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Hyundai Heavy Industries will build ITER vacuum vessel.

- Hyundai Heavy Industries will build the main body of ITER (International Thermonuclear Experimental Reactor) vacuum vessel and port.

Hyundai Heavy Industries announced that it signed a contract to build the main body of ITER vacuum vessel and port at the National Fusion Research Institute (NFRI) located at Daedeok Science Town in Daejeon on January 15 (Friday) 11 AM with the attendance of related officials, including Lee Gyeong-soo, director of NFRI, Lee Jong-sam, managing director of Hyundai Heavy Industries.

Under this contract, Hyundai Heavy Industries will construct and deliver 2 of the 9 vacuum vessel sectors and 35 sets of all 53 set ports of the ITER for 7 years by the late December 2016.

ITER project is an international tokamak research and engineering project to build and research mega nuclear fusion test reactor in Cadarache, the southern region of France, to develop and commercialize nuclear fusion energy through the collaboration of seven countries, such as Korea, USA, EU, Japan, China, Russia, India, and a total of 11.2 billion Euro (KRW 14 trillion)

is expected to be invested until 2040.

Depending on the result of the project, it would be determined whether the electricity can be generated from the nuclear fusion device called 'artificial sun'. Specifically, the vacuum vessel to be built by Hyundai Heavy Industries is the product that should be delivered the first among 86 parts for ITER, and is the critical part that should be delivered in the most timely manner to ensure the successful construction of ITER.

Each sector is 12 meter high and weighs 400 tons, and requires super high precision welding technology to endure the ultra low temperature, ultra high temperature, and vacuum pressure.

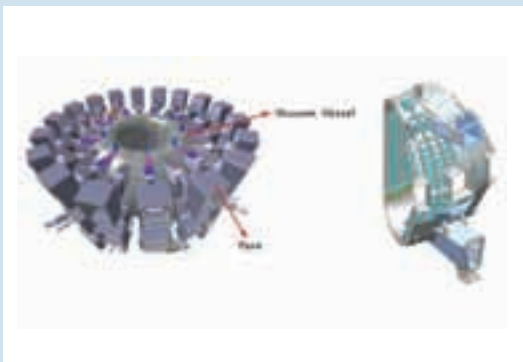
Hyundai Heavy Industries already designed the large ultra high vacuum vessel and ultra low temperature vessel in 2007, the core facilities capable of enduring 100 million °C, when it developed the design of the main system of Korea Superconducting Tokamak Advanced Research (KSTAR) for the commercializa-

tion of artificial sun.

At that time, Hyundai Heavy Industries was recognized highly for its technology building the large cylindrical steel structure through defectless welding, which measured 9 meter in diameter, 10 meter in height, and weighed 1,000 tons.

Lee Jong-sam, managing director of Hyundai Heavy Industries said, "This contract awarded to us this time is the result of combining our welding technology, which we have accumulated for nearly 4 decades as the world's top shipbuilder, with our plant technology, the best both in Korea and abroad." He added, "We will promote our technology throughout the world, going beyond Korea, by making ITER vacuum vessel successfully."

Hyundai Heavy Industries expects that the production of ITER vacuum vessel will have a tremendous ripple effect for the technology of nation's industry, such as the production of very large structure and super precision technology development.



The photo shows the main body of ITER vacuum vessel and port that Hyundai Heavy Industries will build.



Hyundai Heavy Industries (HHI) and the National Fusion Research Institute (NFRI) signs the contract to build ITER (International Thermonuclear Experimental Reactor) vacuum vessel (Lee Jong-sam (fifth from the left), managing director of HHI, Lee Gyeong-soo (fifth from the right), director of NFRI).



STX Offshore & Shipbuilding develops Arctic ice breaking ship in a row.



The model ice breaking ship is breaking the ice with its stem and stern in a test.

STX Offshore & Shipbuilding in collaboration with STX Europe has made a great success in constructing the Arctic Ice Breaking Shuttle LNG Carrier and the Large Ice Breaking Container Carrier, which is the first accomplishment of the mutual R&D work in the global production network.

The Arctic Ice Breaking Shuttle LNG Carrier which was developed this time is designed suitable for navigating on the route linking the offshore plant producing LNG and the port located in the Polar Region.

Specifically, the carrier is equipped with the ice-breaking technology allowing its independent operation without the help of a special ice breaker for cracking 1.5-meter-thick ice. In addition, with the adoption of Double Acting System (DAS), the vessel boasts the outstanding operation performance through the ice sea, cracking ice and navigating in any directions both backward and forward.

As the natural resources exploitation project is being carried out in Yamal, Russia, the world's largest natural gas reservoir, a huge demand is expected to be created for vessels equipped with advanced ice breaking technology in the years to come.

STX Offshore & Shipbuilding has moved forward with the development of the ship model suitable for the resources exploitation project in Russia since several years before, finally developing this ship model successfully. The Arctic Ice Breaking Shuttle LNG Carrier and the Large Ice Breaking Container Carrier which STX Offshore & Shipbuilding developed are the types of ship that conform to the trend as the main sailing route between Asia and Europe has come to the limelight. With the installation of DAS and Hybrid Propulsion System, the ice breaking container carrier is designed not only to have the ice breaking technology capable of independent operation through the Northern Sea Route but also provide high propulsion efficiency in ordinary sea.

STX Offshore & Shipbuilding and Aker Arctic Research Center (AARC), the subsidiary research center of STX Europe, have collaborated in a variety of steps such

as design development and performance test over the past 24 months since early 2008, and finally accomplished the construction of Arctic Ice Breaking Shuttle LNG Carrier and Ice Breaking Container Carrier. Taking credit for attaining the state-of-the-art technology in the research & development of Arctic Ice Breaking Shuttles, Helsinki-based AARC is a research center acquiring a number of original technology patents related to vessel's ice breaking technology.

STX expects that the latest success in the development of ship for the arctic navigation will lay the cornerstone for promoting the ice breaker project in the Polar Regions vigorously in the upcoming years.

In the meantime, starting with STX Europe's clinching the order of KRW 200 billion worth of the polar supply and research vessel last year, STX has speed up the effort to secure the state-of-art ice cracking technology through the global production network.

Vice Managing Director Choi Young-dal from Shipbuilding Research Institute of STX Offshore & Shipbuilding said, "STX has dedicated itself to developing mega-sized high value-added vessels including 22,000 TEU containerships and 400,000 DWT class very large ore carrier(VLOC) in an endeavor to win the future market earlier than any others." He added, saying "With the construction of Arctic Ice Breaking Shuttle LNG Carrier and Ice Breaking container carrier developed this time in collaboration with STX Europe, we will shift into high gear to develop the ship model suitable for regional resource development project."



The Korean Register Shipping (KR) is on a smooth path to relocating its headquarters to Busan.

The Korean Register of Shipping (KR) is scheduled to move its headquarters to Busan in 2012. For the relocation of the headquarters, Korean Register of Shipping will begin the construction of new building from late February this year, following the on-site forum on January 11 (Monday) and the selection of the constructor on February 02 which comes on the heels of the announcement on December 23 last year of the bidding for the construction of new building.

The Korean Register of Shipping entered into the Agreement on the land supply with Busan Metropolitan Government on May 2005 and obtained the approval of construction in June from Gangseo District Office, and paid KRW 15.7 billion for the use of land in November last year.

KRW 58.1 billion will be invested in the construction of new building which will be erected in the Myeongji Residence Complex of Gangseo district, which will be a 18-story building including two basement floors. About 310 employees will be working in the new building that houses the offices and international conference room and facilities.

The relocation to Busan is expected to provide the momentum to the vitalizations of related industries such as shipbuilding equipment and material industry, shipbuilding industry, ship repair businesses, and others. Furthermore, it is speculated that the ripple effect will generate KRW 2 trillion and 500 billion for the economy with the revenue hovering above KRW 150 bil-

lion based on 2009, and generate more than KRW 10 trillion in 2020 for the economy based on the sales of manufacturing companies with the revenue reaching KRW 800 billion, as well as the expanded opportunities for the employment of talented people in Busan. Hiring a total of 2,500, the relocated Korean Register of Shipping is expected to boost the opportunities for recruiting talented people in Busan.

In addition, the relocation is expected not only to reinvigorate the local economy but also to increase the brand recognition of Busan as international conventions and meetings hosted for more than 12 times a year in relation to the maritime and shipbuilding industry will help expand the promotions of the city and international exchanges and boost the competitiveness of maritime business and industry in conjunction with the maritime business cluster, besides the education throughout the year for about 3,000 people from external registers of shipping and companies.

Established in June, 1960, Korean Register of Shipping is a non-profit organization which carries out the inspection during and after the shipbuilding for the safety of ship and issues the registration of ship and certificates necessary for subscribing to the insurance on hull and machinery (insurance on ship) and sale and purchase. It has the total asset of KRW 62.9 billion, employees 601 (310 in headquarters, 291 in branch offices), 1 division, and 42 branch offices (15 in Korea, 27 abroad).

Meanwhile, the Metropolitan government is supporting the Korean Register of Shipping in a multifaceted way to facilitate the relocation, like providing the local tax break such as acquisition tax break, registration tax break imposed on the purchase

of land for the relocation and allowing the families of employees working in the relocated office to be admitted into the school outside the standard admission quota.

Market Pioneer Group will be sent over to Hanoi, Vietnam, the emerging shipbuilding market.

The market pioneer team will be dispatched to Hanoi, Vietnam, to open the outlet for export in Vietnamese shipbuilding market, an emerging market which has come into the limelight in the shipbuilding equipment and material industry. The team will be composed of delegates from 19 companies such as Donghwa Entec Co., Ltd.

Organized jointly by the implementation team of Noxan Cluster at the Korea Industrial Complex Corp and Busan Marine Equipment Association, the market pioneer team will visit Vietnam for 5 days from January 11 to January 15 to produce the plans for the market feasibility investigation on the shipbuilding industry of Vietnam, an emerging shipbuilding market, and the strategies to make inroads into the market, and enter into MOU to lay the groundwork for opening the market, dispatch trade delegations, co-participate in the trade shows specializing in the shipbuilding sector, host international trade forums with the invited delegations from the shipbuilding industry and clients.

The implementation team of Noxan Cluster and the Korea Industrial Complex Corp finally selected 19 companies, including Shin Young Air Clutch, Uyang B&P Industry Co., Ltd, Donghwa Entec Co., Ltd,



etc, among the list of companies that would participate in the International Trade Show of Shipbuilding Equipment & Materials in Vietnam (Vietship 2010), with the priority being given in selection to the companies (first-come first-served basis, if necessary) which the Vietnamese shipyards picked out because of specific products that captivated their attention and the companies that submitted the application to Korea Industrial Complex Corp for the participation in the preliminary investigation of the demand.

In addition, 7 local shipyards of Vietnam agreed to receive the market pioneer team after the negotiation with the companies

exporting the shipbuilding equipment and materials. 80% of the expenses will be supported, such as the ticket for single flight, transportation in Vietnam, accommodation, and the cost of hosting the forum.

The seminar will be held in Hanoi on January 11 (Monday), the first day, in relation to the penetration of the Vietnamese shipbuilding market. On the following days which is on January 12 (Tuesday) onward, the market pioneer team will visit local shipyards of Hai Phong such as Bach Dang Shipbuilding, Namchu Shipyard, Ha Long Shipyard, Pha Rung Shipyard, Benkin Shipyard, Vinocomin Shipyard, Vinashin (Vietnam's state-owned shipbuilding com-

pany) to grasp the trend of Vietnamese shipbuilding market and explore the possibilities of Korean shipbuilding equipment and material companies to make foray into the Vietnamese shipbuilding market.

An official at Busan Metropolitan Government said, "The market pioneer team which will be dispatched to Hanoi, Vietnam, this time, will pave the way for building and strengthening the relationship between Vietnamese shipyards and Korean shipbuilding equipment and material companies through the execution of MOU, taking advantage of the supply route of the exporters."

Sungdong Shipbuilding & Marine Engineering Co., Ltd celebrated the New Year with its partners.

Sungdong Shipbuilding & Marine Engineering Co., Ltd celebrated the New Year 2010 by holding an event at its main auditorium on January 10th for the clients and the supervisors of registers of shipping, wishing the strongest order intake in 2010 as in 2009.

An event was held to wish happy new year and convey the heartfelt thanks to the clients and the loved families of the registers of shipping who are far away from home. The event themed around the family and harmony among the people with different culture, not eating and boozing.

A celebrative performance during the event attracted about 200 people, including foreign clients who flew to Korea for the construction of ship from many countries such as Greece, Russia, Singapore, and the

supervisors of registers of shipping and their families.

They showed a great deal of interest throughout the performance, and were all ears listening to the music played with various Korean traditional musical instruments and the symphony of string orchestra, and were captivated by the joyful art of samba dance and the performance of Bulk Head, the internal rock club of Sungdong Shipbuilding & Marine Engineering. Particularly, they had a pleasant time showing off their singing skills at the improvised singing contest at the ending part of the event.

A family member of the supervisor of a register of shipping at the event said, "I did not have free time to spend time together for something that will stay in my heart for a long time because my husband has been busy very much since we came to Korea, but I am happy for

watching this performance which I think will be enshrined in my heart."



Cake-cutting ceremony



Celebrative festival

Competitiveness of company comes from the creative ideas of employees.

- Idea proposals saved KRW 45.9 billion for Hyundai Heavy Industries in 2009.

Kim Geum-man, an assistant engineer at the large engine assembly department of Hyundai Heavy Industries, is a 30-year veteran in engine assembly. In 2009, he presented a new idea after he was told by his colleagues that they had to rework often because of the error occurring in the process of attaching the angle calculator, the main part of engine, to the main body. He floated the idea that the jig (an ancillary apparatus fixing the parts during the welding) that he devised by himself could be used when the welding was performed. And his idea was accepted and applied to the site work. It was proven to be effective immediately.



Kim Geum-man, an assistant engineer

Only one worker is required now, instead of three previously, and no rework is necessary any more. His idea brought about the sharp increase in the productivity and the remarkable cost-saving. In this way, 606 ideas put forth by Kim were adopted in 2009. Hyundai Heavy Industries estimates that KRW 190 million were saved through his ideas.

Hyundai Heavy Industries owes its cost-saving to the ideas of its employees. According to the report on 'Excellent Idea Proposers' in 2009', about 16,000 employees presented 145,000 ideas, who account for nearly 70% of total employees. It means that an employee proposed 9 ideas. Among the proposed ideas, 4,700 have been adopted. Hyundai Heavy Industries said that the ideas that its employees forwarded led to the saving of KRW 45.9 billion throughout 2009.

