, allows the operators to track real-time location and status of ship block structures, materials, equipments, transporters, etc, thereby enabling efficient deployment, utilization, and management. This technology tackles the problems hindering efficient distribution, such as the error in the position of block structures, ill-prepared operation of transporter and so forth in existing yards.

Another component technology for building digital shipbuilding yard is the Group Communication System for shipbuilding industry. This technology, if applied, facilitates multifarious communication among workers at the site while on the move using the compound terminal that integrates various capabilities of existing devices such as radio, TRS (Trunked Radio Service), and mobile



World's first smart ship built by HHI

phone.

The compound terminal allows the workers, for example, to communicate without radio interference or cut-off of voice signal while working, refer to ship design drawings in real time, and recognize location of block structures through RFID/TAG reader.

Previously, workers at yard had to carry radio for real-time group communication, TRS for individual/ordinary group communication, and mobile phones for personal communication at the same time, which resulted in inconvenience by disrupting the movement. The Group Communication System which was developed this time completely resolved problems with radio communication and TRS such as the shortage in industrial frequency and delay in TRS connection.

ETRI and HHI expects that the Digital Shipbuilding Yard Technology will lead to the efficient use of yard space and resultantly bring benefits such as the improvement of working environment at the site, enhancement of productivity in collaboration, and reduction of communication costs.

Smart Ship Technology means integrated wired/wireless ship network, the SAN, which provides capabilities to monitor and control all functions onboard ship in real time and will help build up competitiveness in ship operation. Smart Ship Technology allows both managers on board ship at sea and managers at remote site to monitor and control the operation status of ship engine, navigation system, various sensors and control units in real time via the integrated single screen. That will lead to the economic operation of ship and efficient management of ship resources, and enable remote maintenance and repair of ships.

As many as around 460 apparatus were assembled in 8 different groups in conventional ships and workers had no choice but to monitor the operation status one by one via the monitors displaying the operation-related information for individual groups. The cables on board were 80km long.



Group communication system for shipbuilding industry

Monitoring of operation status of navigating ships from a remote site

Navigation bridge on board ship, incorporating the smart ship technology

Navigation bridge alert system

Fig.4 IT-based total solution for ships

Besides, shipping companies had to directly dispatch technicians by helicopter, etc, for just ascertaining and fixing the problem if any failure or malfunction of navigation system is reported. Therefore, each remote maintenance and repair can save USD 3,000.

Ham Ho-sang, Director of Convergence Technology Research Division of ETRI, said, "This is an example of success in convergence technology accomplished through the formation of sustained interpersonal relationship and constant feedback between R&D personnel and workers at the site throughout entire processes encompassing the collection and analysis of requirements of shipyards, research and development, and test. Combining the shipbuilding industry, a traditional industry, and IT, a cutting-edge industry, it will pave the way for widening the gap with competitors such as China, Europe, Japan and other countries amid increasingly fiercer competition." 

DSME and Napa join hands to develop ship operation software

Daewoo Shipbuilding & Marine Engineering (DSME) entered into an agreement with Napa Group, a Finland-based company which specializes in developing software for the design/operation of ships, to jointly develop 'Napa-DSME Power', a ship operation program, thus embarking on full-fledged sales.

Napa-DSME Power is the Energy Efficient Operation Program (EEOP) that presents optimal route/speed profile and engine configuration through simulation based on the analyzed environmental factors which affect ship's navigation such as weather, flow of tide, etc.

Thus, Napa-DSME Power can dramatically improve safety and economic efficiency while reducing fuel consumption and emissions of pollutants. Both companies have been inundated with inquiries from major international ship owners, such as Russia's state-owned shipping company Sovcomflot, etc, and will actively proceed with effort to promote Napa-DSME Power to ship owners.

Gwon Oh-ik, Director in charge of Basic Design Group of DSME, remarked, "Napa-DSME Power is an operation software most suitable for the concept of green ship which DSME has focused." He added, "This deal serves as stepping stone toward a full-fledged construction of high-efficiency green ships that increase fuel efficiency and minimize emissions of pollutants, which best fulfill the requirements of ship owners."

Sebastian Sjöberg, Area Sales Manager of Napa Group, said, "This cooperation will reinforce our ability to provide ship owners, our customers, with the solutions for more efficient ship operation." He explained, "Napa-DSME Power is a revolutionary management system that provides capabilities to enhance overall efficiency of fleets."

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EUGEN MÆRSK

Ship management sector, a new blue ocean to be unlocked

As the ship management sector which provides services such as seafarer management, ship repair, etc, to ship owners on contractual basis is expected to achieve annual growth exceeding 6%, shipping companies are striving to dominate the market. As a result, ship management sector has emerged as new blue ocean of marine industry.

Recently, marine companies are accelerating their drive to achieve dominance in the ship management sector which came into limelight as blue ocean in marine industry.

In the first place, STX split its ship management and equipment divisions into a company named 'STX Marine Service' on April 5.

With the STX Vice-President Lee Gweon-heui joining the new company as CEO, STX Marine Service was incorporated with the capital of KRW 10 billion. STX Marine Service consists of 3 divisions and is staffed with around 400 workers in 13 departments, focusing on crew/ship management and maintenance, marine services, parts services, shipbuilding supervision, marine consulting, ship chandlery/ship equipment sale, etc. STX Marine Service, which manages around 120 ships, set the target of KRW 1 trillion 400 billion in sales in 2020.

SK Shipping also plans to set up an independent entity to act as its ship management arm in the second half of this year and is said to be working out related details.

Ship management sector is bullish in its outlook

Ship management business means carrying out the management functions of shipping company in part or in whole for the ship owner in accordance with the management contract entered into between ship management company and ship owner. Ship management companies provide a broad range of services to the ship owners, including crew management, ship repair, procurement of ship chandlery/ship equipments, insurance management, etc.

Ship management sector has registered over 6% annual growth rate and is expected to continue to tread a growth



path, thereby emerging as a promising sector that offers big blue ocean opportunities for large shipping companies keen to carve out large market share. Besides, ship management business can have huge spillover effect on other industries and can play a pivotal role in helping the government create jobs, and thus has been highlighted as a high value-added industry.

Countries with advanced shipping industry, such as Europe, Hong Kong, Singapore, etc, have systematically developed and nurtured growth in the ship management sector with a wider variety of support at policy level. There has been an

increasing trend worldwide toward the separation of the ownership (ship owner) and management (ship management) to build up competitiveness of ship owner.

In response to that, the Ministry of Land, Transport and Maritime Affairs, Korea Shipowners' Association, Korea Ship Management Companies' Association jointly carried out policy research designed to promote advancement and globalization of ship management sector for 6 months from March to September 2010 in a bid to cultivate and upgrade domestic ship management sector which currently lags behind other nations to the next level on a par with the world's leading

Table 1. Current state of ship management companies

	Late 2006	Late 2007	Late 2008	Late 2009	Late 2010	Annual variation
Ship management overall	289	285	309	335	342	4.39%
Only the seafarer management	97	95	97	94	90	-1.73%
Total	386	380	406	429	432	2.54%

Source: Korea Ship Management Companies' Association, 2010

Table 2. Current state of foreign ship management

(Unit: ships, persons)

Type	No. of ships managed			No. of seafarers on board				
	Merchant ship	Fishing boat	Total	Merchant ship		Fishing boat		Total
				Marine engineer	Staff members	Marine engineer	Staff members	
Late 2005	1,085	166	1,251	3,094	727	156	138	4,115
Late 2006	1,131	152	1,283	3,082	699	147	122	4,050
Late 2007	1,146	105	1,251	3,091	681	124	107	4,003
Late 2008	1,185	102	1,287	3,287	679	114	96	4,176
Late 2009	1,173	93	1,266	3,252	616	135	98	4,101
Late 2010	1,116	95	1,211	3,086	476	127	99	3,788
Annual variation (%)	0.62	-10.15	0.60	0.02	-7.74	-3.40	-6.21	-1.57

Source: Korea Ship Management Companies' Association, 2010



Table 3. Foreign currency earnings from foreign ships

(Unit: USD)

Type	Total amount	Seafarer wage	Management fee	Others
Late 2007	490,905,580	215,088,962	38,353,244	237,463,374
Late 2008	577,865,950	264,072,322	50,330,552	263,463,076
Late 2009	641,775,976	281,409,247	48,898,173	311,468,556
Late 2010	633,340,500	269,341,662	47,264,354	316,734,484

Source: Korea Ship Management Companies' Association, 2010

shipping countries. The research was undertaken jointly by the Korea Institute of Maritime and Fisheries Technology, the Korea Maritime University, and the Institute of Maritime Industry.

Lee Hee-young, manager at the Ministry of Land, Transport and Maritime Affairs Seafarers Division said in the final briefing session on September 9 last year, "This research aimed to promote advancement and globalization of ship management sector as part of effort to help the nation's marine industry break into the world's top ranking. By securing firm foothold in foreign markets, Korea will become the undisputed No. 1 worldwide in the ship management sector, managing 4,850 vessels in 2020."

The results of the research show that invigorating the ship management sector will boost production by KRW 10 trillion 678.5 billion, increase value-added by KRW 4 trillion 610.3 billion, and create additional 100,769 jobs based on year 2020. To achieve that, a variety of measures have been taken into consideration, including the approval of seafarer recruitment right/subcontract to vitalize small and medium-sized ship management companies, adoption of certification system to advance ship management businesses, cultivation of professional ship managers, establishment of ship management system incorporating state-of-art IT technologies, introduction of incentive scheme to attract overseas ship owners.

Korea has excellent marine engineers and accumulated experience and expertise related to seafarer management. Experts agree that Korea, situated close to the Japanese and Chinese markets geographically, is well positioned to foster its ship management sector.

In relation to that, Professor Jeon Young-woo at the Korea Institute of Maritime and Fisheries Technology, who is in charge of this research, said, "In Japan, ship owners usually rely on the third party ship management services to manage most of their fleets. In particular, ship owners worldwide have

preference for the services delivered by excellent marine engineers of Korea, which brightens the outlook for Korea's ship management sector."

According to the Korea Ship Management Companies' Association, there are approximately 430 ship management companies nationwide as of 2010, and the number is steadily increasing. They are currently managing 1,211 foreign ships and 3,788 seafarers.

Busan has emerged as mecca of ship management industry

60% of roughly 430 domestic ship management companies are located in Busan. Besides, about 160 out of 180 companies affiliated with the Korea Ship Management Companies' Association are headquartered in Busan or practically based in Busan.


Specifically, large shipping companies relocated to Busan, including Haeyoung Maritime Services (in May 2005, Hyundai Merchant Marine) and Hanjin SM (in September 2006, Hanjin Shipping). Besides, STX Marine Service (established in April 2011, STX) and the headquarters of SK Shipping's ship management unit (scheduled to be established in the second half of 2011) are located in Busan. Eventually, Busan has become home to the headquarters of all 4 domestic major shipping companies.

Busan owes its status as hub of ship management industry to the constant efforts that have been made to attract investment related to ship and marine sector. Those efforts include the establishment of ship finance institutes and a series of meetings - organized by Lee Gi-woo (Vice Mayor for Economic Affairs, Busan Metropolitan City) - of shipping companies' CEOs (regular lines, irregular lines, Korea Ship Brokers Association, Chairman of Korea P&I Club, etc) which have been held 7 times since the end of 2010. By establishing the headquarters in Busan, ship management companies

are expected to create jobs as they need to recruit staffs of headquarters and seafarers, and induce the growth of population in Busan because families of seafarers will move into Busan.

In addition, 7 shipyards ranking in the top 10 worldwide, including Hanjin Heavy Industries & Construction (HHIC), are located in the vicinity of Busan and professional shipping/ship manpower training institutes such as Korea Maritime University and Pukyong National University are situated in Busan, as well as about 360 marine equipment manufacturers.

Shortly, Busan will be catapulted into a mecca for ship management industry as the International Ship Chandler Distribution Center (Nanghang-dong, Yeongdo) is slated for completion next year and the Korea Register of Shipping (Myeongji-dong, Gangseo), the world's 7th largest ship inspection agency of government, is scheduled for completion in May next year.

An official from Busan Metropolitan City said, "We will keep striving to attract ship management companies to Busan by adding momentum to our marketing efforts targeting shipping companies presently based in Seoul." 

STX bolsters its ship management business

STX Group formally launched STX Marine Service, a corporation dedicated to the ship management, on April 5 and announced that it would strengthen its ship management business recently in the limelight as the blue ocean in marine industry.

STX Group's launch of STX Marine Service, a new corporation specializing in the ship management, signals that STX Group has further spurred momentum toward unlocking and achieving dominance in the blue ocean in ship management sector of marine industry.

The launching ceremony of STX Marine Service was held at the headquarters in Jungang-dong, Jung-gu district, Busan on April 5, attended by related officials and guests, including



The launching ceremony of STX Marine Service, held at its headquarters in Jungang-dong, Jung-gu district, Busan on April 5

Lee Jong-chul, Vice-Chairman of STX Group, Lee Gwon-hee, Vice-President of STX Marine Service.

STX Marine Service was spun off from SMC division of STX, and has provided comprehensive services in the ship management sector and expanded its supply of ship chandlery and ship equipment sales. STX Marine Service plans to focus on high value-added ship management services, marine consulting services related to newbuild planning/supervision, and expansion of its capability for integrated services in the shipbuilding and engine sector.