'Idea Proposal' began in 1980, initiated as part of efforts to encourage the employees to identify problems by themselves, aiming to reduce the waste and simplify the production process, and has been put into practice for more than three decades so far.

Particularly, Kim Geum-Man, the assistant engineer, has won the prize of the best idea proposer for two consecutive years, in 2008 and 2009, which has been the first-ever for an employee since the Idea Proposal began for the first time in Hyundai Heavy Industries.

He has proposed many ideas because of his habit of taking memos, careful observation, and his diligence. 14 ideas that he suggested are patent pending.

An official at Hyundai Heavy Industries said, "Hyundai Heavy Industries owe its development into the world's best compa-

ny to its employees who have put forward innovative ideas over the last three decades". He added, "The creative ideas of employees will help the company save the cost and tide over the present recession."

Hyundai Heavy Industries rewards for the ideas adopted depending on the grade, and the employee who presented the most number of ideas is provided with various benefits such as the commendation from the CEO and high performance rating.

Yeongnam-based KTR headquarters was named the testing laboratory by ABS

KTR (Korean Testing & Research Institute, headquartered in Yeongnam) which is located in Daun-subdistrict, Jungu-district, Ulsan, was named the testing laboratory by American Bureau of Shipping (ABS), which is the first-ever nationwide and the third time worldwide.

Ulsan Metropolitan Government announced on December 30 (local time) last year that ABS sent the notification, along with the certification, to KTR informing that the Yeongnam-based KTR headquarters would be designate as the testing laboratory of International Maritime Organization's (IMO) new Performance Standard for Protective Coatings (PSPC) on ships.

This designation is all the more meaningful because it came amid the growing concern about the domestic shipbuilding industry, and ABS will consider the test report of protective coatings (PSPC) on ships, issued by KTR, same as the result of test conducted by ABS. Therefore, domes-



tic shipbuilding companies and makers of the coatings on ship can save the time and cost remarkably if they commission the Yeongnam-based KTR headquarters to conduct the test and evaluation in Korea instead of foreign laboratories.

Yeongnam-based KTR headquarters became the only testing laboratory certified by ABS across the country as the testing laboratory of International Maritime Organization's (IMO) new Performance Standard for Protective Coatings (PSPC) on ships, following the designation of the Korea Register of Shipping (KR) in 2008 and Det Norske Veritas (DNV) in 2009.

Particularly, the protective coatings on ship is one of the most important areas in the shipbuilding industry along with the steel sheet and welding.

Yeongnam-based KTR headquarters have carried out the essential test and inspection related to the shipbuilding such as the steel sheet, engine, ballast water microorganism test, etc, as well as the protective coatings on ship.

An official at Ulsan Metropolitan Government said, "The designation of Yeongnam-based KTR headquarters as the testing laboratory of ABS this time will provide the springboard to domestic shipbuilding industry and makers of protective coatings on ship to overcome the difficulties amid the declining order intake and the stiff competition from Chinese companies." Meanwhile, Yeongnam-based KTR headquarters has carried out the certified tests of materials related to the shipbuilding, automotive, chemical, and environmental sector while coping with the regulations on new chemicals since it was organized on March 22 with 4 teams comprised of 39 personnel.



Hyundai Mipo Dockyard Co., Ltd launched its first line "8027" CON-RO Ship.

Hyundai Mipo Dockyard Co.,Ltd launched its first line of CON-RO (on the right side of the photo), the high value ship, following the construction of Pure Car Truck Carrier (PCTC) and the open hatch ordinary cargo ship.

Hyundai Mipo Dockyard announced that it launched the first ship "8027" of the five 24,400-ton CON-RO ships for Italian GRIMALDI on the fourth dock on January 12.

Following the steel cutting ceremony in March last year, "8027" was unveiled in about 90 days after the keel laying on the third dock in October.

Scheduled for delivery in early April after the finishing works at the quay wall for about three months, this ship is 210 meter long, 32.2 meter wide, and 37.2 meter high with a speed of 20.9 knots.

Particularly, this ship can load or unload the freight that has the self-driving force, such as car, bus, truck, etc, as well as container, by using the trailer or crane installed on the ship.

Meanwhile, "8004", the final ship among the four 49,000-ton open hatch ordinary cargo ships of Norwegian GRIEG, was launched on that day together on the fourth dock. ⚓



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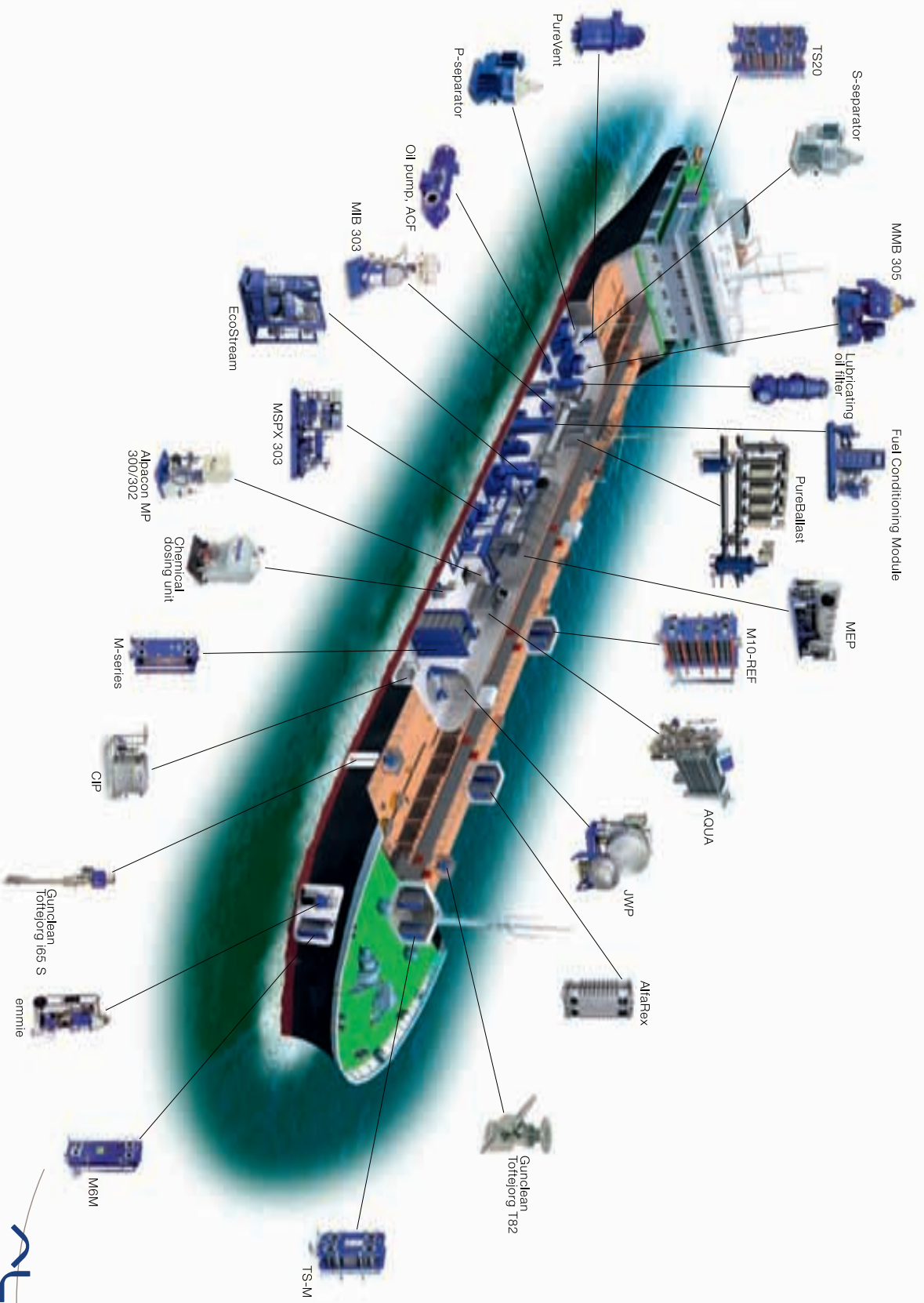


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Alfa Laval on board



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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 introduces 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.

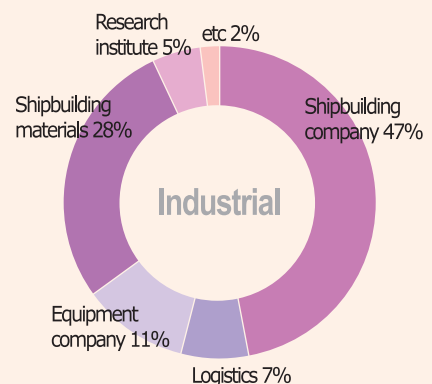
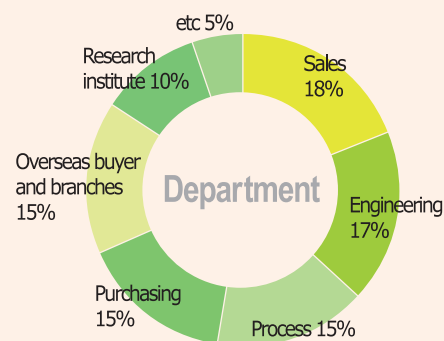
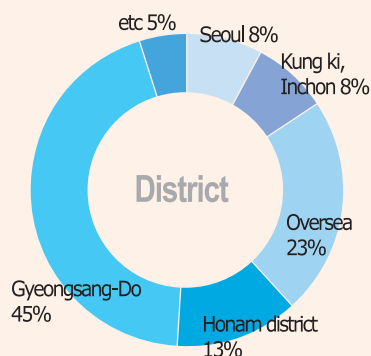
Product

New shipbuilding industry products overview

Business News

Issues and news articles from global shipbuilding companies and organizations

Detailed area breakdown





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HEMPEL



The future of high value ship and our countermeasures

Clinching the order primarily for the high value ship is the common business strategy of top-rated domestic shipbuilding companies. That strategy reflects the strong will to gener-

ate more revenue with the same input of elements of production. Korea shipbuilding market also bore the brunt of the



global depression last year with the declining order inflow.

Korean shipbuilding industry regained its top market dominance from China again and maintained its top position as the order inflow began to rise from the latter part of 2009.

The Korean shipbuilding industry has rebounded along with the increasing share of flagship products such as offshore plant, drill ship, FPSO, icebreaking tanker, LPG carrier, LNG carrier, oil rig, and others, which Korea has technological prowess in.

Let's have an up-close view of domestic shipbuilding companies to explore their strategies for growth and their goals.



Samsung Heavy Industries Co., Ltd.

Samsung Heavy Industries has the strategy to conquer the market of high value special ship, such as LNG-FPSO, cruise ship, etc, to revive its growth momentum of order inflow which has been stagnated in the aftermath of global economic depression.

1. Samsung Heavy Industries have conquered the LNG-FPSO market.

Samsung Heavy Industries developed LNG-FPSO, a new-concept ship capable of producing, liquefying, and storing natural gas on the sea in 2008 for the first time on the planet, and has been awarded all orders for five LNG-FPSOs placed from countries across the globe since 2008.

LNG-FPSO is the FPSO for natural gas ordered for the first time worldwide, unlike the ordinary FPSO for the production and storage of crude oil. LNG-FPSO provides the multiple functions of producing, liquefying, and storing natural gas, and does not require the construction of in-land liquefaction and storage facility that costs tremendously, and has been ordered as a special ship tailored to the requirement for the commercialization of about 2,400 small-to-medium sized offshore gas fields throughout the world that has less than 100 million tons of reserves

Before the LNG-FPSO was developed, the natural gas extracted from the gas field was stored in the in-land liquefaction and storage facility and then was transported through LNG carrier.

LNG-FPSO that Samsung Heavy Industries developed is the multiple function ship mounted with the facility to liquefy and store immediately on the sea, and does not require the in-land liquefaction and storage facility that costs KRW 2 trillion on the average, and was developed to meet the requirements for the commercialization of small-to-medium sized offshore gas fields.

Signing the long-term supply contract in July last year with Royal Dutch Shell, the global oil giant, to build up to 10 LNG-FPSOs worth \$50 billion over the 15 years to come, Samsung Heavy Industries has conquered the LNG-FPSO market.

LNG-FPSO that Samsung Heavy Industries will construct is 456 meters long, 74 meters high, and weighs 200,000 tons (empty weight), worth \$5 billion which is equivalent to the value of 35 very large oil tankers.

In addition, this ship can store 450,000m³ of LNG equivalent to the LNG consumption of three days in Korea, and is planned to be used for the production of 3.5 million tons of natural gas annual in the offshore gas field in the northwestern part of Australia from 2016.

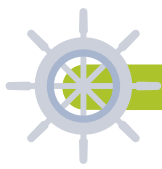
Considering that as many as 44 drill ships for deep-water oil field development have been ordered over the last four years, dominating the offshore plant market, the orders for FPSO or LNG-FPSO for producing the crude oil and natural gas in the oil field and gas field discovered by the drill ship are expected to be flowing in.

2. Samsung Heavy Industries has become the byword for high value ship, achieving unrivaled competitiveness in the drill ship sector

Samsung Heavy Industries has become synonymous with high value ship and has secured an unrivaled competitiveness in the drill ship sector, the engine of growth for maritime industry.

Drill ship is the maritime vessel capable of extracting the crude oil and gas at deep-sea or on the sea with high waves where offshore platform cannot be installed, and is a high tech and high value ship providing the mobility and the ability to extract resources from the deep sea bed.

The drill ship orders resumed in August, 2005, five years after they came to a halt in 2000, and it was Samsung Heavy Industries that clinched the order for the first ship. This drill ship, designed for the extraction in the Polar regions of the North Sea, is the special ship which can extract the crude oil,



overcoming the sea conditions of the North Sea.

This drill ship is said to represent the integration of advanced technologies enabling the world's fastest drilling speed, meets the strict environmental standards of the countries around the North Sea, and conforms to the regulations governing the safety of work and the work environment, etc, for the first time across the globe.

Later, Samsung Heavy Industries has been awarded the order for 29 drill ships out of 44 drill ships ordered across the country since 2000, taking 66% share in the global market, the top share worldwide in the drill ship sector.

In 2008, Samsung Heavy Industries clinched the order for 11 drill ships out of the 19 drill ships ordered throughout the world, including the drill ship worth KRW 1 trillion which was recorded as the world's most high-priced one.

3. Samsung Heavy Industries has achieved the dominance in the polar region ship market with its ice breaking tanker.

Samsung Heavy Industries received the orders in 2005 for three 70,000-ton ice breaking tanker, which can both advance and reverse in navigating the sea in the Polar regions, from Sovcomflot, Russia's largest state-owned shipping company, advancing into the global ice breaking tanker market for the first time in the history of shipbuilding industry.

The significance of this order for the ice breaking tanker is

that the market is a "blue ocean" which no domestic shipbuilding company has ever advanced into, setting the stepping stone for Samsung Heavy Industries to achieve the dominance in the high value shipbuilding market as the oil field development in the Polar regions will be promoted.

The deep sea bed of Arctic may hold approximately 1.5 trillion barrels of oil which can be used for 6 decades by the entire population across the globe and 48 trillion cubic meters of gas that is equivalent to the half of global reserve.

Having made inroads into the global ice breaking tanker market, Samsung Heavy Industries secured the dominance in the polar region tanker market and is better positioned to clinch orders for the ice breaking LNG carrier and ice

breaking container vessel in the upcoming years on the basis of its ice breaking shipbuilding technology.

STX Offshore & Shipbuilding Co., Ltd.

STX, the mecca of core technology, has remained completely stable despite economic recession.

- STX advances into the high value ship market with its cutting-edge shipbuilding technology
- STX is solely capable of building cruise ship in Korea in the wake of the launch of STX Europe
- STX Europe is the repository of core technology, such as the cruise ship, national defense sector, ice breaking vessel, etc
- STX seized the opportunity for growth based on its motto "Technology Business" amid the economic recession

STX is the one of the most outstanding global company, advancing by leaps and bounds despite the global economic depression. STX has tided over difficulties wisely through its drastic investment in the core technology, differentiated from competitors, which it has made in preparation for economic sluggishness.

1. STX is gearing up to open offshore plant market, winning the contracts for drill ship, FSU, and others.



A magnificent scene unfolded at the production base of STX Dalian Shipbuilding in Dalian, China, in late July last year before the delegates of ship owners, registers of shipbuilding, and officials of STX Dalian Shipbuilding as the 1,000-ton block was being installed in the trench facility (offshore structure installation facility).

That was a symbolic event proclaiming that STX has embarked on full-fledged production since it advanced into the offshore plant business. On that day, the block which was installed in the trench facility was the block of the offshore pipe layer (OPL) ordered in October 2007.

The offshore pipe layer (OPL) plant, which swung into production from that day, was the offshore plant for which STX Group received the order first time, and is scheduled for delivery to Technip, a global engineering company, in France in 2010.

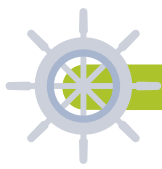
Particularly, the offshore pipe layer (OPL) plant which will begin to be built this time is the high value ship requiring highly advanced design and quality, and will carry out the

installation of pipes for the transportation of crude oil in deep sea.

An official at the production base of STX Dalian Shipbuilding said, "The offshore plant finally swung into production at the production base of STX Dalian Shipbuilding which will make a leap forward to become the production base of offshore plant in the years to come", and he added, "We will make the best use of the global network linking Korea, China, and Europe to develop the offshore plant business as the new engine of growth."

STX Group has focused on opening new market abroad and R&D in this expanding market in the wake of the transfer of the offshore plant business to STX Offshore & Shipbuilding, while strengthening its position in the field of high value special ship.

STX has produced various offshore drilling and production facilities tailored to the requirements of customers in its shipyards in Korea and Dalian, China, and 15 shipyards of STX Europe which reach across 6 countries on the basis of its cut-



ting-edge design know-how and shipbuilding ability and vast technical capabilities of STX Europe. Following the \$200 million worth of the order which it was awarded in 2007 to build offshore pipe layer (OPL) plant, STX Group won the \$800 million worth of order for four drill ships and an order for Floating Storage Unit (FSU), the crude oil storage facility, consecutively in 2008, expanding its competitiveness remarkably in the field of offshore plant. This year, STX Group plans to secure the capability to carry out the construction of EPC (Engineering, Procurement & Construction) based on the successes that it has achieved from the previous projects, and clinch the orders for high value products such as FPSO, drill ship, semi-submersible rig, LNG floaters and others. Particularly, STX Group expects tangible achievements from the offshore plant project on the basis of its active partnership with foreign countries rich in natural resources, such as Mid Eastern countries, Latin American countries, and African countries, etc.

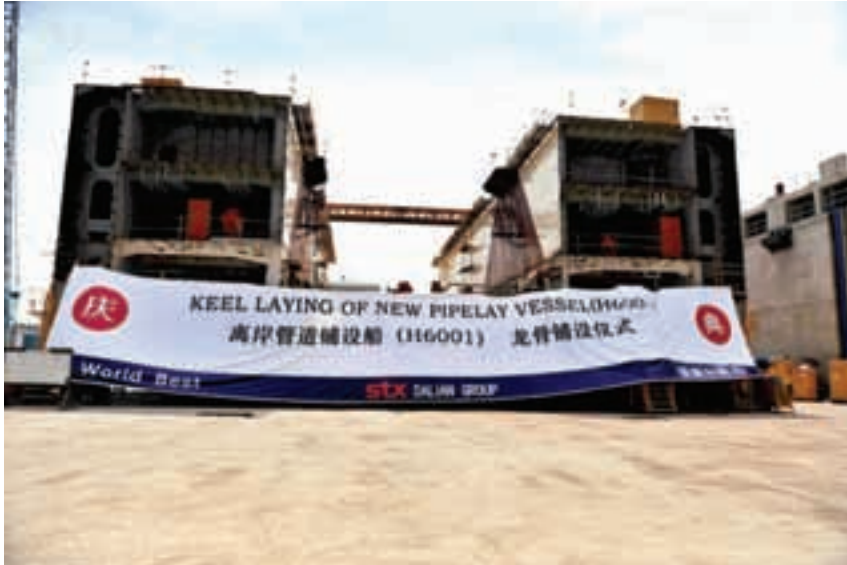
2. STX aims to achieve the specialization by shipyard, maximizing the production efficiency.

STX will use the launch of STX Europe, the largest shipbuilder in Europe, as the springboard to target Norway, France, and Finland as the three major strategic bases in Europe and move forward vigorously with its strategy to achieve the specialization by shipyard.

In the first place, STX plans to develop Norway into the offshore production base. It has the strategy to expand the opportunities for business through the systematic linkage with the existing network of Africa, South East Asia, and Central and Latin America which have a large demand for the resource development.

In France, STX will secure a new engine of growth by focusing on the cruise and national defense industry. It aims to develop its cooperative relationship with the French government on the basis of the core technology of French shipyards in LNG carrier and the construction of aircraft carrier, submarine, etc, in order to advance into Europe, Mid East, Africa, and other regions.

In Finland, STX plans to develop business model for researches on the Polar regions on the basis of the world's best ice breaking vessel technology. The core technology of Finland in the ice breaking vessel and special ship is expect-



ed to be instrumental very much in developing the resources in the Polar regions.

3. STX has emerged as the practical power in the special ship sector.

Winning the orders from national defense industry, it spearheads the effort at a revival in the order inflow.

STX announced that it was awarded the order in the national defense sector in recognition of its excellent ability to build special ships. STX received an order for one next-generation naval test ship from the Agency for Defense Development (ADD) in May last year.

A naval test ship supports marine weapon system tests and conducts environmental surveys on the test sea area. The ordered vessel is a further advanced model equipped with the latest technology and state-of-the-art functions to test and evaluate enhanced weapon system.

The vessel, worth approximately KRW 43 billion, weighs 1,200 tons and is capable of accommodating about 30 people, with a speed of up to 4,000 nautical miles, and is scheduled to be delivered to ADD in May 2012.

The Specialized Ship Division of STX Offshore & Shipbuilding has successfully built "Hanbada," a training vessel for Korea Maritime University, in 2005, and has undertaken basic designing of an ice breaker for the Korea Ocean Research and Development Institute. And last year, it established a Research Institute of Naval Technology focusing on R&D of special ships.

Currently, four guided missile high speed ship (PKX) ordered from Defense Acquisition Program Administration, and two 1,500-ton high speed patrol ships and one 3,000-ton training vessel for Korea Coast Guard are being built at the Shipbuilding Complex in Jinhae, Gyeongnam, a province in the southeast of South Korea.

Do Jong-chil, director of STX O&S Specialized Ship Division, said, "Despite extremely low order inflow, we have attained good results through our multifaceted analysis of customer demands and strategic sales activities." "We plan to expand our capabilities

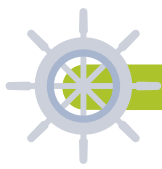
in building specialized vessels in collaboration with STX Europe, and the export counselling has been in progress actively to increase the benefit to the nation through the export in the defense industry."

Earlier, the group achieved good result, clinching the order for specialized vessel in April last year. STX France Cruise, a subsidiary of STX Europe, won an order of one 21,000-ton military transport vessel (helicopter carrier) from the French government.

Daewoo Shipbuilding & Marine Engineering Co., Ltd.

Daewoo Shipbuilding & Marine Engineering Co., Ltd has evolved into the world's best shipyard in the shipbuilding and maritime industry through its on-time delivery and best quality product.

Among others, LNG carrier of Daewoo Shipbuilding & Marine Engineering has stayed head and shoulder above other companies, bolstered by its technological prowess and know-how. In fact, Daewoo Shipbuilding & Marine Engineering has clinched the orders for a total of 82 ships related to LNG carriers (except the Moss type) until November 2009 and has delivered 68 ships so far, breaking the world's record in the order intake and delivery. In 2007, the LNG carrier and LNG-RV carrier of Daewoo Shipbuilding & Marine Engineering were selected as world's top class products by the Ministry of Knowledge Economy.



Daewoo Shipbuilding & Marine Engineering has maintained its competitive advantage through its steady investment in technology and product development. The most typical example showing the competitive edge of the company is the LNG-RV (Regasification Vessel) which was unveiled in 2002.

This vessel is the new-concept vessel capable of transporting the liquefied natural gas (LNG), equipped with the revaporization facilities mounted on the existing LNG carrier, while being moored at the sea. LNG-RV incorporates the cutting-edge technologies such as Maneuvering Aids & Positioning System (MAPS), mock test apparatus, facilities for mooring at the sea and gas supply system, and others, as well as revaporization facilities. Capable of carrying out the works which used to be performed by the in-land supply base, LNG-RV is touted as a new technology which saves the cost of facilities which usually require tremendous investment and reduces the damage to the environment arising from the process of construction. Above all, LNG-RV also serves as the terminal as it can be supplied with the liquefied natural gas transported by ordinary LNG carrier and supply the LNG to the small area by itself.

In 2005, hurricane Katrina in New Orleans, USA, shut down all gas supply facilities in and around the impacted area. However, the LNG-RV vessel built by Daewoo Shipbuilding & Marine Engineering demonstrated its superb performance as it solely continued to supply gas, and the company received the letter of appreciation from its ship owner.

The ordinary LNG carrier of Daewoo Shipbuilding & Marine Engineering incorporates the technology distinctive to Daewoo Shipbuilding & Marine Engineering. Twin axis diesel engine method is one of the most typical examples for that. This technology, the first-ever across the globe, was applied

to the construction of 210,000-ton very large LNG carrier built in 2007, and is characterized by the connection of two engines to each axis.

This technology provides the advantage of enabling the operation of the heterogeneous engine in parallel and the operation with the other engine in emergency if one engine is out of order.

In addition, LNG-RV provides strong propulsion and stable maneuvering performance, and also provides the excellent capability of vibration and noise suppression. The existing LNG carrier naturally emits 4 to 6 tons of vaporized gas per hour during the transportation of load. Therefore, the engine for existing LNG carrier had to be the one which consumes this gas in order to treat this gas even if the efficiency was low, and the apparatus which can use the fuel such as kerosene, and diesel, etc, had to be put into place together to make up for the shortfall of gas during the operation at full speed. Besides, the most of the vaporized gas had to be incinerated when the carrier was passing entrance port and an exit port or standing by in the terminal where the engine is not operated nearly at all.

The gas wasted in that way is approximately 300 tons per sail. Daewoo Shipbuilding & Marine Engineering developed two technologies to save the LNG which used to be wasted away and secure the economic efficiency. One is the re-liquefying technology, and the other is 'sLNGc' technology. Re-liquefying technology is to re-liquefy LNG which is vaporized into the air naturally and transport the re-liquefied LNG to the freight compartment through the re-liquefying facility on the LNG carrier.

Furthermore, Daewoo Shipbuilding & Marine Engineering developed 'sLNGc' (Sealed LNG Carrier) in 2007 to prevent the vaporization of LNG fundamentally and completed 10 patent applications both in Korea and abroad. This technology intercepts the vaporization of LNG fundamentally and prevents the damage to the freight by increasing the pressure inside the freight compartment.

Those technologies enables the saving of the LNG consumption, helping generate about \$1 million in additional revenue annually. In that way, the technology of Daewoo Shipbuilding & Marine Engineering maximizes the benefit of ship owner, providing the win-win situation for both ship owner and shipyard.

Daewoo Shipbuilding & Marine Engineering has maintained its unrivaled position in the LNG carrier field, bolstered by its



technology prowess. The most typical example for that is the Qatar gas project which has been carried out in collaboration with the Qatar's state-owned petroleum company and the oil giant Exxon Mobil since it was launched in 2003.

Daewoo Shipbuilding & Marine Engineering was awarded the contract to build 19 LNG carriers out of 46 large LNG carriers ordered from this project, and broke the world's record of

order intake as a single shipyard. Five carriers were delivered successfully so far.

'Al Ruwais' which grabbed the attention as the world's first very large 200,000m³ LNG carrier, was selected the most excellent vessel in 2007.

Daewoo Shipbuilding & Marine Engineering plans to make significant inroads into the new LNG product market on the basis of its LNG carrier technology and market dominance.

The current technology of LNG carrier pursues the role of LNG complex base capable of the whole processes that encompass the production, storage, transportation, and supply, going beyond the simple transportation of LNG.