On the same day, STX Marine Service announced 'STX Marine Service Vision 2020' aiming to achieve KRW 1 trillion 400 billion in sales and KRW 120 billion in operating profit in 2020.

Meanwhile, Lee Jong-chul, Vice-Chairman of STX Group, remarked in the launching ceremony, "STX Marine Service has grown into the nation's top ship management company by harnessing its technology and expertise accumulated over the last 45 years in the field of shipping and shipbuilding. I hope that STX Marine Service will become a leader that creates new paradigm across the marine industry."



CIMPS 2011 in retrospect

On April 12-14, CIMPS 2011 is held grandly in Nanjing International Expo Center. CIMPS 2011 rents an exhibition area of 24,000sqm, attracts 503 exhibitors from 20 countries and regions, among which HME organized four members participating the exhibition.

After more than one year intensive and dedicate preparation, CIMPS 2011 grandly opening in Nanjing International Expo Center during April 12-14.

CIMPS 2011 opened with great eclat

Sponsored by Jiangsu Provincial People's Government and China Chamber of International Commerce, CIMPS 2011 invites the Vice Chairman of CPPCC, Mr. Chen Baotian, to make a speech at the Opening Ceremony, and launch the laser ball which symbolizes the official opening of CIMPS 2011 together with the Mayor of Nanjing Municipal People's Government, Ji Jianye. Many overseas and domestic honorable guests attend the opening ceremony, include: Zhaojin, Head of Department of Commerce of Jiangsu Province, Qinyan, Deputy Head of Jiangsu Economy and Information Technology Commission, Liqi, Deputy Mayor of Nanjing Municipal People's Government, Zhang chaomei, Head of Trade Development Bureau of Ministry on Commerce, Zhang xiangmu from Ministry of Industry and Information Technology of PRC, Zhi luxun from Ministry of Commerce PRC, Wang peisheng from the Navy Equipment Department of the Chinese People's Liberation Army, Mark Jackson, Chairman of the Baltic Exchange, Djoni Sutji, Head of Overseas Cooperation of Indonesian National Shipowner's Association Chen Baotian, the Vice Chairman of CPPCC, said in his speech that the shipbuilding industry of Jiangsu Province has achieved rapid development after entering the new century.

Seizing the transferring opportunity of the world shipbuilding industry and actively participate in the international competition, the output of Jiangsu shipbuilding industry in 2010 accounts 35% of Chinese shipbuilding industry and 15% of the global production.

2011 China International Marine Port & Shipbuilding Fair (CIMPS) brings together the world's leading marine industry manufacturers and industry experts to exchange and communicate with each other which will further enhance the inter-



nationalization, specialization, and market level of Jiangsu shipbuilding industry. He also expressed his best wishes to CIMPS hoping to better promote the transformation and upgrading of Jiangsu's shipbuilding industry by this platform. The vice Mayor of Nanjing Municipal People's Government, Mr Li Qi, also expressed his warmest congratulations to CIMPS 2011. He said in his speech that Nanjing is the most important shipbuilding base of China and take the advantage of its excellent resource of the Yangtze River and its relatively complete industrial chain, and under the support of the government policy, it has achieved a good and rapid development.

2011 China International Marine Port & Shipbuilding Fair is the largest and most influential maritime show in Jiangsu Province at present, which is the important platform for exchange and communication between Jiangsu and the world shipbuilding industry. CIMPS 2011 has now become a well-known shipbuilding industry event for its high degree of internationalization, large scale, and wide influence.

CIMPS 2011 attracts exhibitors from 20 countries and regions with 5 pavilion from Singapore, UK, Korea, Finland and Denmark, which fully shows its principle of "international, professional and trade only", and trust from both domestic and



overseas shipbuilding industry. The successful opening of CIMPS 2011 will bring more business opportunities between domestic and overseas shipbuilding industry and also play a positive role in promoting the development of Nanjing exhibition industry.

“Match-making”

The 2011 Cooperation & Communication Conference among Equipment Suppliers, Shipbuilders and Overseas Buyers (hereinafter referred to as Match-making) was held ceremoniously on April 19.

Match-making 2011 attracted more than 30 domestic and overseas shipyards, including Wujiazui Shipbuilding, Ming De Heavy Industry, Jinhai Heavy Industry, Jinling Shipyard, New Yangzijiang Shipbuilding, Zhenjiang Shipyard, Runyang Shipbuilding, Dayang Shipbuilding, Huanghai Shipbuilding,

Rushan Shipbuilding, STX Shipbuilding; more than 10 ship design firms and nearly 100 equipment suppliers.

Indonesia delegation of ship owners and more than 60 ship brokers made close exchange with shipyards on-site. And we are honored to have secretary-general of China Chamber of Commerce for Import & Export of Machinery & Electronic Products Ship Branch, Zhang Shouchun chair the conference and marketing director of the Baltic Exchange, Robin King address the conference. They both give high remarks on Match-making.

As the main brand of co-locate events, and subservient to the objective of establishing a trade bridge between shipyards and equipments suppliers and enhancing the exhibition effect, Match-making 2011 fit in not only with the needs of shipyards to purchase advanced equipments and to cooperate with ship owners and ship brokers but also the demands of equipment suppliers to meet directly with merchandising managers of shipyards, forming a high efficient platform for business.

On the background of gradual rise in global shipbuilding market, shipbrokers have brought shipyards and equipment suppliers the up-to-date information in shipbuilding market, which offered not only an effective platform for match-making, communication and finally the concluding of the transaction, but also a opportunity for domestic and overseas supplier to display their latest products. Over 80% of exhibitors got orders or reached a tentative agreement on site and speak highly of Match-making. ⚓





Establishment of Global R&D Center

Hyundai Heavy Industries (HHI) established Global Research & Development (R&D) Center in China last month and is poised to develop technologies that will lead the global heavy industry and recruit workforce.

Recently, Hyundai Heavy Industries (HHI) opened its global R&D Center in Shanghai, China to target the world's largest market and attract talented engineers from around the world. This Global R&D Center is an independent corporation established with 100% investment by a China-based holding company of HHI.

The new R&D center will focus on developing construction equipment, electro electric system equipment, and marine engines in the rapidly-growing Chinese market. Long-term goals are developing global strategic products such as smart-grid, offshore wind turbines, and robot systems for global markets.

Following the efforts of the Chinese government to attract foreign R&D investment, and a well-established global technology network where many multinational corporations are headquartered, HHI selected Shanghai as its global R&D base. Starting with 30 engineers this year, the company will employ 120 engineers by 2012, and 200 by 2013.


HHI selected Shanghai, China, as the site for its Global R&D Center because the Chinese government is providing a variety of supports, including tax incentives for foreign R&D centers, with an aim to secure

state-of-art technologies, Particularly, Shanghai is the key base for R&D projects of many global companies such as Microsoft, GM, etc, making it considerably easy to recruit core talents and create global technological network.

In addition, this Global R&D Center will collaborate with various research centers at the renowned universities of China, such as Peking University, Tsinghua University and Shanghai Jiao Tong University, to develop a wide range of core technologies and parts with vigor, which is another positive aspect.

Lee Chung-dong, Chief of the Technology Development Division of HHI, said, "The only way to survive in the 21st century, an era of cut-throat competition and creativity management, is to secure advanced technologies and push ahead with commercialization earlier than others. Opening this Global R&D Center, we will produce world's best products and do our utmost to make it transform into the world's top-rated R&D center dedicated to the global heavy industry."

Industry-academic networks with research centers at Peking University, Tsinghua University, and Shanghai Jiaotong University will also play a role in developing core equipment and technology. With 600 engineers at its four domestic research centers and a technology center in Hungary, HHI has developed 31 World Class Products, the most of any Korean company.

The World Class Products is a policy where the Ministry of Knowledge Economy of Korea selects products that have over 5 percent global market share, rank within the Top 5 in their market, and with an international market worth over USD 50 million annually. 



Opening ceremony of the Global R&D Center in China, held on April 8

FuelSaver

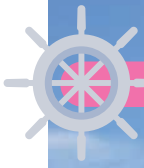
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Korean shipbuilders have reclaimed world's top shipbuilding spot in new orders

Korea surpassed China to recapture its status as the world's largest shipbuilding nation in terms of new orders (both in quantity and value) in the 1st quarter of 2011. Wining a wave of orders for high value-added ships, Korean shipbuilders outperformed China in new order intake by a wide margin despite tiny difference in the number of ship orders received.

Korean shipbuilders have regained its top spot in terms of quantity and value of new orders received in the 1st quarter of 2011, according to the Ministry of Knowledge Economy (MKE) and the Korea Shipbuilders' Association (KOSHIPA). Korea surpassed Chinese rivals by a wide margin both in quantity (CGT) and value of new orders on the back of the strong global demand for high value-added ships of Korea despite small difference in the quantity of orders placed with Korean shipyards and their Chinese counterparts, respectively.

The data of London-based market researcher Clarkson show that in the 1st quarter of 2011 the Korea shipbuilding orderbook stood at 90 ships worth USD 12.8 billion with 3.3 million CGT while the Chinese shipbuilding orderbook stood at 88

ships worth USD 3.5 billion with 1.95 million CGT.

For some time, Korean shipyards are expected to continue to win new orders for technologically competitive and high value-added ships amid the prospect for increasing traffic volume, sustained high oil prices, natural resource exploitation on an expanded scale, etc.

Korean shipbuilding industry rides high in the 1st quarter, 2011

The combined orderbook of Korea's 7 large shipbuilders stood at USD 10.7 billion (21% of combined annual order target) in the 1st quarter of 2011, including 28 large container ships (worth USD 3.9 billion) with the capacity of more than

8,000TEU and 14 drillships (USD 7.5 billion). At the beginning of this year, a combined new order target of USD 50.9 billion was set for 2011 by Korea's 7 major shipbuilders : Hyundai Heavy Industries (HHI), Daewoo Shipbuilding & Marine Engineering (DSME), Samsung Heavy Industries (SHI), Hyundai Samho Heavy Industries (HSHI), Hyundai Mipo Dockyard (HMD), Hanjin Heavy Industries & Construction (HHIC), STX Offshore & Shipbuilding (STXOS). In addition, 3 Korean shipyards - HHI, DSME, HSHI, Sungdong Shipbuilding & Marine Engineering (SSME) - clinched all of new global orders for 34 large container ships with the capacity of more than 8,000TEU.

The high value-added ship orderbook has risen while Korea's year-on-year growth in the value of orders has not varied significantly this year. As a result, small and medium-sized shipyards has seen the value on their orderbook dwindling, as well as their shares of aggregate domestic orders. The data from Clarkson and the KOSHIPA show that the combined value of new orders awarded to domestic shipyards stood at USD 12.7 billion in the 1st quarter of 2010 and USD 12.8 billion in the 1st quarter of 2011, and among them, newbuilding orders won by Korea's 7 large shipyards increased year-on-year from USD 2.4 billion to USD 10.9 billion this year.

The orderbook for containerships, offshore plants, etc, has shown the most impressive year-on-year growth, unlike the previous year when the year-on-year growth in new orders for bulk carriers and tankers remained the strongest. The orderbook for bulk carriers and tankers has declined because of the a surplus of newly commissioned ships compared to the traffic volume, decrease in freight charge, and other factors.

Trend of order placements worldwide

The global new orders decreased 6.6% year-on-year to reach 6.29 million CGT in the 1st quarter of 2011. Between 2010



and 2011, the new orders worldwide on the quarterly basis stood at 6.73 million CGT (1st quarter, 2010), 10.95 million CGT (2nd quarter, 2010), 10.22 million CGT (3rd quarter, 2010), 8.63 million CGT (4th quarter, 2010), and 6.29 million CGT (1st quarter, 2011).

Korea retained its No.1 ranking in the global shipbuilding industry in terms of new orders by raking in significant portion of global orders for the high value-added ships such as large container ships, drillships, LNG carriers, etc, and ranked the second worldwide in terms of volume of ships built and order backlog. Worldwide, Korea received the largest number of new orders from 2003 to 2008, built the largest number of ships from 2003 to 2009, and had the largest order backlog from 2000 to 2008.

Prices of most newbuild vessels slipped a little bit compared to the end of 2010, except for LNG carriers.

Trend of Korean shipbuilding industry by major indexes

New orders received by Korean shipbuilders stood at 3.3 million CGT, a 28.8% increase year-on-year, in the 1st quarter of

Table 1. Trend of change in the global shipbuilding market

	2007			2009			2010			Jan. to Mar. 2011		
New order placement (Unit: 10,000 CGT)	9,360			1,476			3,653			629		
Order intake of major countries (Share, %)	Korea	China	Japan	Korea	China	Japan	Korea	China	Japan	Korea	China	Japan
	3,264 (34.9)	3,262 (34.8)	1,386 (14.8)	461 (31.2)	675 (45.7)	152 (10.4)	1,238 (33.9)	1,737 (47.6)	231 (6.3)	330 (52.5)	195 (31.0)	23 (3.6)

Source: Clarkson

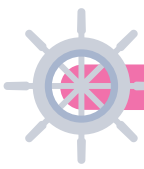


Table 2. Trend index of Korean shipbuilding industry

Year	New orders			Volume of ships built			Order backlog		
	No. of ships	Unit (10,000CGT)	Variation (%)	No. of ships	Unit (10,000CGT)	Variation (%)	No. of ships	Unit (10,000CGT)	Variation (%)
2008	671	1,844	△43.5	509	1,548	28.6	2,376	6,902	6.4
2009	169	461	△75.0	515	1,538	△0.6	1,883	5,460	△20.9
2010	478	1,238	168.5	508	1,595	3.7	1,590	4,521	△17.2
2011 1/4	90	330	28.8	111	327	△20.2	1,521	4,391	△2.9

Source: Clarkson

Table 3. Trend of ship prices by type

(Unit: USD 1 million, point)

Type	2005	2006	2007	2008		2009		2010		2011
				Aug.	Dec.	Mar.	Dec.	Mar.	Dec.	Feb.
VLCC (320,000DWT)	120	120	146	160	150	141	101	97	105	103.5
Container ship (6,350TEU)	89	101	107	108	100	95	67	66	79.5	76
Bulk carrier (180k capesize)	59	68	97	99	88	81	56	56	57	55
LNG carrier (160k)	205	220	220	250	245	245	212	212	202	202
Clarkson ship price index	162	168	184	190	177	157	138	136	142	141.7

Source: Clarkson

2011, driven by the soaring demand for high value-added ships. Their orderbook value increased 0.7% year-on-year to reach USD 12.8 billion, which is 3.6 times larger compared to Chinese rivals.