Daewoo Shipbuilding & Marine Engineering also plans to expand its share in the complex LNG plant market with its LNG FPSO (Floating, Production, Storage and Offloading vessel) which moves to the field that has abundant LNG reserves under the sea and produces LNG from deep-water production fields and liquefies the produced LNG for storage before unloading, and LNG FSRU (Floating Storage and Regasification Unit) which vaporizes the liquefied and stored LNG into the form of natural gas ready for supply. ⚓



FuelSaver

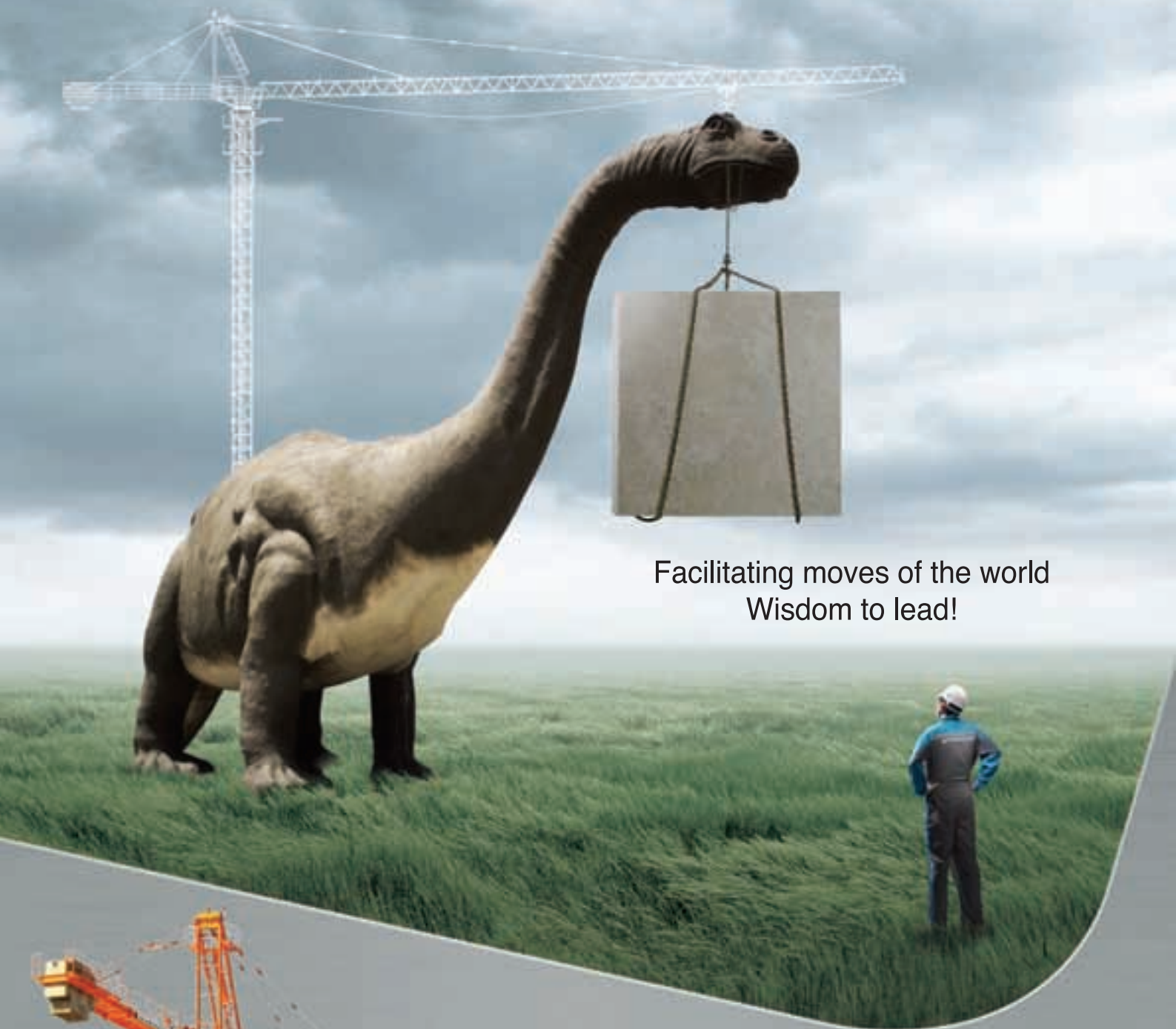
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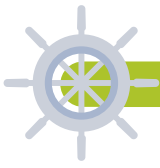
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Specialized research institution for the shipbuilding marine materials and supplies that leads the future technology - Korea Marine Equipment Research Institute (KOMERI)

Korea Marine Equipment Research Institute

1. Policy Research Division

- Planning of research projects and establishment of project targets
- Business related to the management of the knowledge assets
- Research, planning and trend-analysis business related to technological policies
- Public relation activities and dissemination of the research results

2. Planning and Publicity Team

- Establishment of mid-to long-term advancement strategy for the KOMERI
- Works related to the management objective, practical plan establishment and innovation
- Review and analysis of outcome for each project
- Affairs on operation of the Steering Committee and the Board of Directors

- Structuring and implementation of evaluation system for employee work competency
- Affairs related to the quality control and audit
- Affairs related to the computerization and publicity

3. Management Support Team

- Affairs related to budgeting
- Affairs on accounting and business expense settlement
- Affairs on human resource management and employee service
- Affairs on purchase of goods and contracting
- Affairs on property management and facilities maintenance
- Affairs on document conservation and publication management
- Affairs on other operation of the KOMERI

1) Project for the Electronic Equipment Test Certification Center for Ships



(1) Project classification

Regional Strategic Industrial Promotion Project (regional industrial base structuring project) of the Ministry of Knowledge Economy

(2) Summary of project

- Project name: Electronic Equipment Test Certification Center for Ships
- Scale of project: 14.34 billion won (government for 10.14 billion won, local government for 3 billion won, and private fund for 1.2 billion won)
- Period of project: 2004. 1. 1 ~ 2008. 12. 31 (5years)

(3) Objectives of project

- Structuring of infra for international certification level of facilities and equipment support
- Structuring of systematic and efficient integrated quality certification system and service support
- Support of core technology support and specialized human resource required for the new product development
- Support of testing and certification service of domestic and overseas dimensions Provision of technology information and trend of high technology
- Re-education of industrial human resources

(4) Contents of project

- Testing and certification evaluation project
- R&D

- Information supporting project

- Equipment supporting project

- Education and training project and others

2) human resource development project for tailored shipbuilding marine materials and supplies for business enterprises

(1) Project classification

Industrial technology human resource development project of the Ministry of Knowledge Economy

(2) Objectives of project

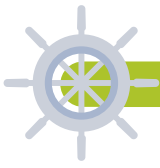
- Strengthening of technology development competency for the shipbuilding marine materials and supplies companies
- Structuring the training basis for the shipbuilding marine materials and supplies industry
- Improvement of specialized human resource in shipbuilding marine materials and supplies industry

(3) Summary of project

- Name of project: human resource development project for tailored shipbuilding marine materials and supplies for business enterprises
- Period of project: 2005. 5. 1 ~ 2010. 4. 30

(4) Content of project

- Preparation of re-education road map



- Teaching material development and lecture opening
- Organization of various committees and structuring of infra
- On-Line and Off-Line education system
- Networking and DB for human resource
- Seminar on newest technology
- Securing of specialized lecturers with human resource pool system
- Publication of publicity data and publicity campaign

3) Shipbuilding related materials and supplies and part standardization base structuring project

(1) Project classification

Industrial technology base project (standardization field) of the Ministry of Knowledge Economy

(2) Summary of project

- Name of project: Shipbuilding related materials and supplies and part standardization base structuring project
- Size of project: 2.67 billion won (government for 2 billion won, private for 0.67 billion won)
- Term of project: 2005. 4. 1 ~ 2010. 3. 31 (5years)

(3) Objectives of project

Structuring the basis to lead the global standard in the shipbuilding materials and supplies industry

(4) Contents of project

- Item standardization
 - standardization for common use
 - Strengthening of international standard and standard activity competency for leading technology and market
- Structuring of standardization system
 - Discovery of expert and organization

- Support and management of expert activities
- Dispersion and expansion of outcome and result

4) Project for part material reliability improvement

(1) Project classification

Part and material reliability evaluation base structuring project of the Ministry of Knowledge Economy

(2) Summary of project

- Name of project: Part and material reliability evaluation base structuring project
- Term of project: 2005. 5. 1 ~ 2010. 4. 30

(3) Objectives of project

- Structuring of reliability evaluation base for development of the shipbuilding materials and supplies industry
- Establishment of reliability certification system
- Dispersion of reliability technology data in the shipbuilding materials and supplies field and increase of technology exchanges

(4) Contents of project

- development of reliability evaluation items
- reliability evaluation test and interpretation of break down
- development of reliability evaluation standard
- Structuring of reliability evaluation equipment
- environment test

5) The development of basic technology for high-valued next generation ship's equipments

(1) Project classification

The SME hub technology development project of the Ministry of Knowledge Economy

(2) Summary of project

- Name of project: The development of basic technology for high-valued next generation ship's equipments
- Term of project: 2007. 9. 1 ~ 2012. 8. 31

(3) Objective of project

- Domestication and commercialization of 9 items of materials and supplies in high-valued ship



- Item: Light weight, door and frame set for each grade/type, window and frame set for each grade/type, and provision store

(4) Contents of project

- Domestication and commercialization of 9 items of materials and supplies in high-valued ship
- Structuring DB related to production and works for 9 items of materials and supplies in high-valued ship
- Pilot product production and capability evaluation performance
- Acquisition of Korean Register of Shipping approval and USPH (United State Public Health) approval

6) SMBA industry and research Joint technology development consortium project

(1) Project classification

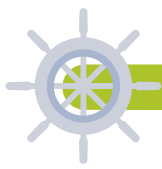
SMBA industry and research Joint technology development consortium project

(2) Summary of project

- Name of project: SMBA industry and research Joint technology development consortium project
- Term of project: 2008. 7. 1 ~ 2009. 6. 30

(3) Objectives of project

- Strengthening of corporate technology through the trouble shooting in on-site technology and dispersion of core technology



- Structuring the cooperative system for joint technology development for self-regulated industry and research

(4) Contents of project

- Technical support and joint studies of SME
- Provision of equipment and facilities
- Transfer of technology held by the KOMERI
- Training on operating various high-tech softwares
- Publicity for participating companies in the consortium through the publicity media of the KOMERI
- Testing and measuring for the quality assurance of the developed products
- Hosting of education and training sessions, technology instructions and workshops

4. Fire prevention testing equipment

- Vertical furnace



- Horizontal furnace



5. Explosionproof testing equipment

- Inside of explosionproof test lab
- Testing equipment



- Inner pressure explosionproof



6. Sound test

- Full view of sound test lab



- Reverberation Room



- Measurement equipment



- Inserting cassette



- Inside of No. 1 and 2 Lab

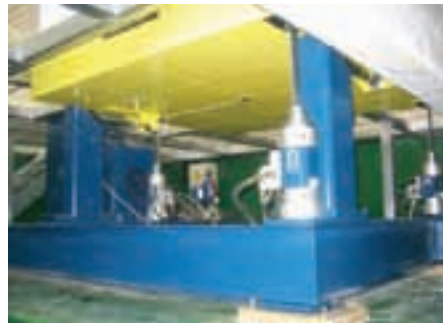


7. Vibration test

- Large vibration tester



- Large vibration tester (lower part)



- All-purpose vibration tester

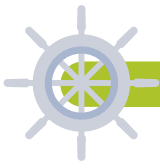


8. Environment test

- Small thermo-hygrostat

- Thermo-hygrostat






- Salt water spray tester



9. EMC test

- 10 m EMC Chamber
- Shield Room
- EMI Test System
- Power Fail Simulator
- RF Power Amplifier
- C.V.C.F System
- Signal Generator

10. Bio-environmental tests

- Water quality multi-probe test kits
- Clean bench
- Fluorescent microscope
- Air shower
- Clean room 

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- propulsion
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Structural Adhesives

Parker Fluid Connectors Group Marine Products Offering

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

Tube Fitting



Parflange F37



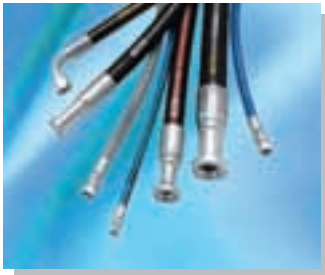
Tube & Bending



SensoControl



Hydraulic Hose



Industrial Hose



High pressure Hose



Multitube



Marine Hose



Parker Scanrope
Mooring Line



Parker Scan Subsea
Parker Cabett Subsea
Umbilical & Cable



Quick
Coupling



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Parker Hannifin Connectors, Ltd.

1. The World Leader in Motion and Control

Parker is the global leader in motion and control technologies, partnering with its customers to increase their productivity and profitability.

Parker Hannifin is the world's leading diversified manufacturer of motion and control technologies and systems, providing precision-engineered solutions for a wide variety of mobile, industrial and aerospace markets. The company's products are vital to virtually everything that moves or requires control, including the manufacture and processing of raw materials, durable goods, infrastructure development and all forms of transport. Parker is strategically diversified, value-driven and well positioned for global growth as the industry consolidator and supplier of choice.

Where can you find Parker?



Parker is The Global Leader in Motion & Control Technologies. Within Parker's eight operating groups, the company's engineering expertise spans the core motion technologies - electromechanical, hydraulic and pneumatic - with a full complement of fluid handling, filtration, sealing and shielding, climate control, process control and aerospace technologies.

Parker's 9 Technologies support 1,200 Markets Worldwide



2. Parker Hannifin Connectors Products Offering

Parker Hannifin Connectors, Ltd located in Yangsan, Geongsangnamdo, Korea has been manufacturing Fluid Connectors products, Hydraulic Hose, Hose fitting, Tube Fitting, Quick coupling, Tube Fitting, Brass Fittings and automotive LPI products.

In Korea, Parker launched Joint Venture 1986 started Hydraulic Hose and Fitting Production as named HS Parker. Ltd. and completed New Plant at Present Location in 1990. 1998, Parker Acquired Full Ownership of the Joint Venture Changed Company Name into Parker Hannifin Connectors Ltd.

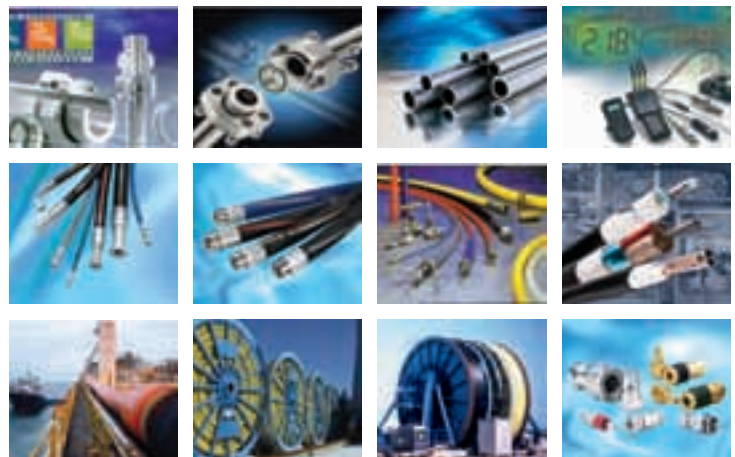
- 1986 *Launched Joint Venture Started Hydraulic Hose and Fitting Production*
- 1990 *Completed New Plant at Present Location*
- 1995 *ISO 9001 Certified for Manufacturing Hydraulic Hose and Fittings*
- 1998 *Parker Acquired Full Ownership of the Joint Venture.*
- 2000 *Established Parker Hydraulics Engineering Center Governmental Award \$10 Million Export Tower*
- 2003 *Recorded Monthly Hose Production 1,000,000 meters*

- 2004 *Opened 1st Parker Store in Ulsan, started 1st GPP Contract: Injection Molding Machine*
- 2005 *ISO 14001 Certified (Environmental) ISO/TS 16949 Certified (Automotive)*
- 2007 *Reached \$100 Million in Sales*
- 2009 *Opened Korea Marine Service Center.*

Parker Hannifin Connectors Ltd. has been providing various hydraulic products with premier customer service and high quality to leading manufacturers of Heavy Industry; Hyundai Heavy Industry (HHI), Doosan Infracore (DIC), Volvo construction Equipment Korea (VCEK) as well as various hydraulic customers in Korea. Also Parker Hannifin Connectors has been exporting products locally manufactured with certified systems and management to overseas divisions and customers.

Parker Fluid Connectors Group Marine Products Offering

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



3. Parker Korea Marine Service Center (KMSC)

Parker Hannifin Connectors Co., Ltd. opened Korea Marine Service Center to offer Marine services, like pipe-spool bending, Hose Assemblies, Breadman Services, Kitting, Tech Services, Training. Korea Marine Service Center also is responsible for



the development of Hydraulic components, design of system integration and installation in the construction yard. Especially, it plays a leading role in replacing welding with environment- friendly technology with the Non- Welded connection technology in Hydraulic connection lines, and pipe routing and design using 3D modeling. Especially Korea MSC offers the cold bending capability max. Tube size up to 220 x12mm



The following works are the Parker Marine Service Center's work scope.

- Prefabrication
- On site supervision
- Installation
- Modification
- Flushing
- Testing
- Piping Turn Key Package
- Breadman (KanBan)
- Kitting
- Tech Service
- Hose assemblies
- Multi Group products and services



Prefabrication

- Design
- Bending
- Flaring, grooving
- Kitting
- Pressure testing
- Cleaning
- Flushing
- Documentation
- Shipping



Product & Service

- Tube Fittings, EO2FORM
- Tubes, Tube Clamp
- F37 Products, Flanges
- Hose, Hose Fitting
- Prefabrication
- On-site Service Team
- Engineering Support



4. Systematic Piping Solutions. - Traditionally Parker always offers the best performance.

Regardless of the enormous outlay of time and expense, and the safety risks arising from deficient welding, neglectful X-raying or ultrasound testing, welded hydraulic lines are still being deployed.

In this respect, weldless flange systems offer the possibility to make significant savings. At the same time, this kind of connector opens up previously unknown degrees of freedom to machine and equipment builders. In screwed hydraulic lines, freedom from leaks and contamination, and resistance to pressure, are an absolute given. There is no expensive inspection or weld certificate, and everything can be done with just one socket wrench.

Ever-higher requirements

The development of hydraulics is characterized by increasing system pressures, the necessity to reduce installation, maintenance and also operating expenses, and by increased safety requirements, as well as by larger, more powerful machines and plant. On top of all this come increased ranges of types and the demand for compact, space-saving hydraulic tube systems. All of these demand a rethink in respect to planning, construction and operation, and require new solutions. This applies to hydraulic lines for both stationary as well as mobile systems. The Parker Piping Solutions concept provides an answer to these problems.

A complete solution

It is not only too many cooks who spoil the broth. Parker Piping Solutions offer you the complete professional solution for hydraulic systems.

From advice on design and pre-assembly through to delivery and installation - everything is of the highest quality and reliability. You have only one contact person and will have no problems with friction or

co-ordination among personnel. You can take the load off your own team and free up your capacity - altogether, its time-saving for you and for us. This is how we are applying high pressure to achieve new efficiencies.

5. Parker marine essentials

1) Product solutions for the marine industry

Be worth your passengers' trust Parker helps to keep all the essential on-deck and below-deck machinery and safety equipment operating.

Whether it's a cruiser, off-shore rig or tanker, pleasure boat, barge or yacht, Parker has the products for all your marine applications. Over 500,000 parts to meet your various marine system needs.

Parker provides innovative components and complete systems to customers worldwide. With extensive engineering expertise in motion and control, market leading breadth of product, and unequalled global distribution, Parker partners with customers to improve their productivity and profitability.



Parker offers one of the most extensive motion and control product lines. With Parker's range of products, we are ready to be your single source supplier for all your marine components, sub-systems and system solutions.

2) Officially approved

For the protection of life, property and the environment, many of Parker products are certified according to GL, LR, DNV, RINA, BV, ABS, USCG and MarED.

Off-shore, month after month, and everything goes smoothly.

Feel relaxed on ships and off-shore rigs. All the hydraulic systems operate at maximum efficiency.

With the assistance of Parker's application engineers you can be sure that the capability of your new marine system will meet or, better, exceed both your specifications and your expectations.

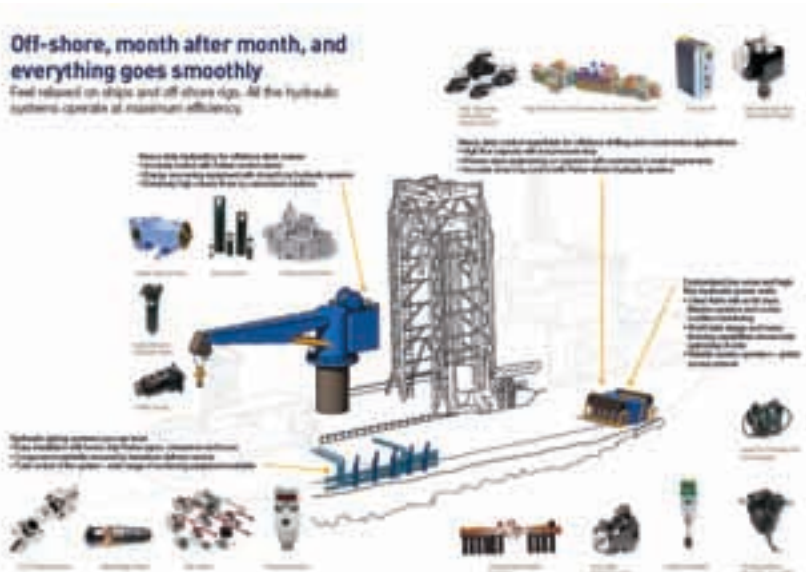
Our engineers will work with your designers to bring together all of the components to meet your marine equipment specifications, and we will work with you to optimize your application's requirements and minimize the space required. Parker is your system Partner. The people at Parker are dedicated to Total Quality Management. Parker can help you save both time and money, with shorter lead times, less paperwork, and fewer hassles.

3) Efficient disembarking, and back to the high seas

Let us reduce operator stress and keep equipment operating efficiently. With Parker's marine solutions it should be a calm crossing.

From our various operating groups, discoveries and technological advancements can be applied across the corporation for the benefit of our customers. Parker systems capabilities enable our customers to reduce their number of vendors while realizing benefits, such as single point ordering and invoicing, strategic account management and kitting on a global scale. Your engine, vessel, system or equipment can be serviced and supported anywhere. Parker operates more than 250 manufacturing facilities around the world. That ensures on-time deliveries around the globe. Through years of close cooperation with clients all over the world we have accumulated a wealth of knowledge, which we are proud to share with you. Wherever your markets or destinations are, expect to see Parker there too.

6. Parflange® F37 system for high pressure tube flange connections without welding, Unique flange program makes welding unnecessary!



Broaden your design opportunities.

The new Parflange® F37 technology is suitable for tube sizes from 16 mm up to 140 mm outside diameter and for pressures up to 420 bar. Coupled with the widely diverse range of types, completely new perspectives in design



Save time and costs.

In comparison with standard welding procedures, Parflange® F37 technology shows outstanding time and cost savings. For example, expensive tube connection cleaning and x-ray procedures immediately become a thing of the past. Also, the manufacturing time for a tube connection rapidly reduces by more than half in comparison with traditional welding.



Profit from the advantages of a new surface finish.

Components in the Parflange® F37 flange programme are supplied with the new chromium (VI)-free surfaces, thus contributing to clean and environment-friendly production methods. ⚓

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Oil Tankers

Undersea Pipeline

Offshore Wind Power

Battleships

Cargo Ships

Passenger Ships

Seaport

Cargo Seaport

Navigation Control Tower

Seaport Security

Coast Guards

Seaport Security System

— Twisted pair cable
— Gigabit fiber optic cable

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3G+7-port managed switch

EDS-P510
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EDS-518A
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Hyundai Samho Heavy Industries Co., Ltd.



Hyundai Samho Heavy Industries Co., Ltd. specializes in the shipbuilding, equipped with world's fifth largest ship production facilities on 3.3 million m² of land in and around Samho sub-county of Yeongam County in Jeonnam Province located in the southwestern part of the Korean peninsula. Hyundai Samho Heavy Industries is complete with the cutting-edge automation facilities, and built main facilities such as dock and factory under its comprehensive plan, and maximized the efficiency of work. The company has the annual capacity of about 50 ship production on two dry docks and one on-land shipbuilding yard, and has evolved into the world's most competitive company in the

21st century, the maritime era, contributing to the development of regional and national economy.

1. History

- | | |
|---------------|--|
| Jun. 01, 1992 | Groundbreaking for Samho Shipyard Construction |
| Feb. 09, 1996 | Launched the first vessel at Samho Shipyard |
| Oct. 27, 1999 | Established Samho Heavy Industries Co., Ltd. |
| May. 15, 2002 | Reborn as a member of the Hyundai Heavy Industries Group |
| Jan. 01, 2003 | Renamed to Hyundai Samho Heavy Industries Co., Ltd. |



Nov. 30, 2004 Awarded \$1 Billion Export Tower Prize on the Export Day

Jan. 01, 2005 Established Hyundai Elephant Ssireum (Korean wrestling) Team

Aug. 16, 2006 Opened Hotel Hyundai

Jan. 09, 2007 Achieved 20 million DWT ship-building record in the shortest period

Jul. 01, 2007 Two types of ships selected as 'World Class Products'

Sept. 12, 2007 Delivered FPSO

Jun. 30, 2008 Completed on-ground ship-building facilities

Nov. 03, 2008 Successfully loaded out the

largest vessel (Suezmax tanker, 26,000 tons) in the on-ground shipbuilding history

Oct. 09, 2008 Delivered the 1st LNG Carrier

Sept. 30, 2009 Expanded 2 docks

Sept. 30, 2009 Completed the construction of Dolphin Quay-Wall

Nov. 30, 2009 Awarded \$3 Billion Export Tower Prize on the Export Day

2. Field of Business

1) Shipbuilding Division

Hyundai Samho Heavy Industries has attained the world's best productivity and quality, bol-



stered by its shipbuilding experience and technology which it has built up since it began to operate Samho Yard in 1992 and young and talented technical manpower of shipbuilding.

The company has established the computerized integrated production system, such as the cutting-edge TRI-BON design system, robot welding system, etc, and became the model of Digital Shipbuilder, incorporating the IT technology of the 21st century and the shipbuilding technology,

Equipped with 6 Goliath cranes capable of lifting 600 tons, 900 tons, 1,200 tons along with the dock and the yard, including the on-land shipbuilding yard, and operating 19 jib cranes capable of lifting loads from 30 tons to 250 tons, it has secured large-scale blocks and maximized the productivity successfully.

Specifically, it has stably made inroads into the high-value added shipbuilding market for 10,000-ton TEU container ship, FPSO, LNG/LPG carrier, and others. In addition, the company has

maximized the synergic effect in sales, technology development, design, purchase, and others, as a member of Hyundai Heavy Industries Co., Ltd

2) Transporter Division

Sharing the history with Hyundai Heavy Industries Co., Ltd, the Transporter Division has been recognized for its excellence in the production of top quality transportation and unloading equipments and has played a leading role both in the domestic and global market.

The Transporter Division which was transferred from Hyundai Heavy Industries to our company in 2004 has the one-stop operation system capable of handling the entire processes of the design, production, transportation, and test run, based on our technology that we have built through our extensive experience with many constructions. In addition, the Transporter Division has produced top quality transportation and unloading equipments in the optimized



installation site that operates the Goliath crane, which are delivered exactly on time as customers want.

(Along with the equipment and facilities shown in the photos) The Transporter Division is producing the transportation and unloading equipments such as container crane, Goliath crane, jib crane, overhead crane, ship unloader, conveyer system, bulk handling system, and others, and has

expanded its business into the floodgate facilities, bulk storage facilities, maritime structures, and others.

So far, the Transporter Division has delivered the crane and bulk unloading equipment to ports, steel mill, power plants, shipyards of 20 countries across the globe, strengthening its reputation as the global manufacturer of transportation and unloading equipment.





Besides, it successfully developed the automated crane, first-ever nationwide, and made foray into the new renewable energy sector, spearheading the efforts at the development of new technology.

The company is expected to attain continuous growth in the transportation equipment sector through its vigorous activities to clinch orders and expansion of business, a sector which has formed a critical foundation of Samho Heavy Industries based on its long experience and extensive know-how.