Chinese shipbuilders still focus on low value-added ships such as bulk carriers and small container ships. However, it is noteworthy that they clinched the order for 4 LNG carriers. In January, 2011, MOL of Japan awarded the contract to Hudong-Zhonghua Shipyard for the construction of 4 LNG carriers worth USD 220 million per unit.

Korean shipbuilders obtained orders for all 34 large container ships with the capacity of more than 8,000TEU. In addition, they secured entire drillship orders (12 vessels) that Brazil awarded to overseas shipyards, except the ones (7 vessels) placed with domestic shipyards. According to Clarkson, Korea's 3 large shipyards (HHI, SHI, DSME) obtained 12 drillship orders (worth USD 6.7 billion) out of 19 drillship orders placed worldwide in 2011. The remaining 7 drillship orders were received by domestic shipyards of Brazil.

Korean shipbuilders' total volume of ships built decreased 20.2% year-on-year to reach 3.27 million CGT in the 1st quar-

ter of 2011 and is expected to slide a little bit after it reached peak in 2010.

The export registered a 67.9% year-on-year increase to reach approximately USD 16.5 billion (preliminary) in the 1st quarter of 2011, propelled by the strong growth in the export of large



Table 4. Quantity of new orders received by Korea and China

Year	Korea			China		
	No. of ships	Unit (10,000CGT)	Order value (Unit: USD 100 million)	No. of ships	Unit (10,000CGT)	Order value (Unit: USD 100 million)
2007	1,197	3,264	972	2,077	3,262	823
2008	671	1,844	707	1,129	1,875	533
2009	169	461	148	477	675	131
2010	478	1,238	365	1,022	1,737	347
2011 1/4	90	330	128	88	195	35

Source: Clarkson

Table 5. New orders awarded to Korea and China based on ship type in the 1st quarter, 2011

Type	Worldwide		China		Korea	
	No. of ships	Unit (10,000CGT)	No. of ships	Unit (10,000CGT)	No. of ships	Unit (10,000CGT)
Bulk carrier	80	152	56	109	20	36
Tanker	16	26	9	10	6	13
Container ship	55	244	12	36	42	208
LNG carrier	6	51	4	34	1	8
Total	227	629	88	195	90	330

Source: Clarkson

ships. The growth in export has been driven by strong sales of FPSO (USD 2.1 billion), drillship (USD 2.6 billion), RIG (USD 600 million), large container ships (USD 1.4 billion),

VLCC (USD 600 million), etc.

Korean shipbuilders' order backlog stood at a total of 43.91 million CGT, down by 17% from late 2010, which is equivalent to around 2 years of work.

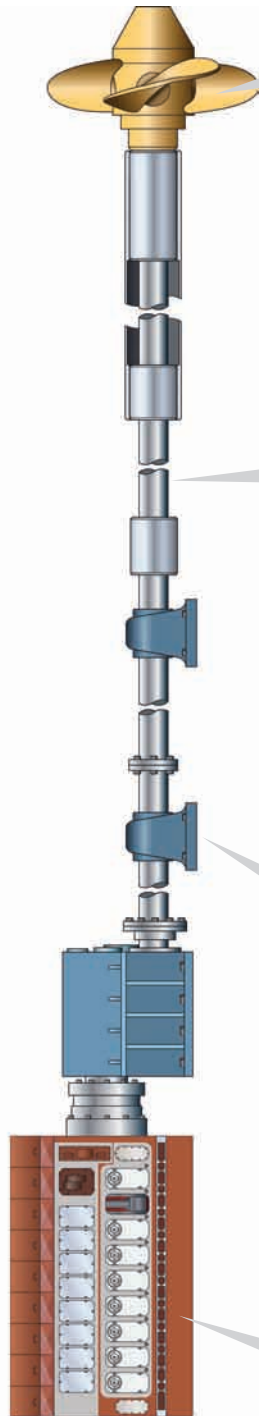


Future outlook

The Ministry of Knowledge Economy (MKE) adjusted the export target of ships and marine equipments for 2011 upward by 2.3% from USD 50.5 billion to USD 51.7 billion as the delivery of large ships goes smoothly as planned. Delay in the delivery of small and medium-sized ships may result from the surplus of ship space in bulk carriers and tankers and the declining traffic volume. However, no particular disruption is expected to be posed to the delivery of high value-added ships.

The export of high value-added ships registered USD 15.3 billion in 2008, USD 13.4 billion in 2009, USD 18 billion in 2010, and is expected to record USD 27.2 billion in 2011. 

Marine industry moves forward thanks to laser precision alignment



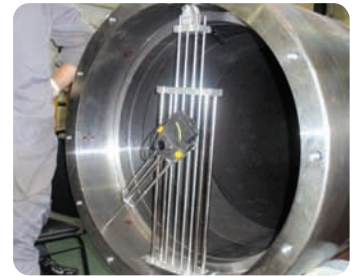
PROPELLER

LEVALIGN Ultra



STERN TUBE

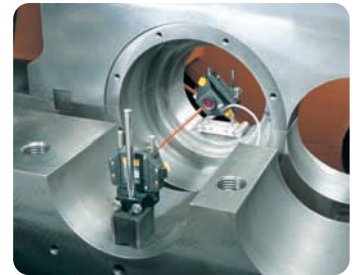
CENTALIGN Ultra
(unmounted shaft)



LONG SHAFT

ROTALIGN Ultra
(mounted shaft)

CENTRALIGN Ultra
(unmounted shaft)



MAIN ENGINE


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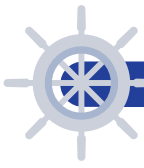


Monthly KORSHIP, Korea's only shipbuilding magazine in English, provides up-close look at world's shipbuilding industry building a bright future on the horizon at sea.

Monthly Korship focuses intensively on major issues of shipbuilding industry and keeps you up-to-date with the latest news and trends of domestic and overseas shipyards with accuracy and swiftness.

Technology - It provides detailed overview of the expertise, know-how and products of companies, touting the technological competitiveness of shipbuilding equipment and material companies.

Application - It provides explanations on the function, strengths, weakness of products based on their application to ships.



Ocean rope for offshore facilities

POSCO developed 'POS-NEPTUNE' in close cooperation with client to meet the soaring demand for ultra strong ocean ropes for offshore oil exploitation or production facilities of which construction has reached an unprecedented level recently.

POSCO

A few years ago, it was reported in the news that oil reserves worldwide might be depleted in approximately 50 years. Oil, a limited resource, will be depleted someday, but it is even more serious that oil reserves will be depleted much faster than expected. Renewable energies which come from natural resources such as sunlight, wind, tides, and geothermal heat, etc, have yet to completely replace the use of fossil energies. Some suggest that the current estimate of global oil reserves is only 1/3 of total oil reserves unearthed so far, considering that the estimate predicting the depletion of oil within the next half century is based on the economic costs of current exploratory drilling operations and oil exploration/drilling technologies. It implies that oil can be recovered from the untapped 2/3 of total oil reserves if the oil exploitation technology develops further and drilling expands the boundary.

which measures several hundreds of meters in length. Furthermore, the ropes must be descended to the depth of up to 3,000m to fix offshore facility in deepwater which often causes the constraint of rope length although the ropes need to be descended only 200m in relatively shallow continental shelf.

Ropes are required to become thinner and longer even if the weight is identical. To meet this requirement, materials need to be developed which can increase the strength of rope and reduce the diameter of rope.

High strength ropes, if developed, can reduce surface area and unitary weight, saving the shipping cost. In addition, bobbin wound with ropes and associated ancillary facilities can be made smaller.

Oil exploration focus shifting to the sea

Recently, energy companies are competing fiercely to develop new offshore oil deposits in deepwater, the Arctic Ocean, etc. They are also exploring for mineral resources that lie at the bottom of sea.

Offshore facilities such as drilling rigs, exploration vessels, etc, require greater sturdiness and durability as the exploration focus has moved off the ground into the continental shelf and even deepwater. In other words, it has become urgent to develop ocean ropes that increase stability in extreme or harsh environments of exploration.

High strength materials are essential

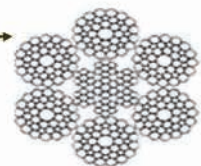
The ropes used to anchor or fix offshore exploration facilities, etc, must be longer if they are descending further into deepwater. However, difficulties arise from the lack of ropes wound upon bobbins when fixing the offshore facility. Even if the bobbin capacity is increased, it is impossible to supply the rope



Deep seawater resource exploitation facilities



Neptune rope product



Cross section of Neptune rope



POS-NEPTUNE, the world's strongest

To meet the aforesaid requirements in the market, POSCO successfully developed and commercialized high strength structural steel for deepwater oil exploration in cooperation with client from 2009 to 2010. Previously, clients used the ocean ropes supplied by Japanese steelworks. However, POSCO developed high strength ocean ropes comparable to the imported ones in 2009 after several trials and errors and finally produced the world's strongest ocean rope in 2010.

As unique standard product name of POSCO, the new ocean rope was named 'POS-NEPTUNE' (named after the Roman god of the sea).

Ocean rope used for offshore facilities is made of high value-added steel that require perfect combination of manufacturing and processing technologies for production.

For ensuring satisfactory processability in performing the wire drawing and high strength, heat treatment with Lead Patenting (LP) and subsequent zinc plating are applied to the wire rod measuring 6 to 13mm in diameter to finally obtain the wire measuring 1 to 5mm in diameter. Then, hundreds of these wires are helically laid together and positioned within the strand (Stranding) and around the core (Closing) to produce a finished product measuring approximately 100mm in diameter.

An official from POSCO said, "With an aim of developing the wire rod for high strength ocean rope, POSCO has exerted constant effort to develop the steel material through systematic collaboration with the related personnel in charge of wire rod, and successfully developed the steel material that can completely replace imported ones."

In addition, POSCO developed the cooling process, etc, to ensure uniform strength and component design to increase the strength of final product, thereby establishing a mass production system.

Neptune rope does not fracture easily during the twisting process and falls into the category of steel which is strictly managed in relation to the internal inclusions of material, center segregation, external surface scratching, structure of metal, etc, to prevent the material from being destroyed if submerged in seawater for a long time.

'Win-win' with client

Neptune rope was developed through joint technological development in cooperation between POSCO and client and represents a 'win-win' amid the soaring demand from related industries.


Neptune rope was not the type of steel in production when its development was requested, but POSCO swiftly moved ahead with the development of the wire immediately upon hearing that domestic clients kept encountering difficulties because they had no alternative but to import the wire at high cost from Japan, said the official from POSCO.


At the outset, POSCO did not have basic information related to the ropes used for offshore facilities, but had to make the product with the same strength and grade as existing products. While learning more about the new product to achieve high strength, POSCO eventually derived the strength that can meet the required physical properties of product, unique component system optimized through the improvement of wire drawing processability, and microstructure.

This process was reviewed in relation to the required physical properties and the production process of client. For that, POSCO set the direction of development jointly with client from the inchoate stage of development and the results of test were quickly conveyed and discussed to increase efficiency of subsequent experiments and shorten the duration of such experiments.

By working closely with client in that way, POSCO successfully developed and began mass production in 2 years after it started the development.

POSCO is slated to expand supply as demand grows in maritime industry

This year, POSCO plans to develop the world's first ultra strong steel, even stronger than existing products, in line with the recently growing demand for steel from offshore energy industry. In particular, POSCO is slated to expand supply every year, given the skyrocketing demand for Neptune rope from the ever-growing maritime industry worldwide. 



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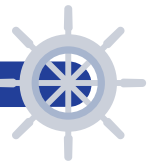
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Continuous viscosity measurement provides real-time validation of fuel quality.

'Accurately' measuring bunker quantity

The shift away from the traditional volume measurement of bunkers to mass flow measurement could be the key to substantial cost savings for ship owners. Bunkerworld asked Joel Weinstein, Research and Applications Engineer for Micro Motion, a division of Emerson Process Management and Ashley Hayes, Marine Business Development Manager for Micro Motion, to explain more.

Emerson Process Management Co.

Marine fuel costs represent a major portion, in some cases 60-70%, of a ship's operating cost. With increasing oil prices and a focus on energy conservation, careful fuel management and increased engine efficiency have become vital for financial and environmental reasons.