3. Products

- 1) Container Ship : Container ship is cargo ship that carries the load in container.
- 2) Crude Oil Carrier : Crude oil carrier transports the crude oil directly.
- 3) LNG Carrier : LNG carrier is a tank ship designed for transporting the natural gas, such as methane, liquefied at -163°C , and is one of the most typical high-value ships which require special cargo hold and welding technology for the maintenance of constant temperature.
- 4) LPG Carrier : LPG carrier is a tank ship designed for transporting liquefied petroleum gas such as propane, butane, and others.
- 5) Bulk Carrier : Bulk carrier is the ship that transports dry cargo such as coals, ores, grains, and others.
- 6) Car Carrier : Car carrier is the ship that carries cars and trucks.
- 7) Transporter : Container crane, automated terminal equipment, industrial crane, bulk carrier equipment, etc
- 8) Maritime Facility : FPSO (Floating, Production, Storage & Off-loading Unit), offshore platform

4. Research and Development

Hyundai Samho Heavy Industries has built world's strongest competitive advantage based

on its differentiated and specialized shipbuilding technology and digital technology.

The company has carried out specialized research in sectors divided into the fluid, structure, noise/vibration, and design support group. For application beyond the test level, it has used the CFD (Computational Fluid Dynamics) program and the interpretation program that it developed independently, and has shed light on the fluid phenomenon physically and applied the findings to the shipbuilding.

Hyundai Samho Heavy Industries has spared no investment in the development of the automated

equipment, maritime facilities, and the special welding capabilities for special ship, in an endeavor to ensure the high welding quality and productivity which are the most crucial in the shipbuilding.

1) Technology Education Institute

The Vocational Training Center of Hyundai Samho Heavy Industries, which opened in 1996, has played a pivotal role in providing the opportunities for self-development, setting the stepping stone for the development of company by promoting the mastery of skill, strengthening the





driving engine of growth for the country, and fostering the skilled manpower.

Committing to increasing the competitiveness of skill and technique and providing the future-oriented technology education, the Technology Education Institute has provided the education and training in a pleasant education environment complete with state-of-art equipments. The courses for technical manpower cultivation are divided into the respective sectors of shipbuilding, coating, shipbuilding consignment, and electricity work consignment.

2) Welding Research

Committed to securing the top quality welding and highest welding productivity, the Welding Research Department in the Technology Education Institute has exerted its best efforts to lay the cornerstone to become the world's best shipyard - recognized highly for its top welding technology - pursuing the site-oriented R&D, development of automation equipment, development of maritime facilities and special ship, and the cultivation of the best talented workforce. The research sectors are divided into the welding technology category (welding technology

development, WPS development, welding technician qualification management, measurement/verification/calibration, new measuring instrument application, welding automation area), robot welding method development, welding automation system/gantry development, functional carriage development and wearing, and welding work area.

5. Contribution to the Society

Hyundai Samho Heavy Industries has created about 11,000 jobs in the company and attracted about 50 vendors, playing a key role in the reinvigoration of the regional economy.

The company has been affiliated with about 40 social welfare facilities in the southwestern part of the country, engaging in various volunteer service activities, and has moved ahead with the efforts at "One Company One Village" movement to be twinned with local organizations as part of efforts to help the rural villages.

In addition, it has provided warmhearted help to needy neighbors, such as the disabled, the elderly living alone, children without parents, children with leukemia, and others. ⚓



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Major features

- **Input range selection function** : You can select specific pressure cell range you wish to measure.
- **TUF (Two Unit Function)** : You can switch standard pressure units to vacuum pressure unit (mmHg) automatically.
- **Peak hold function** : You can check the peak value in real-time due to peak hold function memorizing input value (max / min).



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 - SPAN < 10% of URL : ($\pm 0.05 + 0.015 \text{ URL/SPAN}$) % of SPAN
 - SPAN $\geq 10\%$ of URL : $\pm 0.2\%$ of SPAN
- Output DC4~20mA, 2-Wire type
- Power supply : 15~35VDC
- Explosion proof / water proof standards : Exd II C T6 / IP67
- Diverse unit available
(Pa, kPa, MPa, psi, g/cm², kg/cm², mbar, bar, mmH₂O, mmHg, %, OFF)
- 12 segment 4digit LCD display
- Memory back up for 10 years
(using non-volatile memory semi conductor)
- Arrester embodied (option)
- Pressure application range 10 : 1 Rangeability





Aquapox DTM WH3350, the Water-borne paint for the Inside of Deck House on the Ship

KCC Corporation

1. Aquapox DTM WH3350

Aquapox DTM WH3350 is the first type liquid water soluble paint applicable to the inside of the deck house and the engine room of ship that are coated with alkyd oil paint.

The name of brand new "Aquapox DTM WH3350" developed by our company implies the type and application.

Aquapox suggests that it is a water soluble epoxy coating material, and DTM which is the acronym of "Direct To Metal" means that it can be coated directly on the steel plate.

So far, the use of water-soluble paint has been confined to the construction application because of inferior physical properties compared to oil coating agent, and the water-soluble paint was constrained in its application to structures such as ships that are operated in extreme environment.

Recently, shipyards have made special efforts to reduce VOC as part of efforts to highlight the eco-friendliness, and WH3350, the water-soluble paint, is the eco-friendly product that meets the requirements of customers.

2. Strengths of Aquapox DTM WH3350

1) Shortening the Construction Process

Contemporary ships are the collection of many structures, which can be compared to factories floating on the sea, not merely the means for the transportation of

loads. Specifically, engine room has very complex system with countless number of pipelines and structures, as well as engine. Thus, the installation of engine and mechanical equipment require a long construction process which may affect the schedule of entire ship construction processes. In addition, frequent use of fire for welding, etc, raise the concern of fire, and consequently, the coating is difficult to be carried out in parallel with such processes, complicating the operation of processes as a result.

"Aquapox DTM WH3350" can shorten the time taken to complete the coating as it reduced the existing oil 2-coat specification to 1-coat specification. Besides, it reduced the post-coating minimum hour for access to less than 12 hours per coating from more than 24 hours for two coatings, which increases the productivity remarkably.

2) LOWVOC/Incombustibility

"Aquapox DTM WH3350" is free from any toxic solvent odor because it is a water-soluble paint, and has the advantage of stable physical properties against fire.

In addition, it is a low VOC paint containing only 1/10 of VOC compared to the existing oil paint, and provides many advantages for the processes as it enables the welding and coating at the same time and the performance of coating work in the area with many workers not wearing the gas mask. Aquapox DTM WH3350 was granted the certification of incombustibility by prominent registers of shipping, such as Korean Register of Shipping (KR), Det Norske Veritas

(DNV), etc, in recognition of its excellent incom-
bustibility.

3. Core Technology of Aquapox DTM
WH3350

1) Hardening Structure

The hardening structure of first type liquid water solu-
ble paint can be divided into the fusion and oxidation
hardening. The water soluble resin can be divided into
hydrophilic and hydrophobic part. The hydrophobic
part is inside the emulsion particle while the
hydrophilic is oriented toward the outside. .

The resin emulsion particles remaining after the water
is removed fast in the early stage of coating undergo
the process where the resin particles coalesced by
the surface active agent and contrast agent are
released and intertwined one another, which is called
'fusion'.

In addition, the dual bond inside the chain of resin oxi-
dizes and combines one another, which is called
'oxidation hardening'. The film of the first type liquid
water soluble paint is formed completely based on
those two hardening structures, and the elaborate-
ness of the coating film and the resultant curing and
water resistance of the coating film are determined by
how fast and well the resins are intertwined.

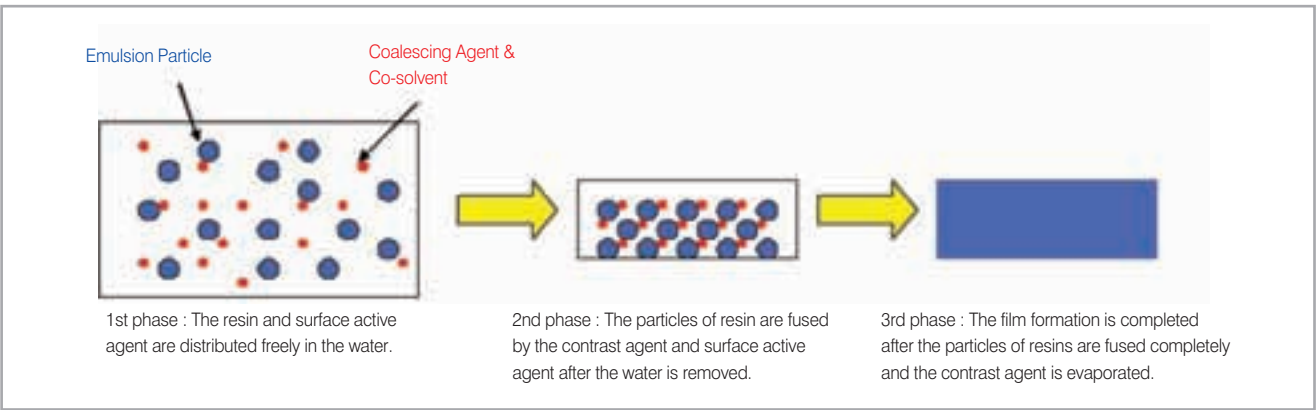
The hardening structure of this product is character-
ized by the complex application of the natural curing
structure and the oxidation hardening structure and
provides the excellent initial curing and long-term
physical property, although only either of the natural

curing structure or the oxidation hardening structure
generally works as the major hardening structure
depending on the paint.

2) Differentiation from Competition Products

This product provides excellent adhesion and
recoatibility compared to competition products as it
applies the organic/inorganic hybrid resin with com-
plex structure of both organic matters and inorganic
matters, not falling under the category of the existing
universal resins. Furthermore, it provides superb water
resistance with elaborate coating structure, compared
to competition products.

Water Condensation Test for 30 Days	Aquapox DTM WH3350	Competition Product
 <p>The test piece is installed on the upper side to be exposed to the water continuously for 30 days, testing to see whether any damage is caused to the coating film. (Test Method by ISO 6270)</p>	 <p>No damage to the coating film</p>	 <p>Blister is caused to the front. No.6, MD</p>





The initial water resistance against the rain water is important for the engine room and the inside of the deck house on a ship which is the dry space not contacting the sea water directly, rather than the strong anti-rust against the salt water.

The water soluble paint undergoes the process of changing from the water rich phase to the oil rich phase when the coating film is formed, and the initial water resistance of the coating film depends on how fast the change in the aforesaid process is made and how fast the film formation is completed in the oil rich phase.

The organic/inorganic hybrid resin of "Aquapox DTM WH3350" provides faster film formation and excellent adhesion with steel sheet, compared to the existing universal resin, and has superb physical property that causes nearly no damage to the coating film even in the case of the immersion into the water in the early phase of coating.

4. Conclusion

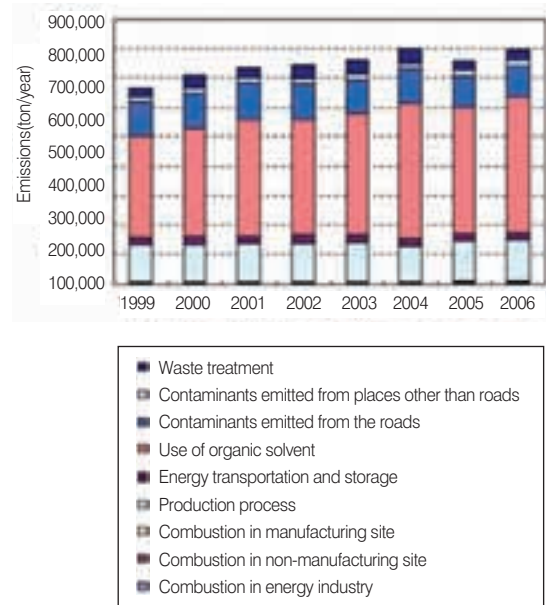
The current marine paint market can be said to be shifting toward the eco-friendly paints. "Aquapox DTM WH3350" is the water soluble paint and will play a significant role in the shift of F.B.E coating material toward eco-friendly features.

5. The development of new marine products in KCC that leads environment-friendly paints for vessels

Global environment-friendly policy and the paint industry

Along with the policy promotion of the globalized green growth industry, the importance to make an effort throughout the entire field of industry to reduce the amount of annual VOC generation has been highly stressed more than any other time. The government is promoting the policy that aims to reduce the amount of current VOC discharge by up to 30% until the year 2020. Such reduction goal is the world best and to realize the goal, the VOC reduction must be made in the field of paint industry that accounts for 46% of domestic VOC(1) discharge (794,15 tons) as of 2006.

Domestic VOC emissions by industrial field



*Data on the Air Contaminants Emission Released by National Institute of Environment Research

Amount of VOC discharge in Korea Sources of VOC generation

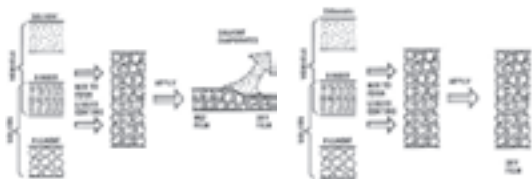
- Oil storage & underground facility 4.5%
- Vehicle operation 34.9%
- Others 5.4%
- Gas station 5.3%
- Printing industry 3.6%
- Painting industry 46.2% (Paint production: 4.6%, painting process: 41.6%)

Amount of discharge (Ton/year)

- Waste treatment
- Contamination source by using non-roads
- Contamination source by using roads
- Use of organic solvent
- Energy transportation and storage
- Production process
- Combustion of production business
- Combustion of non-production business
- Combustion of energy industry

1) Solvent Based Paint VS Solvent Free Paint

Solvent-based paints can be applied in the form of



Solvent borne coating agent : The solvent evaporates during the hardening
Solvent free coating agent : Very little evaporation occurs during the evaporation.

solution by dissolving the solid high molecule resin in the solvent, and therefore, has the advantage of increasing the efficiency of coating as the solvent evaporation alone can speed up the coating film formation above a certain level and enables the progress of post-process. Also, it has the advantage of improving the physical properties of the final coating film by increasing the flexibility and adhesion to steel sheet as it forms the film in the form of long chain.

In addition, its increased content of PVC enhances the mechanical physical properties and brings about the benefit of cost-saving. Finally, it facilitates the response to various on-site task conditions, enabling the seamless coating process.

The on-site workability increased through the improvement of the specific gravity and viscosity of the paint with the application of functional pigment. That improved the problem of the existing solvent free paint of our company and other companies which are very weak under the winter condition. The photos below compare the atomization pattern of coating formed by the airless coating machine at the atmospheric environment of 10°C

For those characteristics, the existing solvent free epoxy paint is applied in a limited way for the part such as fresh water tank that has relatively favorable work condition, and has had the application rate as low as approximately 5% among the overall paints for ship. However, the development of KOREPOX H.B. EH3000, the solvent free epoxy paint for ship, will widen the application of solvent free paint to water ballast tank and cargo hold area.

2) Core Technology of KOREPOX H.B. EH3000

The newly-developed KOREPOX H.B. EH3000 provides high on-site workability and excellent flow, enabling the coating with the airless coating machine which is currently used in shipyards, and was designed to protect the ship from the crack that may be caused by the twist of ship body and the corrosion arising from the contact with the sea water when the ship is navigating on the sea for a long time. The core technology of KOREPOX H.B. EH3000 is the high performance resin application technology, pigment application technology, and the technology for the optimized mixture of both technologies.

"KOREPOX H.B. EH3000", which can substitute the existing solvent borne epoxy primer in the market, provides superb anti-corrosion and resistance against sea water, conforms to the environmental standard and VOC emission standard, which is the most eco-friendly solvent free epoxy anti-corrosion paint for ship that ensures the safe performance of work in shipyards. ⚓



The coating pattern formed by the existing solvent free coating agent



EH3000 coating pattern

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Coating thickness measurement - state of the art : Paint and corrosion protection measurements using innovative technology : New IMO-standards for the inspection of anti-corrosion coatings in shipbuilding

International standards focusing on the inspection of thickness of ship's coatings.

Sechang Instruments co., Ltd.



Past maritime disasters caused by enormous corrosion damage bring IMO, classification societies, ship owners as well as shipyards to realize the importance of corrosion protection of ships. Modern coating thickness gauges such as the modular QNix® 8500 measuring system offer a fast and accurate

inspection of corrosion protection as well as efficient and convenient documentation of measurements using a PC.

Especially since the implementation of the “Coating Technical File” which is to be kept during the complete ser-

vice life of a ship, this system allows the required coating thickness measurements to be analyzed and documented individually by the various organizations involved.

The high quality of the coating thickness gauges from AUTOMATION Dr. Nix, which are being manufactured in Germany exclusively, the fast customer oriented service as well as easy and individual data processing guarantee users a high degree of productivity, flexibility and increase in their value creation.

Report on the use of modern coating thickness gauges for ship inspections and the latest related IMO-standards. The quality of coatings in the ship building industry is increasingly subject to international regulations, because protective coatings reduce corrosion and thus increase a ship's stability.

Especially the ballast water tanks of a ship are of particular importance here, because these tanks are prone to corrode easily and any danger to the ship's structure due to corrosion damages is difficult to assess while the ship is being used. In this regard, the first international conventions for preventing corrosion have been implemented: the "Safety of Life at Sea" (SOLAS) Reg. II-1/3-2 regarding ballast water tanks and double hulls, resulting in the extensive IMO-resolution MSC215 (82) including the Performance Standard for Protective Coating PSPC.

The standard aims to provide a constant quality of coatings lasting 15 years of service life. It applies to all ships with more than 500 gross registered tons concerning their ballast water tanks and to double hull ships with a length of at least 150 meters with building contracts dating later than July 1, 2008. In accordance with the latest IMO-regulation, the International Association of Classification Societies IACS issued procedural requirements (IACS PR 34) that demand a complete documentation of work in a so-called "Coating Technical File" (CTF). The CTF has to be kept on board the ship during its complete service life and contains specifications of the coating system, documentation of the shipyard as well as the ship owner concerning inspection, maintenance, and repair work.

This brings about new challenges for shipyards and ship owners as well as for classification societies, because



according to items 6.1.1-3 of the latest IMO-resolution, the measuring results have to be documented into the CTF by an accredited expert.

Essential : Precise and efficient analysis of coating thickness measurements in practical use

In regard to quality control the generally epoxy-based coating, coating thickness has to be evaluated in accordance with the 90/10 rule as required by the IMO-standard MSC215 (82). This 90/10 rule specifies that 90% of all measurements have to be larger than or equal to the reference thickness and that the remaining 10% of measurements must not be smaller than 0.9 times the reference thickness [5]. In addition to that, shipyards refer to the DIN EN ISO 12944-5 [6] especially when dealing with rough surfaces.

Since January 2008, this standard refers in its controversial Part 5 to ISO 19840 and ISO 2808 [7], [8]. In addition to the qualifications of personnel according to training standards



such as the FROSIO or NACE, fast and reliable gauges are necessary to take for instance about 40,000 measurements a day in rough environmental conditions and on difficult spots. With regard to the reliability of several thousand coating thickness measurements taken each day, the specifically treated ruby measuring heads of the interchangeable probes of the QNix® 8500 measuring system offer an excellent wear resistance, because rubies provide a significantly higher durability than any metal overlay.

In shipyards, building a ship is organized in so-called ship sections that are coated and measured separately before assembly. The structured recording of individual sections can be saved to individual named batches.

The fast and structured taking of measurements of each individual layer of the usually used multi-layer systems, depending on location and time is essential, because it provides an efficient working method and thus ensures highly efficient quality management. The extensive analysis and documenta-

tion of measuring data for the "Coating Technical File" can conveniently be processed with a PC. To this end, wireless measurement transmission from gauge to PC is available. Thanks to direct transmission of measuring data to Microsoft Excel, the user can analyze the data for statistical purposes according to his requirements and document it individually for the use in the "Coating Technical File". Together with the spreadsheet program, the QNix® 8500 measuring system provides a convenient tool offering a complete solution, including measurement, analysis, and documentation for fast and thus efficient processing of measuring data and its documentation in those institutions that are responsible for building, inspecting and verifying. This will be even more important in the future, when the IMO regulation MSC Res. 244 (83) will presumably make the documentation of repair and maintenance work of ships of more than 500 gross registered tones mandatory. ⚓

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Reducing carbon footprint on river cruises

Vacon Korea

River cruising is becoming ever more popular, and why not? It combines comfortable scenic cruising in the vicinity of interesting cities and villages with the luxuries of ocean cruising. MV Viking Legend represents a new age. It is the world's first river cruise vessel with diesel-electric main propulsion - and is also excellent proof of German engineering skills.

"If you enjoy ocean cruising, you will love river cruising," says Tor Hagen, Chairman and CEO of Viking River Cruises, the world's largest river cruise company and operating on the majestic rivers of Europe, Russia, China and Egypt. During the past few years, the popularity of river cruising has grown faster than ocean cruising, with growth rates of 23.4 % and 7.7 % respectively. MV Viking Legend made its maiden voyage from Amsterdam in the Netherlands to Budapest in Hungary in July 2009. It is the world's first river cruise vessel to feature a diesel-electric main propulsion and network system, based solely on inverter-driven asynchronous genera-

tors and propulsion motors. In contrast to conventional diesel-electric propulsion, the system does not need space-consuming switchboard systems, which is a major benefit onboard where space is limited. The system - designed and delivered by German-based e-powered marine



solutions GmbH & Co. KG (ems) - uses liquid-cooled Vacon AC drives technology, asynchronous generators and motors made by AEM in Germany.

The main propulsion system consists of four electrically-driven Schottel rudder propellers. The required electrical power for the propulsion system and ship's network is provided by three diesel generator sets only. These are dimensioned (2 x 1000 kW, 1 x 560 kW) so that sufficient power for the ship's network and propulsion drives is mostly provided by just two diesel generator sets. However, only one generator set is needed to ensure reliable operation of the vessel.

Environmentally compliant, efficient and quiet

The main propulsion, emergency propulsion and network systems of MV Viking Legend are incorporated into a compact, common yet redundant network solution, which complies with the latest European rules and regulations for river cruise vessels and the techni-

cal requirements of classification society Germanischer Lloyd.

The many benefits of this innovative system include significantly reduced fuel consumption and CO₂ and NO_x emissions, which makes Thomas Bogler, Viking's Vice President of Nautical Operations, very pleased. "At any given moment the ship's energy needs are automatically calculated and the engines produce and supply only as much energy as needed. This allows the ship to use 20% less energy than a comparable ship," he explains. The system also improves the manoeuvrability of the 135-metre vessel in narrow rivers and minimizes maintenance costs.

Noise and vibration onboard - major factors affecting passenger and crew comfort - are low because the diesel engine is smaller than a conventional one. A quieter ride is also achieved by the use of four smaller propellers instead of two large propellers. Moreover, both engine rooms have been insulated in order to further reduce noise and vibration.

Innovative German-Finnish engineering skills

"MV Viking Legend's integrated diesel-electric network and propulsion concept, named 'e-power pack', proved to be very reliable during an extensive test and sea trial period. Its success is based on the innovative combination of newly developed design features and established technologies for marine applications provided by Vacon and AEM," says Peter Andersen, Managing Director of e-ms.

The 'e-power pack' has very short reaction times in all cases of load variations on the common DC bus. This is due to the innovative and very efficient DC voltage and power control and load management system, which eliminates the need for the chopper resistors and similar devices used in conventional diesel-electric propulsion systems. "To avoid any trouble on the DC-bus when running the generators at different loads or different speeds, Vacon's application software was adapted by one of their very experienced software application engineers during commissioning, and this work was completed in only three days," says Mr Andersen. "Even under very abrupt load





change conditions (ranging from 50 % to 100 % load), none of the consumer sections show any kind of frequency or voltage variations,” Mr Andersen concludes.

Vacon participated in the MV Viking Legend project with an international team of German and Finnish colleagues, with Martin Kopka, Sales Manager at Vacon GmbH based in Essen, Germany, as project manager. “High-level application know-how at the parent company was our great asset in this project. We are looking forward to working with e-ms again in the future, as we see many opportunities for their concept,” says Mr Kopka.


In addition to river cruise vessels, the ‘e-power pack’ may also be of great benefit particularly on board offshore supply vessels, cargo vessels, inland water way vessels and mega yachts. A hybrid-propulsion concept with an integrated shaft-generator feature will be of use especially to cargo vessels that have to comply with strict environmental constraints and operate with high efficiency.

MV Viking Legend accommodates 189 passengers in 98 deluxe staterooms, as well as 50 crew members. With an overall length of 135m and width of 11.4m, MV Viking Legend is one of the largest river cruise vessels in Europe. The vessel is considered extra environmentally compliant due to its significantly reduced fuel consumption and CO₂ and NO_x emissions. The MV Viking Legend was designed by Schiffstechnik

Buchloh in Unkel and built by SET Schiffbau - und Entwicklungsgesellschaft in Tangermünde, Germany.

Vacon AC drives on board MV Viking Legend

- 4 x 330 kW main propulsion
- 2 x 300 kW thrusters
- 2 x 1 MW asynchronous generators with inverter
- 1 x 560 kW asynchronous generator with inverter
- 2 x 400 kW ship network supplies
- 2 x 200 kW ship network supplies
- 1 x 600 kW supply unit for supply coming from landside grid

All Vacon AC drives are connected to a common DC bus with load balancing. For more information on Vacon’s solutions to the marine segment, please see 

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Daewoo Shipbuilding & Marine Engineering has received its first orders for 2010.

Nam Sang-tae, CEO of Daewoo Shipbuilding & Marine Engineering and John Angelicoussi, chairman and CEO of Angelicoussis Shipping Group of Greece entered into the contract to build two large mega oil tankers and two bulk freighters for the Angelicoussis Shipping Group of Greece on January 9 (local time). In addition, Daewoo Shipbuilding & Marine Engineering clinched the order for one fixed crude oil production facility from the world's famous petroleum company. The total amount of those contracts is worth approximately \$750 million.

The two 320,000 ton very-large crude carriers and two 180,000 DWT bulk carriers ordered this time are the same type of vessels that Daewoo Shipbuilding & Marine Engineering has been building for Angelicoussis Shipping Group of Greece, and will be built at Okpo Shipyard of Daewoo Shipbuilding & Marine Engineering and are scheduled for the delivery to the ship owner in the latter half of 2012.

Angelicoussis Shipping Group of Greece is the one of the largest shipping groups in Greece, possessing about 130 ships currently, and has maintained close relationship with Daewoo Shipbuilding & Marine Engineering, placing orders for more than 50 ships with Daewoo Shipbuilding & Marine Engineering, since its first business with it in 1994.

All the more meaningfully, this contract was concluded with the major shipping company amid the stagnated order inflow since the financial crisis that began in 2008. Particularly, the maritime index has been increasing, prompting the precarious speculation that the shipbuilding and maritime industry will hit the bottom and rebound sooner or later.

The plant ordered this time is the fixed crude oil production facility to be installed on the offshore oil field, 105 meter long, 70 meter high, and weighing 45,000 tons. Daewoo Shipbuilding & Marine Engineering is scheduled to deliver this plant in 2013. This facility will be operational from 2015 and produce 90,000 barrels of oil every day.

Nam Sang-tae, CEO of Daewoo Shipbuilding & Marine Engineering said, "The oil price hike is expected to raise the demand for the offshore oil field development, and the shipbuilding market can be expected to be put on the path towards recovery as the Greek shipping company savvy in the market



Nam Sang-tae (right), CEO of Daewoo Shipbuilding & Marine Engineering and John Angelicoussi (left), chairman and CEO of Angelicoussis Shipping Group of Greece are putting arms around each other's shoulders after exchanging the contracts.



Nam Sang-tae (right), CEO of Daewoo Shipbuilding & Marine Engineering and John Angelicoussi (left), chairman and CEO of Angelicoussis Shipping Group of Greece are shaking hands after exchanging the contracts.

outlook is moving ahead." He added, saying I will do my utmost to attain this year's goal of winning \$10 billion orders.

Daewoo Shipbuilding & Marine Engineering rose to the status of top-ranking shipbuilder last year, receiving approximately \$4 billion worth of orders for ships and offshore plants, and set the goal of obtaining \$10 billion orders this year.

To reach that goal, Daewoo Shipbuilding & Marine Engineering plans to stimulate the potential demand of ship owners by developing new products and focus on opening new markets.

Sungdong Shipbuilding & Marine Engineering heralds new hope for the shipbuilding industry, winning the orders for two vessels and will enter into LOI for two vessels.

Sungdong Shipbuilding & Marine Engineering clinched a order for one cape size bulk carrier, a large merchant ship, from a Greek shipping company in the afternoon on January 10, which is the first contract for the company in 2010 in the field of merchant ship.

The Cape size bulk carrier ordered this time will have a length of 292 meters, a width of 45 meters with a speed of 15.2 knots, and will be delivered in 2012.