Highly accurate and robust fuel flow measurement will provide the foundation for increased fuel efficiency and accurate accounting of fuel purchases.

Coriolis measurement

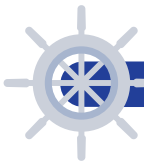
Coriolis meters provide continuous, online measurement of mass flow rate, volume flow rate, density, temperature, and

batch totals - all from a single device. Coriolis meters have no moving parts or obstructions in contact with the fluid being measured and require no maintenance, flow conditioning or straight pipe runs.

Unlike volume measurement, mass measurement is independent of operating pressure and temperature, which negates the need for error-prone density conversions.

For highly viscous fluids where entrained gas and air is unable to escape, direct mass flow measurement can perform better than competing technologies such as volumetric meters and tank gauges.

Consider the measurement of bunker fuel with 5% entrained



Micro Motion



gas. A volumetric meter or a tank gauge will give liquid oil batch errors of +5% compared to true batch totals, even if the meters are functioning perfectly.

The reason is that each meter, because it measures the volume of what is going through it, measures both the bunker fuel and the low-density entrained gas and registers this as a large volume of oil. The mass of the entrained gas, however, is so small that it does not contribute significantly to the total mass of the mixture.

A Coriolis meter, which measures mass flow directly, will give a more accurate measurement of the quantity of fuel oil present.

Control and visibility

Marine fuel measurement during bunkering provides better control over and visibility into the amount of fuel received by vessels, and is perhaps the most essential component of fleet-wide fuel management.

Traditional fuel oil bunkering methods are based on volumetric tank measurements and a reference density (typically obtained by laboratory sample). Look-up tables, the reference density, and the 'dip' are used to calculate the total mass of the bunker fuel delivered.

These processes deliver a range of measurement accuracies that depend on many factors including temperature, pressure, presence of entrained gas, dip tape, tank volume uncertainty, accuracy of conversion tables, human error, and how well the density sample represents the average batch density (heavy fuel oil tends to stratify in tanks).

Additional inaccuracies can occur due to dead volumes in tanks or aeration of oil, both of which increase the apparent

volume of oil delivered.

Although some heavy fuel oil (HFO) suppliers have advanced laser level gauges, multiple sample points, and highly accurate lookup tables, a direct Coriolis mass measurement completely avoids the problems inherent in volumetric tank measurement.

Coriolis meters deliver the mass total without all the instrumentation and measurement conversions. In addition, because the mass of air is negligible, ship owners do not pay for air that may have entered the fuel stream.

Coriolis mass flow technology is well-suited to HFO applications, particularly bunkering, where customer billing is based on mass.

Marine fuel blending

Blending for the marine industry typically involves the combination of HFO or Bunker C, and an intermediate fuel oil (IFO), which is available in a range of viscosities and sulphur contents.

Precise blending of these fuels at the supply hub is very important due to increases in fuel prices, engine wear from different fuel grade burn temperatures, and the limitations associated with shipboard storage.

The pre-bunkering blending of fuels guarantees that a vessel receives fuel with optimal properties for the intended use of specific onboard engines, leading to reductions in NO_x and SO_x emissions. This procedure is growing in popularity due to regulations that discourage the mixing of fuels.

Onboard mixing has been at the center of a growing number of bunker dispute claims, machinery failures, and failures to meet environmental standards.

Coriolis measurement has been used for many years in a range of blending applications, including hydrocarbons. Fuel quality is controlled through automatic valves installed in each incoming fuel stream. Accurate mass flow measurement of each stream with Coriolis meters allows for exact set-points to be controlled.

Quality control

The measurement and control of HFO viscosity require flow meters to be able to handle the thick, viscous bunker grades used, along with any impurities that have not been filtered out, and varying amounts of entrained gas in the oil.

The blending of marine HFO in terminals and onboard fueling barges often leaves the buyer and/or supplier without a clear picture of the fuel quality. Continuous viscosity measurement aboard each barge or vessel provides dynamic, real-time validation of fuel quality, thereby reducing the number of bunker disputes.

Critical for applications involving fluids with varying densities such as light and heavy oils, viscosity meters measure not only kinematic viscosity at injection temperature, but also provide a range of other quality factors including density at injection temperature and at the centrifuge temperature.

The viscosities measured can be used to calculate both versions of the ignition index and fuel grade viscosity requested by engine manufacturers.

Many benefits

Coriolis direct mass flow and viscosity measurement technology offer many benefits to marine fuel management operations. Inherent advantages, such as multi-variable measurement and no moving parts are shared among all Coriolis meters.

However, the challenges for fuel bunker measurement are clear and the ability to maintain ongoing measurement performance and reliability in the presence of entrained gas or two-phase flow is not characteristic of all Coriolis meters.

Equally, robust viscosity measurement ensures the quality of marine fuel to lessen waste and optimise the vessel's performance. It is critical, therefore, to ensure any measurement technology is able to deliver accurate measurement in the presence of highly variable process conditions. ⚓

Nd.YAG LASER EL-DPG50

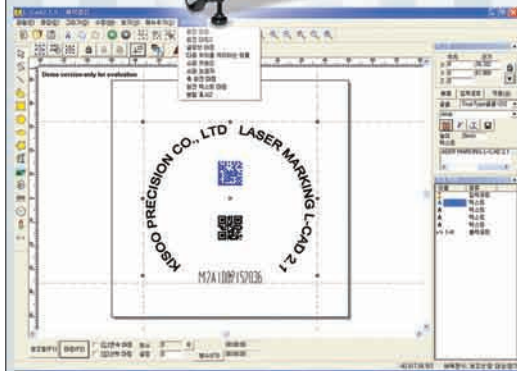
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FLIR thermal imaging cameras ideal for oil detection

Oil recovery is an important task that needs to be performed quickly and effectively in order to be successful. FLIR thermal imaging cameras are an ideal tool to help the oil recovery teams to do their job effectively.

FLIR Systems Korea Co., Ltd.



To test the effectiveness of the maritime thermal imaging cameras of FLIR Systems for oil spill detection FLIR Systems set up a test in the OHMSETT tank in Leonardo, New Jersey. The OHMSETT tank is one of the largest of its kind in the world, measuring 203 meters long by 20 meters wide by 3.4 meters deep. The tank provides a realistic full scale environment, complete with a wave generator and state of the art data-collection systems. The researchers from FLIR used it to

FLIR Systems offers a full range of maritime thermal imaging cameras for every possible application.

replicate oil spills in realistic conditions.

The goal of the test was to obtain quantitative information to confirm that thermal imaging cameras see oil on water. In

order to do that the researchers investigated 5 different kinds of oil in different sea states, from glassy calm to storm-like, at different viewing angles and at different times of day.

The conclusion was that FLIR maritime thermal imaging cameras excel in providing real time video and photos of oil, even in the roughest of seas, in glaring sunlight, with no light at all and from just about any angle.

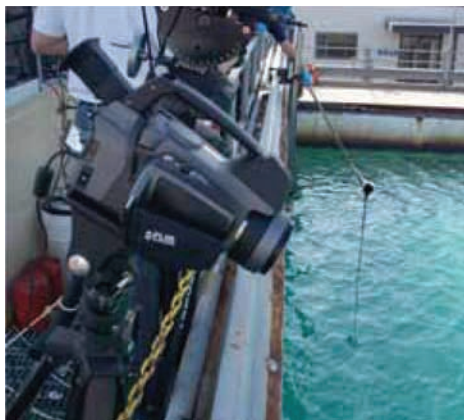
How does it work?

The detection of oil spill is based on the differences between oil and water in temperature, thermal reflection and thermal emissivity. Due to a difference in thermal conductivity oil will usually absorb heat faster during the day, thus it becomes warmer than the surrounding sea water. This makes it show up on the thermal images as a hot spot. During the night, the opposite is true; the oil body will lose heat faster than the surrounding water, which makes the oil show up as a cooler region.

During the day reflection oil also shows up in the thermal image because it reflects the thermal radiation from the sun



The OHMSETT tank in Leonardo, New Jersey, is one of the largest of its kind in the world.



These FLIR thermal imaging cameras are pointed at oil spills in the OHMSETT tank at different angles.



A visible image and a thermal image of Doba/Chad crude oil, at a low camera angle, a glassy calm sea state, in full daylight.

differently. This is similar to the way that oil and water reflect sunlight differently, allowing the human eye to see a color difference.

Detect oil at night

Another difference that enables oil spill detection is a difference in emissivity. Although emissivity differs in the types of oil, generally speaking the thermal emissivity of oil is lower than that of water. This allows thermal imaging cameras to 'see' oil spill in complete darkness, which means that the oil recovery can continue during the night. That's very important because there's a very limited amount of time in which you can collect the oil before it sinks, dissolves or evaporates.

During the day thermal imaging systems also have an edge over visual imaging systems. Not only can thermal imaging cameras visualize oil spill in total darkness, they can also see through smoke, dust and light fog. And because visible imaging cameras rely on visual light they are much more susceptible to solar reflections and changes in the viewing angle, while these factors have very little effect on thermal imaging cameras.

DDE: visualize the smallest of thermal differences

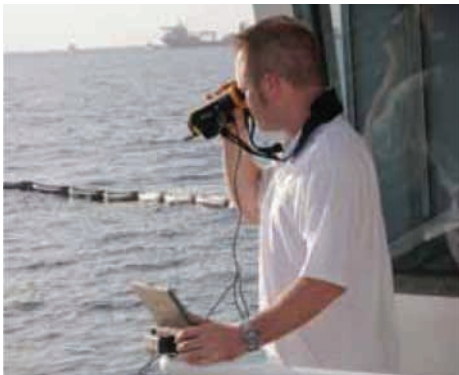
But not all thermal imaging cameras qualify for oil spill detec-



tion. The thermal imaging camera has to be very sensitive to small temperature differences. One reason why FLIR thermal imaging cameras are an ideal tool for oil spill detection is that they contain a built in image processing algorithm called Digital Detail Enhancement (DDE). This allows the camera to visualize even the smallest of thermal differences.

Put to the test

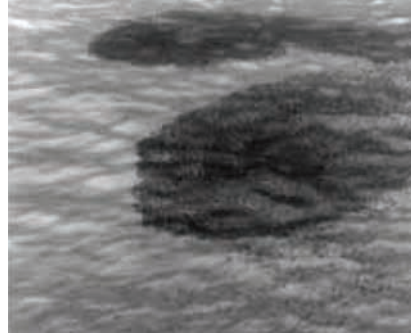
After the tests were finished, the thermal imaging cameras



An oil recovery operator uses a FLIR HM-Series handheld thermal imaging camera to direct the positioning of oil recovery booms.



Visual image and the thermal image of oil that escaped from the Deepwater Horizon as it sunk. Note that the oil is much easier to spot on the thermal image.



The oil spill shows up clearly on this thermal image.


had to prove their usefulness in earnest. On April 20, 2010, just a few weeks after the initial tests the Deepwater Horizon drilling rig blew up. The explosion killed 11 workers and injured 17 others; another 98 people survived without serious physical injury. It caused the Deepwater Horizon to burn and sink, and led to the largest accidental marine oil spill in the history of the petroleum industry.

FLIR maritime thermal imaging cameras were intensely used by the oil recovery teams to provide valuable information about the location of oil. Whether during the finding, containing or the consecutive cleanup, FLIR maritime thermal imaging cameras contributed to the entire recovery process.

FLIR maritime thermal imaging cameras can be plugged into just about every existing video monitor using standard connections and they integrate very easily with other on board maritime electronics.

A wide variety of oil spill applications

Thermal imaging cameras can not only be used at the time of an accident. They can also be very useful for monitoring oil spills during the oil transfer from oil storage bunkers to oil tanker vessels and vice versa. Thermal imaging cameras are also valuable tools for coastguard or other law enforcement agencies. They can track vessels that are illegally polluting our seas by cleaning their oil tanks in open water.

Thermal imaging cameras can monitor all these activities day and night, in practically all weather conditions. Furthermore, once they are installed on a vessel they can not only be used for monitoring oil spills but they can be used for night-time navigation, shipboard security and many other maritime applications as well. 

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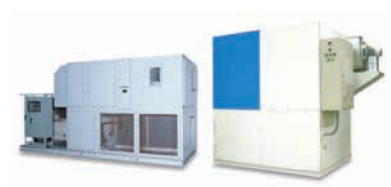
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Monthly KORSHIP, Korea's only shipbuilding magazine in English, serves as the window to the world's shipbuilding industry building a bright future on the horizon at sea.

Monthly Korship provides succinct overview on special features and strength of both current and new products put on the market, and keeps you updated on the shipbuilding orders and construction of ships at major domestic shipyards.

New Order - It is a clean roundup of news on orders placed with shipyards. New shipbuilding orders are reported in detail, along with photos capturing the moment of shipbuilders and clients signing contracts and summary illustrations of order backlog.

Major Performance Gallery - It provides detailed overview on the specification of products with photos.

New Product - It provides updates on new products.



STX OSV was awarded orders for Platform Supply Vessels consecutively

STX OSV (Offshore & Specialized Vessels), which is STX Europe's offshore and specialized vessels division, successfully won orders for Platform Supply Vessels (PSVs) in a row late March.

STX OSV announced that it received an order for a PSV from NorSea Group AS on March 28 (local time).

These vessels will be completed at the Brattvaag shipyard of STX OSV in Norway after the hulls are constructed at a shipyard in Romania, and are due for delivery to the ship owner by June, 2012. They will be built into 'PSV 08' design developed by STX OSV Design, STX OSV's design subsidiary.

These vessels are 4,000DWT PSVs, multi-functional vessels capable of rescue operation, fire-fighting, and anti-disaster operation such as oil recovery in case of oil leak into the sea.

Meanwhile, NorSea Group AS, a Norway-based company, specializes in providing integrated logistics solutions for oil and gas industry.

On March 31 (local time), STX OSV successfully obtained an additional order for 1 unit of PSV from a ship owner.

STX OSV will built the hulls at a shipyard in Romania and complete the remaining works at Brattvaag shipyard in Norway, and deliver the vessels to the ship owner in 2012. These vessels will adopt the 'PSV 09' design, the brainchild of STX OSV Design which is SX OSV's design subsidiary.

PSV 09 design ensures excellent sailing performance and high fuel efficiency, and therefore, has come into the limelight as green ship that can lead the

PSV market.

PSV transports supplies to the oil platform in the sea, such as various fuels necessary for the drilling operation, food/beverage for workers, drilling equipments and manpower, etc, and has come under spotlight along with offshore plants amid a boom in deepwater resource exploitation projects recently.



Image of Platform Supply Vessel (PSV 09) to be built by STX OSV

HHI won order for six 9,600TEU container ships

Hyundai Heavy Industries (HHI) won a KRW 800 billion deal on March 21 to build six 9,600 TEU container ships for shipping line Hamburg Süd. The agreement includes an option Hamburg Süd can exercise to order four additional same class containerships.

The container ships, measuring 332m in length, 48.2 m in width and 26.8m in depth, can carry 9,600 twenty-foot equivalent boxes at a time. The ships are scheduled for delivery between May 2013 and January 2014.

These new container ships are designed to carry containers one foot taller than conventional containers. They can carry 1,700 refrigerated containers, 1,000 more than other same class vessels.

HHI has seen that its container ship orderbook growing recently. HHI received orders for 10 units of 13,100TEU container ships from Hapag-Lloyd of Germany at the end of last year and Hyundai Samho Heavy Industries (HSHI), the subsidiary of HHI, obtained orders for 6 units of 8,800TEU container ships in February.

Particularly, the upward shift in the demand for chartered vessels, specifically among European ship owners, has led to positive speculation that the con-

tainer ship orders, which fell significantly in the fallout of the global financial crisis, will steadily increase.

In fact, Howe Robinson Container Index (HRCI), which began at 1,000 in January 1997, hit the trough at 335 in early 2010 and rose steady to stand at 900 in March.

Another positive sign for more container ship orders comes from the increasing trend toward large container ships and ongoing replacement with new ship models among ship owners in line with the expansion of container traffic volumes and the surge in the demand for green ships as the global economy emerges from the crisis.

An official from HHI said, "HHI has accumulated ample experience and unrivalled tech-

nologies while building about 500 containers ships so far. We will be better positioned in winning new container ship orders in the upcoming period.” This year, HHI has won orders worth USD 6.5 billion (including the orders awarded to HSHI) in shipbuilding and offshore plant sector alone, includ-

ing 5 drill ship orders and ultra large Floating, Production, Storage and Offloading (FPSO) orders, etc.

HHI won USD 600 million order for offshore facilities

Recently, Hyundai Heavy Industries (HHI) received the orders in a row, valued at a total of USD 1.8 billion, for the construction of offshore facilities from BP of UK, an international oil company.

HHI announced that it signed a contract with BP to build offshore platforms worth USD 600 million (approximately KRW 700 billion) in London, UK, on March 21. In late February, HHI clinched an order for the construction of Floating, Production, Storage and Offloading (FPSO) worth USD 1.2 billion from BP.

This construction order is for building 1 unit of Drilling & Production Platform and 1 unit of Quarters & Utilities Platform, etc, which will be put into operation in the North Sea. HHI will carry out the entire processes ranging from the design, through the procurement and production, to the trial operation.

HHI will commence the design process, starting from this month, and complete the production of facilities by the end of 2014, and transport them to the Clair Ridge Field off the coast of Shetland Islands in the North Sea, the northernmost part of the United Kingdom.

State-of-art design technologies will be incorporated into these facilities to ensure that they are ideally suited to withstand harsh operating conditions in the marine environment of the North Sea, such as the strong waves and freezing temperature dipping below zero, over around 30 years of operation and conform to the strict safety and environmental regulations in the North Sea region.

These facilities will produce 120,000bbl of crude oil and 100 million m³ of nat-

ural gas per day if they become operational from the first half of 2015, and the produced crude oil and gas will be transported to the adjacent onshore storage facilities via submarine pipelines.

HHI has gained reputation for its world's best technologies for offshore facilities that are deployed in Arctic and Antarctic areas. The company has an extensive track record in carrying out construction projects in the North Sea, including the riser unity project for BP in 1991 and Harding project, etc. HHI received an order for cylindrical FPSO from a Norway-based ENI in 2010 and won a deal for Q204 FPSO from BP in February this year.

Gang Chang-joon, chief of Offshore & Marine Division of HHI, said, “With oil field exploitation gaining further momentum in the North Sea recently, we expect an upswing in the demand for similar projects and step up effort to win new orders.”

STXOS signed a contract to build 3 additional ethylene carriers

STX Offshore & Shipbuilding (STXOS) announced that it was awarded an order from an European ship owner on April 4 to build 3 units of 6,500CBM ethylene carriers.

This additional order for 3 optional vessels comes after STXOS signed a contract with the same ship owner in February to build 3 vessels of the same type. The additional order is valued at USD 93 million in all. The 6 ethylene carriers will be delivered to the ship owner on a staggered basis with an interval of 3 months, starting from late June, 2012.

These vessels ordered this time measure 113m in length, 19.2m in width, 10.6m in height, and can sail at a maximum speed of 14.9 knots and carry

LPG, as well as ethylene, depending on purpose.

Ethylene carrier orders are expected to increase in the period ahead along with LNG carrier orders, buoyed by a robust upturn in the volume of trading as a result of the dualization of petrochemical production sites and consumption sites, a trend which has gathered momentum with the expansion of large-scale petrochemical complexes in Middle



East, Australia, etc.

In response to that, STXOS has worked closely with world's prominent gas transportation companies, thereby strengthening its sales operation in the market for small and medium-sized petrochemical product carriers, including ethylene carriers.

The European ship owner who placed this order has maintained close cooperative relationship with STXOS for a long time with, and plans to expand foothold in the petrochemical product carrier market which raises the prospect of additional orders in the upcoming period.

An official from STXOS said, "STXOS will actively make inroads into the market for small and medium-sized petrochemical product carriers based on our differentiated shipbuilding technology. We will reinforce the network with existing ship owners and strengthen cooperation with new ship owners to ensure steady growth of our order intake in the concerned sector."

SSME inked a contract to build 2 shuttle tankers, etc

Sungdong Shipbuilding & Marine Engineering (SSME) announced that it received orders for 2 shuttle tankers, 6 container ships, and 1 bulk carrier from European ship owners on March 24.

Jung Hong-joon, President of SSME, directly went on a business trip to Europe to pull out the deals with ship owners, and successfully signed the contract to build 2 units of 157,000-ton shuttle tankers, 6 units of container ships with capacity of 4,700TEU, etc (including 2 optional vessels), and 1 unit of 82,000-ton Kamsarmax bulk carrier.

Winning this shuttle tanker orders this time, SSME takes a first step forward in making inroads into the high value-added offshore sector which has been dominated by very large shipyards so far.

Shuttle tanker is, a type of oil tanker, is a ship that shuttles between the offshore oil field and onshore oil facilities. Connected to offshore drilling rig or Floating Production, Storage and Offloading (FPSO) during the loading process, the shuttle tanker requires the installation of onboard Dynamic Positioning System (DPS) using satellites and computers and Bow Loading System (BLS) at the bow to prevent collision, unlike ordinary oil tankers.

Shuttle tankers have been or will be built at only 28 shipyards in 16 countries. According to Clarkson Research (based on March), Korea has constructed

the largest number of shuttle tankers worldwide so far with 35 units out of the global total of 93 units. The shuttle tanker ordered to SSME this time is the 157,000-ton capacity shuttle tanker, the largest class of this vessel type.

All vessels to be built by SSME, including the shuttle tankers, will be built on land and given the title "the world's first-ever ships built on land". They will be delivered on a staggered basis from 2013.

An official from SSME said, "We have developed new technologies and systems to build shuttle tankers on land, which are high value-added vessels but difficult to construct, and continue to push ahead with researches to expand value-added offshore product lines that live up to the reputation of SSME."

SHI received orders for 2 drillships

Samsung Heavy Industries (SHI) announced that it received an order worth a total of USD 1.12 billion (KRW 1 trillion 219.9 billion) for 2 drill ships from the Denmark-based Maersk on April 6.

These vessels will measure 228m in length and 42m in width and be the same model of drillships which have been built by SHI so far. These models have broad width to ensure stability and easy operations even in severe weather conditions in the North Sea, Seas of Russia, etc, with high roaring

waves.

Having secured this order, SHI has won orders worth a total of USD 3.46 billion this year alone, including 4 drillship orders, 9 container ship orders, 1 Platform Supply Vessel (PSV) and others.

STXOS received a USD 200 million order for shuttle tankers

STX Offshore & Shipbuilding (STXOS) successfully won a USD 200 million order for 2 shuttle tankers from a Greek ship owner.

STXOS announced that it signed a contract with Greek-based European Navigation on April 15 (local time) to build 2 units of 155,000DWT shuttle tankers. This contract includes an option to construct 2 additional shuttle tankers.

These shuttle tankers to be built by STXOS is a Suezmax-class vessel that will measure 278.3m in length, 48.7m in width, and 23.6m in height. They will be constructed at Jinhae shipyard of STXOS and delivered by 2013.

After delivery, these shuttle tankers will be chartered on a long-term basis by Brazil's state-owned oil company Petrobras for the transportation of crude oil produced in the sea off the coast of Brazil.

These vessels are equipped with DP2 (Dynamic Positioning System 2) that automatically maintains a vessel's position during the loading operation at sea using Azimuth Thruster.

Propeller of ordinary ships, the high value-added steering/propulsion system used mainly on offshore supply vessel, is installed at the stern. By comparison, Azimuth Thruster fitted at both bow and stern can rotate 360 degrees

and allows for rapid changes in thrust direction and thus vessel direction.

Meanwhile, European Navigation is a tank operator which provides charter service to oil giants such as Shell, BP, etc. It is the first time that European Navigation places an order with Korean shipyard.

An official from STXOS said, "Shuttle tanker is a type of ship deployed in connection with offshore resource exploitation projects, and fall under the category of high value-added ships. STXOS plans to step up effort to win orders related to offshore resource exploitation projects, such as offshore plants, shuttle tankers, Platform Supply Vessels (PSV), by maximizing the synergy among the shipbuilding affiliates such as STX Europe, STX Dalian and others."

STX Europe secured an order for 1 symmetrical ferry

STX Finland, an affiliate of STX Europe, announced that it received an order for 1 next-generation ferry from Finferries, Finland's state-owned shipping company, on April 8 (local time).

The vessel will measure 65m in length and 12.8m in width and can accommodate 250 passengers and 3 trailer trucks and 39 cars. This ferry will be built at STX Rauma shipyard in Finland and delivered at the end of 2012.

This ferry to be built by STX Finland is the Double-ended Ferry with bow and stern symmetrical and identical in shape, unlike the hull shape of ordinary ships. Furthermore, this ferry is fitted with the stern ramps for loading and unloading trucks and cars at both stern and bow to reduce the docking time. Its rudder propeller at stern and bow enables the steering both in the forward and backing directions, maximizing the efficiency of the symmetrical ferry.

Rudder propellers are high value-added steering and propulsion system often mounted on ships for offshore plants. Rudder propellers fitted at both ends of vessel enable the vessel to make a 360 degrees turn, thus changing the vessel's propulsion direction and movement easily, unlike ordinary ship propellers usually installed at the stern.

STX Finland plans to incorporate a slew of eco-friendly technologies into this ferry in order to ensure that this vessel becomes the first next-generation ferry compliant with the safety standards set forth by EU Shipbuilding Directive. In addition, STX Finland will apply a variety of its proprietary icebreaking tech-

nologies to this ferry that will move and navigate through ice-covered Turku archipelago of Finland.

Timo Suistio, Director of STX Rauma shipyard, said, "I am pleased very much to enter into this contract with FinFerries to build the next-generation ferry. I expect that the construction of this vessel will further reinforce the technological and shipbuilding strengths of STX Finland."



Symmetrical ferry of STX Finland



SHI was awarded an order for supersize container ships

Samsung Heavy Industries (SHI) announced on March 24 that it secured an order for 6 units of 13,000TEU supersize container ships from Orient Overseas Container Line (OOCL) of Hong Kong.

The contract is valued at USD 816 million in all (USD 136 million per vessel), and the vessels are schedule for delivery on a staggered basis by 2013.

An official from SHI said, "Container ship orderbook has been recently rising

after a decline in the aftermath of global financial crisis. It signals that ship owners anticipate an increase in container traffic volumes in the upcoming period. The container ship market has bright prospects."

STX OSV won orders for 3 Multi Role Vessels

STX OSV (Offshore & Specialized Vessels) announced that it received orders for 3 Multi Role Vessels (MRVs) from DOF ASA, a Norwegian-based operator of offshore plants, on April 8.

The hulls will be built at STX OSV shipyard in Romania. The rest of the vessel construction for the 2 vessels will be finished at Aukra shipyard in Norway and the outfitting for the remaining 1 vessel will completed at Brattvaag shipyard in Norway. These vessels are scheduled for delivery in the second half of 2012.

Multi Role Vessel is a type of Platform Supply Vessel (PSV), and these vessels to be built by STX OSV are based on STV OSV's PSV platform incorpo-

rating eco-friendly technology and was developed in close cooperation with the ship owner. These vessels will carry out multifarious functions such as maritime supply of various marine equipments, supportive operations in case of emergency and be fitted with Remote Operation Vehicle (ROV).

Meanwhile, these Multi Role Vessels will be built into the MRV 05 developed by STX OSV Design, STX OSV's design subsidiary.

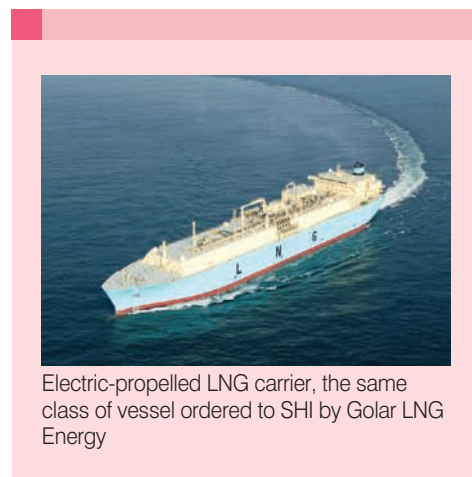
SHI clinched the first LNG carrier order this year in the shipbuilding industry

Samsung Heavy Industries (SHI) has successfully won its first large-scale order for Liquefied Natural Gas (LNG) carriers this year amid growing optimism on prospects for the recovery of LNG carrier market.

SHI announced on April 11 that it recently received orders worth a total of USD 1.2 billion (KRW 1 trillion 300 billion) for the construction of 6 LNG carriers, including 4 LNG carrier orders from Golar LNG Energy, a U.K.-based shipping company.

These LNG vessels ordered this time are 160,000m³ carriers and eco-friendly vessels propelled by electric motor generating power from Dual Fuel (DF) engine that runs on both diesel and natural gas. These vessels are scheduled for delivery by the first half of 2014.

Roh In-sik, President and CEO of SHI, said, "Golar LNG Energy is an operator of LNG carriers and has a fleet that consists of 9 LNG carriers and 4 LNG-FSRUs (Floating Storage and Regasification Units). This order is the first one awarded to SHI by Golar LNG Energy. We will keep striving to win additional orders on the basis of the extensive technology and experience of SHI that



Electric-propelled LNG carrier, the same class of vessel ordered to SHI by Golar LNG Energy

has built about 70 LNG carriers so far." This large-scale shipbuilding project awarded

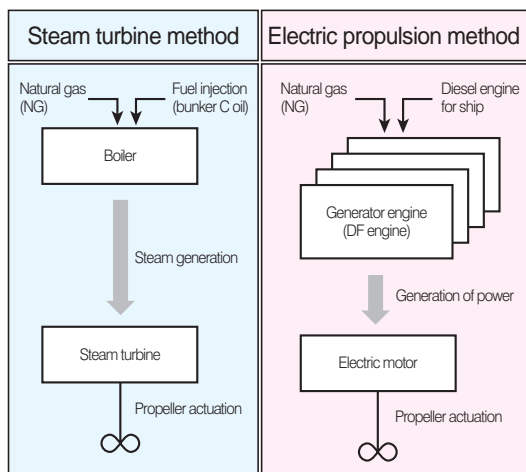
to SHI may herald the recovery of LNG carrier market. The LNG carrier market has seen an unprecedented boom in the early years of last decade. 71 newbuilding orders for LNG carriers were placed in 2004 alone and an annual average of 30 to 40 newbuilding contracts for LNG carriers were added to the orderbook until 2007. LNG orderbook has shrunken rapidly since the outbreak of the global financial crisis which sent the world economy into a

downward spiral.

However, the ever-growing demand for eco-friendly energy and the sustained high oil prices have spurred great demand for LNG carriers, often prompting speculation that newbuilding orders for LNG carriers will also resume.

Particularly, the crisis at Japan's nuclear plants which has escalated in the aftermath of massive earthquake is expected to spur the demand for alternative energies such as LNG. In fact, Russian gas giant Gazprom is currently making a bid for LNG carriers and Qatar Gas Transport Company (QGTC) is also considering placing newbuilding orders.

Meanwhile, SHI has received orders for a total of 20 ships valued at approximately USD 4.7 billion so far this year, including the 6 LNG carriers ordered this time, 4 drillships, 9 container ships, and 1 Platform Supply Vessel (PSV), etc, thus accomplishing over 40% of its annual order target of USD 11.5 billion.



Comparison of propulsion mechanism of LNG carrier

DeWind, a subsidiary of DSME, signed a contract to supply 55 wind turbines

DeWind, a wholly-owned subsidiary of Daewoo Shipbuilding & Marine Engineering (DSME), entered into a contract to supply large-scale wind turbines, embarking on full-fledged sales operation for wind turbines.

DeWind, a wind turbine subsidiary of DSME, announced that it was awarded a contract from Wind Energy Institute of Canada (WEICAN) - Canada's leading national wind power research institute established in early 1980s to develop wind energy - to deliver 5 units of D9.2 model wind turbines by the mid September this year.

In addition, DeWind plans to deliver a total of 50 wind turbines by the first half of 2012. 10 wind turbines will be sent to Frisco wind farm in Texas and the remaining 40 wind turbines will be headed to Novus wind farm in Oklahoma. Having secured this contract, DeWind has a backlog of a total of 55 wind turbines worth about USD 130 million. DeWind has an unsurpassed track record of wind turbine supply as a domestic turbine manufacturer. It has supplied 65 wind turbines in all, including 10 wind turbines supplied to Little

Pringle in Texas after DSME's acquisition of DeWind in 2009.

DeWind has completed development of products tailored to meet specific needs of markets in North America, Europe, Asia, Africa, etc, and gained firm foothold to garner a significant share of the global market, vigorously pushing ahead with sales operations.

Particularly, the wind turbine, developed independently by DeWind and slated for installation from this year, is 2MW-class D9.2 model with blade measuring 93m in length and 10.5% more efficiency than the existing D8.2 model.

The towers for this wind turbine will be manu-



factured in part by DSTN (Daewoo Shipbuilding & Marine Engineering Trendton), a joint venture established last year between DSME and Nova Scotia Province of Canada. As a result, DSME is expected to leverage the synergic effects created between its subsidiaries. DSTN will commence the full-fledged production after completing the remod-

elling in May. Then, DSTN will have an annual production capacity of about 250 wind turbines and also plans to produce up to around 600 blades in the period ahead.

HHI secured KRW 900 billion newbuilding orders

Hyundai Heavy Industries (HHI) announced that it was recently awarded orders worth a total of approximately KRW 900 billion on April 18, including an order for 1 drillship from Norway-based Fred Olsen Energy and an order for 4 container ships from the Greece-based container carrier corporation. Both deals include option for 1 drillship and 4 container ships, raising the expectation of additional orders. Having secured orders for 6 drillships and 3 optional vessels, HHI has received the largest number of orders for drillships worldwide this year. The drillship ordered to HHI this time is scheduled for delivery in August, 2013, and has the world's best drilling ability to operate in water depths of up to 12.8km. Particularly, the drillship features the world's first specialized drill design that optimized the dimension of ship (229m in length, 36m in width) to reduce maintenance cost and increase fuel efficiency. This contract attests to the recognition of the differentiated design and out-

standing drilling performance of HHI's drillships. HHI has drawn acclaim from ship owners in Europe and North America since its first delivery of drillship last year and has signed new orders for drillship in a row. In addition, HHI has also received consecutive orders for container ships, breaking the newbuilding order impasse resulting from the global financial crisis. HHI has won orders for a total of 22 container ships this year, including the 4 units of 5,000TEU container ships ordered by the Greek ship owner this time and 6 units of 9,600TEU container ships ordered in March. HHI has been speeding up effort to spur growth in its orderbook for high value-added ships and offshore facilities such as drillships, Floating Production, Storage and Offloading (FPSO), ultra large container ships, etc, based on its unrivalled technology and extensive shipbuilding experience amassed while building about 1,700 ships so far. As of April, HHI has received orders for a total of 34 vessels worth USD 9.2 billion in the shipbuilding/offshore plant sector, and accomplished 46% of its new order target of USD 19.8 billion for 2011 in the shipbuilding/offshore plant sector.



Kim Oe-hyeon, Chief of HHI's Shipbuilding Division (CEO/left), and Gerry Ventouris, CEO of Container Carrier Corporation, are shaking hands in a signing ceremony in HHI on March 15 to execute the container ship contract.



The shipbuilding market in 2011 is set to register strong growth in new orders for offshore facilities as the projects are being rolled out after postponement along with the surge of newbuilding orders for high value-added ships such as container ships or LNG carriers and a sizable increase in crude oil prices.

South Korean shipbuilders, which maintain strong position in those 2 sectors, clinched large-scale orders for container ships and offshore facilities one after another from the beginning of this year and have continued their smooth sailing.

According to Clarkson data released in March, South Korean shipyards regained status as world's top winner of monthly new orders in 4 months by beating China by a wide margin. As a result, the gap in order backlog between the South Korean shipyards and their Chinese rivals has narrowed considerably.

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. ⚓

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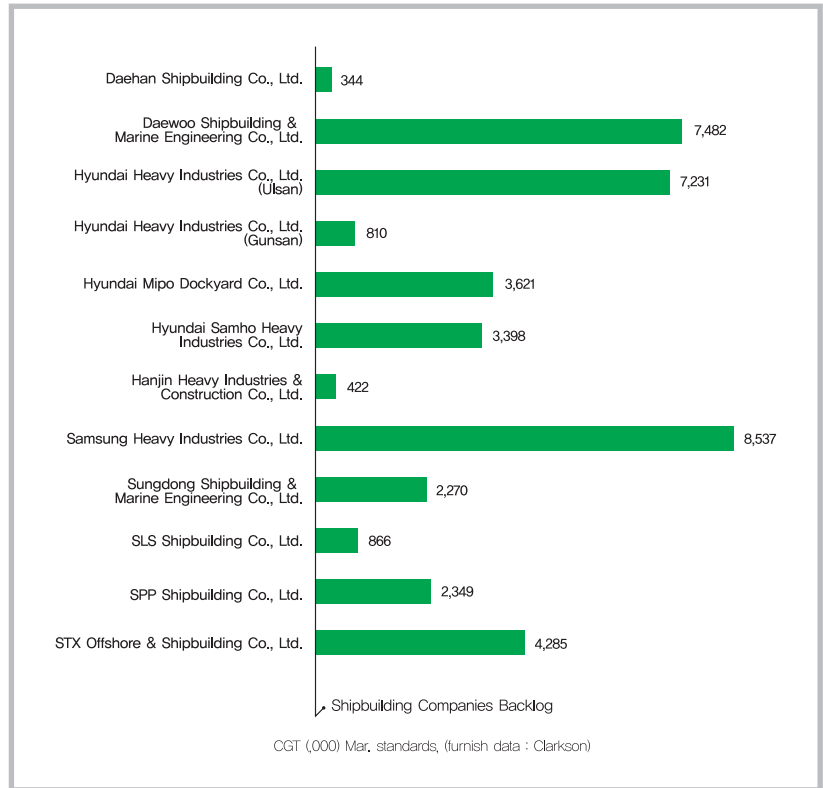


Photo: Hyundai Mipo Dockyard Co., Ltd.

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Wind power

Wind power used to generate electricity has a number of advantages such as no pollution, no fuel costs, and short construction/installation period. In addition, wind power can flexibly cope with variations in nation's electricity demand/supply and the wind farms can become tourist attractions. The recent concerns about fossil fuel depletion have sparked a growing interest in wind power industry that can address the environmental impacts of energies and secure new growth engine. The wind power industry has registered a remarkable growth rate of 28% over the last 10 years.

According to the Global Wind Energy Council (GWEC), the global installed wind power capacity reached 194.4GW as of late 2010 and is expected to rise to 234.4GW by 2011 and 450GW by 2015.



Recently, there have been an increasing trend toward large wind turbines and offshore wind turbines. Large wind turbines are more energy efficient and save construction/equipment costs per unit of output capacity. One of the most compelling advantages of offshore wind farm is that it can be around 20 times bigger and 1.4 times more efficient compared to onshore wind farm.

Recently, Chinese wind turbine manufacturers such as Sinovel and Goldwind have been making great strides on the back of the strong growth in Chinese domestic market, although 3 global players - Vestas, GE, and Gamesa - have carved out significant share of global wind power market. ⚓

Photos: DNV





Major Performance Gallery







Major Performance Gallery





Ballast water treatment- PureBallast 2.0

Alfa Laval Korea Co., Ltd.

Alfa Laval's PureBallast has clearly established itself as the commercial leader in ballast water treatment. Over 100 PureBallast systems have been sold since the system was launched in 2006, and today more than 25 PureBallast installations are already operating at sea.

The experience of installing and working with these systems has been a key source of inspiration in developing the new PureBallast 2.0. While the system's advanced oxidation technology (AOT) is the same as that of its predecessor, PureBallast 2.0 offers additional advantages that will appeal to both ship owners and shipyards. Among them are a major reduction in power consumption and modifications that further simplify PureBallast installation.

"PureBallast 2.0 directly addresses the needs we've observed in our work with ship

owners and shipyards," says Joakim Thölin, General Manager of Alfa Laval Marine & Diesel. "And with the introduction of PureBallast 2.0 EX, we can now meet even the needs of vessels with potentially explosive onboard environments."

Power savings and operating advantages

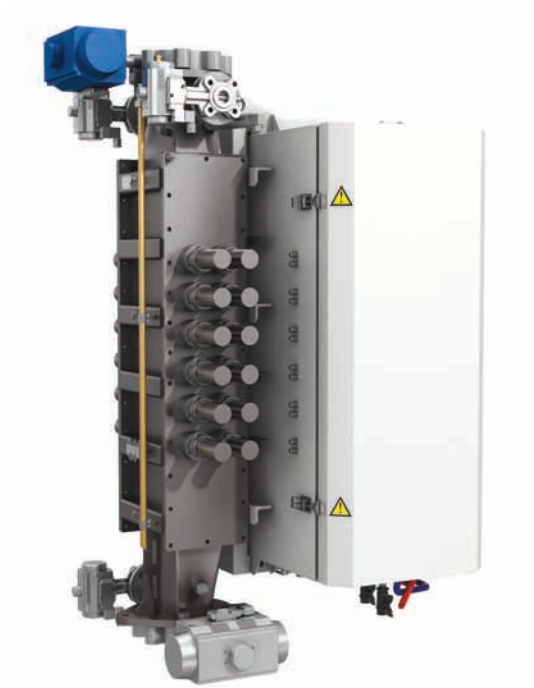
Most prominent among the improvements in PureBallast 2.0 are those related to its power supply. The new system consumes a full 40% less power than its predecessor, which should come as welcome news for ship owners. Shipyards, on the other hand, will appreciate a higher degree of integration and a simplified electrical system that reduces the number of electrical cabinets.

In terms of operation, PureBallast 2.0 has been designed with a number of important



PureBallast 2.0 EX

New
Product



AOT (Advanced Oxidation Technology)

modifications. Flow control is now automatic, individual AOT units can be stopped for maintenance and a pause function lets crews briefly suspend operation (e.g. during heeling). In addition, PureBallast 2.0 features a touchscreen interface with full-colour graphics that connects via Modbus to other onboard automation systems.

“These advances build on the appreciated features of our first PureBallast system, which include ease of installation, ease of use and seamless integration with other onboard systems,” says Joakim Thölin. “With PureBallast 2.0, ship owners and shipyards get a even leaner ballast water treatment system that responds even better to operational demands.”

Explosion-proof PureBallast 2.0 EX

For owners and builders of crude oil tankers, product tankers and chemical tankers,

whose volatile cargo creates potentially explosive areas on board, the launch of PureBallast 2.0 has added significance. PureBallast 2.0 EX, a version of PureBallast 2.0 with additional safety modifications, is designed for Zone I, group IIC and temperature class T4. This makes it suitable for installation aboard most vessels that carry ignition-sensitive cargo.

“Vessels with Ex requirements are not exempted from ballast water treatment regulations, yet there has so far been a lack of treatment systems adapted to their business,” says Joakim Thölin. “This makes the arrival of PureBallast 2.0 EX a highly anticipated answer to very specific needs.”

Additional advantages for shipyards

No matter what type of vessels they build, shipyards will find their own advantages in the launch of PureBallast 2.0. Since PureBallast has been selected for and installed aboard more vessels than any other ballast water treatment system, Alfa Laval has spent more time working with shipyards than any other ballast water treatment supplier.

The insights of this cooperation have fed directly into the development of the new PureBallast system, where they can be seen in the reduced power consumption and number of cabinets, as well as in the system’s clear and installation-oriented documentation.

As Joakim Thölin puts it, “With PureBallast 2.0, Alfa Laval has made it easier both to plan an installation and to get it on board within the construction timeframe. In other words, we’ve made the leading ballast water treatment system even better for those who implement it.”

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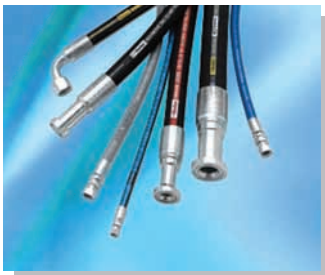
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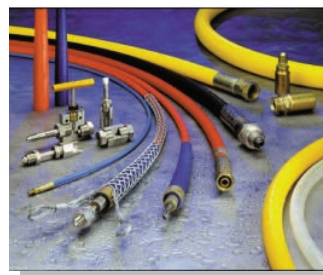
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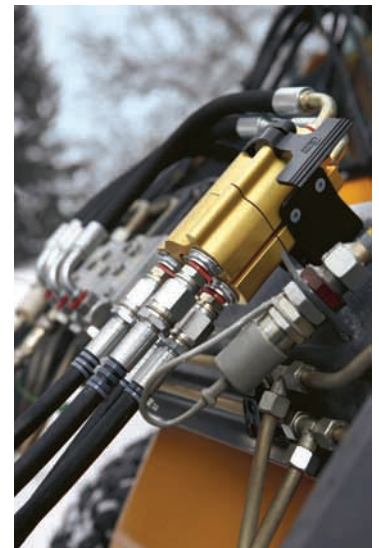
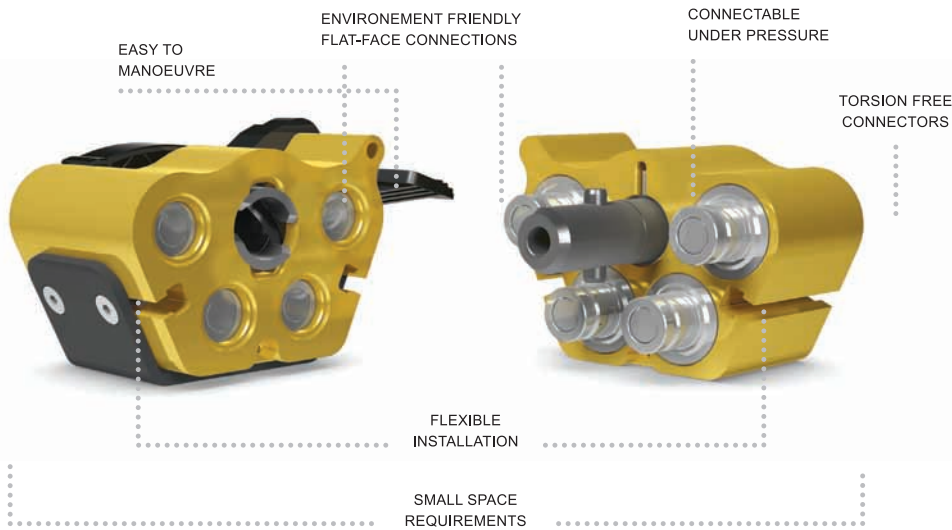
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TEL : +82-51-831-4599

HANCHANG TRANS CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.hctr.co.kr
Main Products : Pole Mounted Transformer, Pad Mounted Transformer
TEL : +82-51-831-3470

HANJULEVEL.

Head Office : Sasang-gu Busan
Homepage Add. : www.hanjulevel.co.kr
Main Products : Level instrument Etc, Vapour Emission Control Sys.
TEL : +82-51-303-0537

HANLA IMS CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.hanlalevel.co.kr
Main Products : Cargo Tank Monitoring Sys. Tank Remote Sounding Sys.
TEL : +82-51-601-3019

HANLA IND CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Oil Filter unit, Gas Blower
TEL : +82-51-264-2201

HANMAUM KI-GONG CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.hankg.co.kr
Main Products : Air Cooler Housing, Oil Cooler Housing
TEL : +82-51-831-5211

HEARTMAN CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. : www.heartman.co.kr
Main Products : Nozzle Tip, Plunger Ass'y, Fuel Injection V/V
TEL : +82-51-262-8869

H.M.E.

Head Office : Kijang-kun Busan
Homepage Add. : www.hyomyungeng.com
Main Products : Battery Charger, Light Signal Column
TEL : +82-51-709-9000

HOSEUNG ENTERPRISE CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.hoseung.koreasme.com
Main Products : Tand Package Unit, Pump Package Unit, Cooler Package Unit
TEL : +82-51-831-2233

HWAJIN ENTERPRISE CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.hwa-jin.com
Main Products : Control Box, Gauge Board System
TEL : +82-512-831-9447

HWAJIN PF CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. : www.hwajinpf.com
Main Products : Butt-Welding Pipe, Fittings Carbon Steel
TEL : +82-51-204-3001

HWA SHIN PRECISION CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Life Boat Winch
TEL : +82-51-831-9839

HYOSUNG STEEL TECHNOLOGIES CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Steel plate cutting, Hy Auto or Manual
TEL : +82-51-831-5093

HYUNDAI HYCRAULIC CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.hhmc.co.kr
Main Products : TURNING ROLLER, BLOCK LIFT
TEL : +82-51-831-8611

HYUNDAI ZINC METAL CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. : www.hdz.co.kr
Main Products : Sacrificial Anode, Hot Dip Galvanizing, Ship Manufacture
TEL : +82-51-266-4788

HYUNJIN MATERIALS CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.hjmco.co.kr
Main Products : Cross Head, Connecting Rod, Piston Rod
TEL : +82-51-602-7700

ILDO MACHINE ELECT CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Heavy Electric Parts
TEL : +82-51-266-6066

IL - SUNG INDUSTRY CO.

Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Silencer, Water Air Filter, Air Intet Trunk
TEL : +82-51-312-4056

IN SUNG INDUSTRY CO.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Profile, Steel Coalming Insulation
TEL : +82-51-293-7550

JAESEUNG ENGINEERING CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Steel Pipe Spool, Sus Pipe Spool, CuNi Pipe Spool
TEL : +82-51-831-8838

JEILSANKI CO.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-831-5398

JEONG-AM SAFETY GLASS CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.jeong-am.co.kr
Main Products : Tempered Glass, Laminated Glass
TEL : +82-51-831-6161

JEONG HWA ACCOMMODATION SYSTEM CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.jeonghwa21.com
Main Products : Wooden Furniture
TEL : +82-51-974-8000

JEONG WOO COUPLING CO., LTD.

Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.jwjoint.co.kr
Main Products : Pipe Coupling, Pipe Repair Clamp
TEL : +82-55-339-7666

JIN GU ENGINEERING.

Head Office : Kimhae Gyeongsangnam-do
Homepage Add. :
Main Products : Rudder Stock, Stern Tube, Stern Roller, Winch
TEL : +82-55-343-3414

JIN IL BEND CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-832-1919

JINKWANG ELECTRIC CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Pull Card Switch, Belt Sway Switch, Belt Speed Switch
TEL : +82-51-831-2571

JINYOUNG METAL CO., LTD.

Head Office : Sasang-gu Busan

Homepage Add. : www.jymct.co.kr
Main Products : Multi Core Tube, Welded Stainless, Steel Tube
TEL : +82-51-313-4001

JMC HYDRAULICS.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Hydraulic Motor For Marine, Hydraulic Control Valve
TEL : +82-51-204-4046

JNC HI-TECHNOLOGIES.

Head Office : Gangseo-gu Busan
Homepage Add. : www.jnchitec.com
Main Products : Junction Box, Elect panel bard, Tel Booth
TEL : +82-51-974-9500

JOKWANG I.L.I CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-602-0200

JONGHAP POLESTAR ENGINEERING CO., LTD.

Head Office : Yeungdo-gu Busan
Homepage Add. :
Main Products : Diesel Engine Piston, Cylinder, Valve
TEL : +82-51-403-5514

JUNG GONG IND. CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. : www.jung-gong.com
Main Products : Ordinary Window Side, Scuttle, Heated Window
TEL : +82-51-261-2911

JUNG - WOO MACHINERY CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Carrier Housing, Split Bearing, Stock, Up.Lower Sleeve
TEL : +82-51-831-5394

KANG BACK INDUSTRY CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Electric Control Box, Valve & Similar , Equipment
TEL : +82-51-831-9025

KANGIL CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Pressure Vessel, Deaerator, Heat Exchanger
TEL : +82-51-972-5672

KANGRIM HEAVY INDUSTRIES CO., LTD.

Head Office : Changwon Gyeongsangnam-do
Homepage Add. : www.kangrim.com/
Main Products : Marine Indutrial Boiler, Exhaust Gas Boiler
TEL : +82-55-269-7701

K.C. CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.iccp-mgmps.com
Main Products : M.G.P.S, I,C,C,P, System Fe Ion, Generator
TEL : +82-51-831-7720

KEO HUNG MACHINERY.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Deck Crane, Provision Crane, Hose Handling Crane
TEL : +82-51-831-6296

KEYSUNG METAL CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.keysungmetal.com
Main Products : Valve(Cryogenic, Ball), Strainer
TEL : +82-51-831-3391

KOC ELECTRIC CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Cast Resin Transformer, Dry Resin Transformer
TEL : +82-51-832-0550

KOREA HYDRAULIC CO.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.enpos21.com
 Main Products : Electric Motor Pump, Hand Pump, Single/Double Acting Ram
 TEL : +82-51-832-1100

KOREA PHE CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.kphe.co.kr
 Main Products : Plate Heat Exchanger, Tank Cleaning Heater
 TEL : +82-51-261-2664

KOREA STEEL SHAPES CO., LTD.

Head Office : Sasang-gu Busan
 Homepage Add. : www.ekosco.com
 Main Products : Flat Bars, Equal Angles, Unequal Angles
 TEL : +82-51-323-2611

KOREA TRADING & INDUSTRIES CO., LTD.

Head Office : Saha-gu Busan
 Homepage Add. : www.kticopper.co.kr
 Main Products : Copper alloy coil, Plate
 TEL : +82-51-293-4423

KORINOX CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.korinox21.com
 Main Products : Cold Mill Stainless, Steel Coil
 TEL : +82-51-832-0031

KORVAL CO., LTD.

Head Office : Saha-gu Busan
 Homepage Add. : www.korval.co.kr
 Main Products : Crank Case Relief Valve, Main Starting Valve, Rotary Valve
 TEL : +82-51-790-9700

KSP CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products : Ship Engine Valve Spindle, Flange, Ring Gear
 TEL : +82-51-831-6274

KSV

Head Office : Youngdo-gu Busan
 Homepage Add. : www.ksv-valve.co.kr
 Main Products : Valve Spindle, Seat-Ring for marine Engine
 TEL : +82-51-415-4466

KTE CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.kte.co.kr
 Main Products : Electrical Equipment (Switchboard & Console)
 TEL : +82-51-265-0255

KUKDONG ELECOM CO., LTD.

Head Office : Saha-gu Busan
 Homepage Add. : www.kukdongelecom.com
 Main Products : Navigation/Signal LT, EX-Pllosion Proof LT, Fluorescent LT
 TEL : +82-51-266-0050

KUKDONG INDUSTRIAL ENGINEERING.

Head Office : Sasang-gu Busan
 Homepage Add. : www.kdie.co.kr
 Main Products : Exhaust Gas Pipe With Insulation, Fuel Injection Pipe and Bloc
 TEL : +82-51-303-6900

KUKJE METAL CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.kjmetal.co.kr
 Main Products : Manhole Cover, Portable Tank, EXH. Gas Pipe
 TEL : +82-51-831-1541

KUM HAW PRECISION CO.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products : Coupling Flange, Bellows Flange
 TEL : +82-51-831-5685

KUMKANG ENGINEERING.

Head Office : Gangseo-gu Busan
 Homepage Add. :

Main Products : Hand Rail, Storm Rail, Platform, Inc. Ladder
 TEL : +82-51-831-0091

KUMKANG PRECISION.

Head Office : Saha-gu Busan
 Homepage Add. : www.kkmarine.co.kr
 Main Products : Engine Parts, (Air Reservoir) & Valve
 TEL : +82-51-262-4893

KWANGIL CORP.,

Head Office : Sasang-gu Busan
 Homepage Add. : www.k-i.co.kr
 Main Products : Stainless Steel, HR Coil
 TEL : +82-51-324-0006

KWANG JIN E.N.G CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products : Pipe Piece, Pipe Spool
 TEL : +82-51-831-1435

KWANG JIN IND. CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products : Part of Heat Exchanger
 TEL : +82-51-831-4131

KWANG JIN TECH.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products : Non Asbestos, Teflon, Rubber
 TEL : +82-51-973-5566

KWANG LIM MARINE TECH. CO.,LTD.

Head Office : Sasang-gu Busan
 Homepage Add. :
 Main Products : Window Box, (STEEL, AL, SUS) Vent Hole
 TEL : +82-51-313-0055

KWANG SAN CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.kwangsan.com
 Main Products : Heating Coil unit, Expansion joint
 TEL : +82-51-974-6301

KWANGWOON CO.,LTD.

Head Office : Youngdo-gu Busan
 Homepage Add. : www.kwang-woon.com
 Main Products : Square Window, Side Scuttle, Door, Hatch, Window Wiper
 TEL : +82-51-414-9494

KYEONG SIN FIBER CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.ksfiber.co.kr
 Main Products : Rudder Bearing Bush, Insulation
 TEL : +82-51-831-0268

KYOUNGWON BENDING CO.

Head Office : Kimhae Gyeongsangnam-do
 Homepage Add. : www.bending4u.com
 Main Products : Hwase Pipe, Chain, Locker
 TEL : +82-55-313-1277

KYUNGIL METAL CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products : Marine Equipment Plating, Head Rest Pipe Plating
 TEL : +82-51-831-1677

KYUNGSUNG INDUSTRY CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.e-clamp.com
 Main Products : Svs Corner & Anchor, Strip, Clamp
 TEL : +82-51-831-4960

LHE CO., LTD.

Head Office : Kimhae Gyeongsangnam-do
 Homepage Add. : www.lhe.co.kr
 Main Products : Heat Exchanger
 TEL : +82-55-340-0624

MANZU INDUSTRY. CO., LTD.

Head Office : Gangseo-gu Busan

Homepage Add. :
 Main Products : Phosphate Coat, Pipe & Structure Painting, Special Painting
 TEL : +82-51-832-0944

MARINE RADIO CO., LTD.

Head Office : Youngdo-gu Busan
 Homepage Add. : www.mrckorea.co.kr
 Main Products : Public Addresser Sys, Common Aerial Sys.
 TEL : +82-51-414-7891

MARINE TECHNICAL ENGINEERING CO., LTD.

Head Office : Sasang-gu Busan
 Homepage Add. :
 Main Products : Oily Water Separator, Bilge Alarm, Air Dryer
 TEL : +82-51-831-1118

MARSEN CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.marsen.com/
 Main Products : Cargo Tank Monitoring System, Tank High/Overflow Alarm System
 TEL : +82-51-831-2108

MAX TECH.

Head Office : Kimhae Gyeongsangnam-do
 Homepage Add. : www.maxtech21c.com
 Main Products : Engine, Shock Absorper, Gasket
 TEL : +82-55-327-9652

MCM CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.mcm21.co.kr
 Main Products : Valve, Junction Box, Switch Cover
 TEL : +82-51-832-0505

MI JIN PRECISION.

Head Office : Sasang-gu Busan
 Homepage Add. :
 Main Products : Valve, Tube, Vend, Pipe for ship
 TEL : +82-51-315-3143

MIJOO INDUSTRY CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products :
 TEL : +82-51-831-1588

MIRAE ENGINEERING CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.miraeship.co.kr
 Main Products : Hull Block, Steel Outfitting, Pipe Spool/Unit
 TEL : +82-51-790-5800

MJ TSR CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.mjtsr.com
 Main Products : Rubber Sheets & Hats, All Types of Parts for Shipbuilding & Industries
 TEL : +82-51-832-0002

MODERN INTECH CO., LTD.

Head Office : Sasang-gu Busan
 Homepage Add. :
 Main Products : Curtain, Carpet, Upholstery, Mattress for Marine
 TEL : +82-51-325-0260

MT.H CONTROL VALVES CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. :
 Main Products :
 TEL : 82-51-974-8831

MYTEC CO., LTD.

Head Office : Gangseo-gu Busan
 Homepage Add. : www.imytec.com
 Main Products : Heat Exchanger, Pressure Vessel
 TEL : +82-51-831-7474

NAMSUNG SHIPBUILDING CO., LTD.

Head Office : Saha-gu Busan
 Homepage Add. :
 Main Products : Rescue Boat Davit & Winch, Assembly, Line Hauler
 TEL : +82-51-200-1277

NAMYANG METAL.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Stair Way Body, Bulk Head Hnlon, Galley Hood
TEL : +82-51-832-1721

NARA CORPORATION CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-790-7505

NAVUTEC.

Head Office : Kijang-kun Busan
Homepage Add. : www.navutec.com
Main Products : Fire fighting & Safety, equipment for marine & Offshore
TEL : +82-51-728-5055

NEW-OHSEUNG CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Manifold, Spool piece, Chain compressor
TEL : +82-51-266-5724

NK CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Ballast Water Treatment System, Co2 System
TEL : +82-51-204-2211

NOKSAN FLANGE CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Flange for ship
TEL : +82-51-831-7956

OBOK ELECTRIC CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Transformer
TEL : +82-51-832-1751

OK KWANG ENG CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.okv.co.kr
Main Products : Marine valves, Strainers
TEL : +82-51-326-7741

OK KWANG METAL CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.okkwang.com
Main Products : Std Flange, Tube Sheet, Forging Material
TEL : +82-51-831-9885

ORIENTAL PRECISION & ENGINEERING CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.opco.co.kr
Main Products : Deck house, Engine room Casing, Life Boat
TEL : +82-51-202-0101

ORIENTAL PRECISION MACHINERY CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.opco.co.kr
Main Products : Crane Component
TEL : +82-51-831-0202

O.S.C.G CO., LTD.

Head Office : Sasang-gu Busan
Homepage Add. : www.oscg.net
Main Products : Cable grand, Junction box
TEL : +82-51-305-3910

PACO HITEC CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. : www.pacohitec.com
Main Products : Hydraulic hose, Fitting
TEL : +82-51-266-6994

PAL MI METAL IND CO., LTD.

Head Office : Jinhae Gyeongsangnam-do
Homepage Add. :
Main Products : Valve, Yoke, Fork, Knuckle, Carrier

TEL : +82-55-552-3840

PANASIA CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.worldpanasia.com
Main Products : Hi-level Alarm Sys. Tank level Gauge
TEL : +82-51-831-1010

PI PLUS CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.pharmaidsolutions.com
Main Products : Rudder stock, Pintle, Intermediate Shaft
TEL : +82-51-831-9338

POONG JIN METAL CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Emergency Shut-Off Valve, Veneral Bronze Casting Valve
TEL : +82-51-831-8510

PSM CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.psminc.co.kr
Main Products : Ring Flange, Shaft, Nozzle
TEL : +82-51-970-3000

SAEJIN INTECH CO., LTD.

Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.saejinintech.com
Main Products : Emergency Towing, Arrangement, Universal Swivel Fairlead
TEL : +82-55-328-1458

SAMBOO METAL CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.samboometal.com
Main Products : Wheel, Shaft, Hyd-Net, Hyd Coupling Bolt, Flange
TEL : +82-51-831-1478

SAMGONG CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.sam-gong.co.kr
Main Products : Oil Purifiers, Ship ` Accommodation, Ladders
TEL : +82-51-200-3040

SAMJOO ENG. CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. : www.sam-joo.co.kr
Main Products : Catering Furniture, Galley Hood, Laundry Equipment
TEL : +82-51-264-6677

SAMJUNG MACHINERY.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Piston Rod, Cross Head, Inter Shaft
TEL : +82-51-832-0190

SAM KWANG HI-TEC CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Rectangle Windows
TEL : +82-51-832-0177

SAMSUNG NONFERROUS METAL CO., LTD.

Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.metalsamsung.co.kr
Main Products : Bushing, Liner, Sleeve, Pintle Bush
TEL : +82-55-329-1067

SAMYANG METAL IND. CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. : www.cuniship.com
Main Products : W-NT 90/10 Flange, Elbow, Tee
TEL : +82-51-266-6655

SAMYOUNG FITTING.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Elbow, Tee, Coupling
TEL : +82-51-832-0211

SDK CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Winch, Hatch
TEL : +82-51-832-1882

SEAPLUS CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.sea-plus.co.kr
Main Products : Low Pressure CO2, Fire Extinguishing Sys
TEL : +82-51-831-0119

SEBO METAL CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.sebometal.co.kr
Main Products : Pump Tower for LNG, Vent Mast
TEL : +82-51-970-0200

SEBO TECH CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Windwall, Heat Shield, Manual Hatch
TEL : +82-51-831-4171

SEIL SERES CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. : www.seilseres.com
Main Products : VRC system, ODM
TEL : +82-51-831-1858

SEJIN BOLT CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Bolt, Nut & Be, Double Nut, Chard Nut, Hinge Bog
TEL : +82-51-831-9832

SEUNG JIN E.N.G.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Pipe Spool (Steel)
TEL : +82-51-831-9050

SEUN STEEL CO., LTD.

Head Office : Jin-gu Busan
Homepage Add. : www.seunsteel.co.kr
Main Products : CR, HGL, CGL, EGL
TEL : +82-51-639-3200

SEWOONG PRECISION MACHINERY CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-831-0595

SEYANG HIGH-TECH

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Water & Oil Strainer, Condensate Chlorination Tank
TEL : +82-51-831-9125

SHILLA E&T CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Spot Cooler, Heat Exchanger, Pressure Yeses
TEL : +82-51-831-7705

SHINDONG DIGITECH CO., LTD.

Head Office : Dong-gu Busan
Homepage Add. : www.shindong.com
Main Products : Navigation Communication, Satellite Communication
TEL : +82-51-461-5000

SHINHWA INTERIOR & TECHNOLOGY CO., LTD.

Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Marine Furniture
TEL : +82-51-441-1294

SHINKWANG ACE ELECTRIC CO., LTD.

Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.skace.com
Main Products : Cable Tray, Accessories

TEL : +82-55-332-3315

SHINMYUNG INDUSTRIAL CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Cable Tray Joint, Hanger
TEL : +82-51-831-5061

SHIN SHIN HEAVY INDUSTRIES CO., LTD.

Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Deck Machinery, Hydraulic system, Surface Treatment
TEL : +82-51-832-0734

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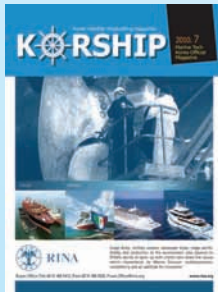
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