Besides, the Sungdong Shipbuilding & Marine Engineering is posed to ink another contract for the same type of ship with S shipping company of Germany at night on January 12, and will enter into a LOI with an Asian shipping company to build two cape size bulk carriers.

The two cape size bulk carriers to be built under the confirmed contract are worth approximately \$130 billion and the contract will be signed for two vessels in January following the LOI, according to an official.

According to the Clarkson Report, Sungdong Shipbuilding & Marine Engineering has the highest backlogs of orders worldwide in the field of cape size vessel.

Sungdong Shipbuilding & Marine Engineering which has made vigorous



170,000-ton cape size bulk carrier

efforts to win orders is geared up to move forward with multifaced sales activities armed with its world's best ground-build method and eco-friendly shipbuilding technology, besides the cape size bulk carrier vessel type.

Sungdong Shipbuilding & Marine Engineering won a total of \$1.1 billion worth of orders for 19 ships (including an option for three optional vessels), and set the goal of attaining the goal of winning a total of \$2.3 billion worth of orders for about 40 ships in 2010. It has the \$5.6 billion worth of backlog orders for 83 ships, except the order that it clinched this time.

STX Offshore & Shipbuilding clinched its first order of ship this year.

STX Offshore & Shipbuilding said that it recently won an order for four 57,300 DWT bulk carriers (including an option for two additional vessels) from the Turkey shipper Densa.

The vessels will have a length of 190 meters, a width of 32.3 meters and a height of 18.5 meters with a speed of 14.5 knots. They will be built at its Jinhae Shipyard and be delivered from 2011 consecutively.

Amid difficult times for shipbuilding industry worldwide last year due to the sharp decline in the order inflow, STX Group achieved meaningful results with its major affiliate shipbuilders including STX Offshore & Shipbuilding and STX Europe winning orders for 31 vessels worth \$2.5 billion. In particular, compared to its first order in April last year, a successful order for merchant ships at the beginning of the year brightens the outlook for orders.



STX Offshore & Shipbuilding signed the contract to build four 57,300 DWT bulk carriers (including an option for two additional vessels) with Densa, the largest shipbuilder of Turkey. The photo shows Densa Chairman Omer Sabanci (left) and STX Offshore & Shipbuilding President Hong Kyung-jin (right)



STX Offshore & Shipbuilding will focus on new businesses such as ocean plant and special ship to achieve its targeted orders of this year. Meanwhile, it plans to speed up R&D process in an attempt to secure competitiveness of future-oriented high value-added ship products.

As STX Europe also clinched orders last year for ice breaking shuttles, helicopter carriers, polar supply and research vessels and platform supply vessels in the ocean plant and special ship business, it plans to continue to positively obtain orders this year in this field. Because cruise lines which hesitated to place new orders last year are expected to resume orders, cruise line business will see brisk performance.

Additionally, along with such ship development projects as ice breaking shuttle LNG carriers and ice-class container vessels which were jointly developed by STX Offshore & Shipbuilding and STX Europe, synergy effects between

global production networks are expected to be generated in marketing, purchasing, procurement as well as R&D.

An STX official said, "Shipbuilding industry has been gradually recovering due to an increase in new orders since the end of last year." He added, saying "As ship owners who start discussing new contracts are slowly on the increase, this year we expect to win an increased number of orders compared to last year."

Subic Shipyard of Hanjin Heavy Industries won the orders for two 180,000-ton cape size bulk carriers.

Hanjin Heavy Industries and Construction-Philippines Inc (HHIC-Phil. Inc.) bagged a contract from a Taiwanese shipping company to build two 180,000-ton cape size bulk carriers.

Despite the dwindling market for shipbuilders amid the economic depression, HHIC-Phil. Inc. successfully won the contract with the dawn of new year.

The cape size bulk carriers which were ordered from Hsin Chien Marine Co.,Ltd and is to be built in Hanjin Subic Shipyard of Philippines are due for delivery on a consecutive basis starting in September 2011.

The backdrop of this contract has come into the limelight as the Subic Shipyard has accomplished the perfect operation and stabilization with its completion of 6 docks last year and began to be recognized of its competitiveness in the market.

Subic Shipyard is built on 800,000 pyong area, 10 times greater than Yeongdo Shipyard, with excellent geographic condition and state-of-art facilities, taking advantage of cheap labor cost, and bolstered by the abundant workforce capable of full operation of the shipyard around the clock. The Shipyard proved that it is viable and competitive to win orders despite the currently declining ship price.

In fact, the company plans to develop the Subic Shipyard, built with the world's highest efficiency production system, into a large shipyard and the core business site of shipbuilding sector capable of beating the competition from Chinese shipyards, and modernize and increase the cost competitiveness of the Yeongdo Shipyard and make it the outpost for the production of high value ship in an endeavor to evolve into the global shipbuilding company.

An official of the company said, "Subic Shipyard has proven its real value with its unrivaled cost competitiveness despite the sluggish shipbuilding market condition. We will expand the shipbuilding capabilities further into the high value ship and mega ship sector by achieving the qualitative growth in the lucrative ship sector, as well as expand the quantity of ship construction."

Subic Shipyard has the state-of-art facilities, including five 370m docks and six world's largest docks which is 550m long and 135m wide, equipped with four very large Goliath cranes, quay wall spanning 4km, and over 1,000m long assembly shop with automation equipments, and has the 2.5 years of work volume for the upcoming years.

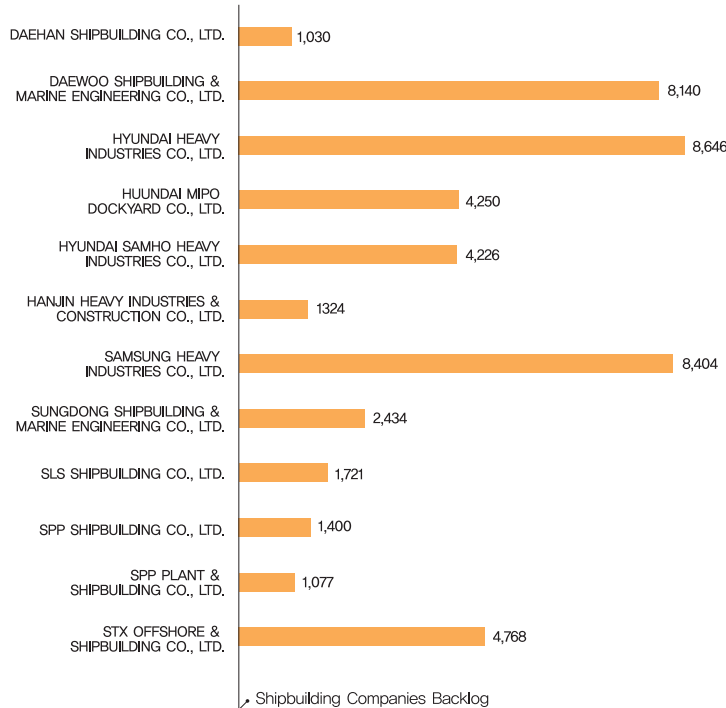


Photo of Subic Shipyard



The world economy is showing the sign of recovery gradually as 2010, the Year of Tiger, dawns, and both domestic and overseas shipbuilding market is rebounding, too. As shipyards are reported to be clinching large orders, Korean shipbuilding market is maintaining its world's top position in the global market.

According to the statistics of Clarkson, shipyards in Korea have enjoyed the influx of large volume of orders and been placed high in the global ranking. In consideration of that, let's have an up-close look at the order volumes that Korean shipbuilders have won. ⚓



o/gt (,000) Dec. standards, (furnish data : Clarkson)





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JUNJINCSM Co., Ltd.

Taking more than 90% share in the aerial working platform segment in the shipbuilding market of Korea, the world's largest shipbuilding nation, JUNJINCSM Co., Ltd has made constant efforts to develop and supply optimized products exactly tailored to the specific on-site requirements based on its varied technology and extensive experience.

Let's take a close look at the products that JUNJINCSM is manufacturing, a company which spearheads the effort in localizing special equipment cars with strict craftsmanship and the challenging and pioneering spirit. ⚓



Work performance



Work performance

JK600T (Truck Crane)
 Max. Lifting Capacity : 60ton at 3m radius
 Max. Working Radius : 32m
 Gradeability : 38%
 Driving Speed : 80km/h





Major Performance Gallery



Work performance



P-150A
(Aerial Work Platforms)
Max. Working Height : 15.2m
Max. Working Radius : 8.2m
Basket Payload : 8/5ton
Gross Vehicle Weight : 7.4ton

T-260I
(Aerial Work Platforms)
Max. Working Height : 26.3m
Max. Working Radius : 19m
Basket Payload : 250kg
Gross Vehicle Weight : 14.7ton

T-380N
(Aerial Work Platforms)
Max. Working Height : 38.3m
Max. Working Radius : 18m
Basket Payload : 250kg
Gross Vehicle Weight : 22ton

TJ-340
(Aerial Work Platforms)
Max. Working Height : 34.5m
Max. Working Radius : 18m
Basket Payload : 250kg
Gross Vehicle Weight : 21.2ton



**HP-360 (Truck-mounted
Aerial Work Platforms)**
Max. Working Height : 36m
Max. Working Radius : 19m
Bucket Payload : 300kg



**SI-150E (Truck-mounted
Aerial Work Platforms)**
Max. Working Height : 16.3m
Max. Working Radius : 10.8m
Bucket Payload : 200kg



Work performance



Work performance



JD-800E (Hydraulic Crawler Drill)

Hole Range : $\varnothing 65 \sim \varnothing 102\text{mm}$

Engine : 156hp

Boom : Extension

Drifter : JET-8

Gross Weight : 10,900kg



JS-120RT (Scissor Lifts)

Max. Working Height : 2m

Basket Payload : 1,000kg

Gross Vehicle Weight : 5.5ton

Power Source : Engine



Work performance

JUNJIN, The Most Reliable Partner Anytime, Anywhere

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DK Lok products are essential for the nuclear power plant.

DK Lok Corporation

As the countries around the world are making vigorous investments in the nuclear power generation and wind power generation, the green growth industry, to cope with the high oil price and high exchange rate, DK Lok Corporation obtained the "N" "NPT" quality certification from American Society of Mechanical Engineers (ASME) in March 2006 and DK Lok Corporation became the first-ever one nationwide for a company specializing in the instrument fitting and valve, and for the second time globally only after Swagelok.

Those certifications set the stepping stone for us to expand our customer basis on a considerably more favorable sales conditions compared to other companies. Furthermore, we have developed the Flexible Metal Hose (See the image.) over the recent two years with the financial support of about KRW 300 million from Korea Hydro & Nuclear Power Co., Ltd in collaboration with Korea Hydro & Nuclear Power as we expected that the nuclear power generation would come to the spotlight as the main source of energy not only currently but also in the years to come. This product, a critical part for the nuclear power generation, signifies the successful localization and substitution of the products imported wholly by

Korea Hydro & Nuclear Power so far, and provides the function and performance as excellent as imported products and are offered at a reasonable price. For Korea Hydro & Nuclear Power Co., Ltd, it's like killing two birds with one stone. In addition, the product is taken credit for helping safeguard the foreign reserves as it can substitute imported products.

DK Lok Corporation has built an extensive track record in supplying the parts to top three shipbuilding companies (Hyundai Heavy Industries, Samsung Heavy Industries, Doosan Engine, etc) of Korea which is the largest shipbuilding country worldwide, as well as the parts for nuclear power generation industry.

Based on our high quality product and certified technology built through the unsparing investment of CEO Roh of DK Lok





Corporation in the facility and R&D to win the fierce competition, our products have been exported with our Dk-Lok brand and D-Pro and Green brand. CEO Roh of DK Lok Corporation was awarded the 10 million-Dollar Export Tower Prize on the Export Day in November, 2008, and the commendation from the President of Korea Republic, and Jang Se-joon, the managing director in charge of international trade, and Park Chul-yong, the general manager in charge of production, were granted the Commendation from the Minister of Knowledge Economy. The company achieved KRW 27 billion in sales last year, a remarkable increase by 35% compared to the previous year, as the sales had been increasing sharply every year.

Despite the sluggish economy, DK Lok Corporation successfully attracted the investment worth KRW 5 billion from Tube Investment Inc. this year for the first time as a small-to-medium sized unlisted company in recognition of our remarkable growth and technology.

In that way, DK Lok Corporation laid the cornerstone to speed up the investment in the state-of-art facilities and diversification of business in an endeavor to compete against global companies, as well as domestic companies. ⚓

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JUNJINCSM Co., Ltd completed the supply of large wrecker trucks worth KRW 2.4 billion to the Defense Acquisition Program Administration.

JUNJINCSM Co., Ltd.

JUNJINCSM Co., Ltd completed the supply of large wrecker trucks on December 24, according to the KRW 2.4 billion worth contract that it was awarded from the Defense Acquisition Program Administration.

The 6x6 drive large tow truck manufactured this time provides high performance on rough terrain and maximized the hill climbing ability. Equipped with the crane incorporating the hydraulic boom technology and the stable outrigger system, this tow truck is expected to be used as rescue equipment for military.

JUNJINCSM Co., Ltd has made intensive efforts to advance into the defense industry in an attempt to diversify the products amid the diversification of the market which began before the global economic depression triggered last year, and has supplied various products such as fire engine, etc, which meet the requirements of market, to the Defense Acquisition Program Administration. Besides, the company has supplied the ordered quantities of products stably every year which were recognized

highly for the superb quality substantiated through the strict quality management and function test, like supplying truck-mounted aerial work platform worth KRW 700 million to the Work Support Office of Korea Electric Power Corporation at the end of November, raising its status as the strategic partner for the national development, and based on those tangible achievements, the company has been doing its utmost to overcome the economic depression by making inroads into both domestic and overseas procurement industry vigorously. 

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<http://www.junjincsm.com>



Lee Jae-hwan, Representative Director of JUNJINCSM Co., Ltd was awarded the Presidential Prize for the co-existential employer-employee relationship and the prize of Job Creation from Chamber Of Commerce and Industry of the Northern Chungnam Province in a awarding ceremony organized.

JUNJINCSM Co., Ltd.

Lee Jae-hwan, Representative Director of JUNJINCSM Co., Ltd was solely awarded the Presidential Prize in the Province in the year-end prize and commendation awarding ceremony related to the coexistence and cooperation between the employers and employees which was held in the main conference room of the Cheonan Office of Ministry of Labor on December 31.

This award is intended to identify and recognize the excellent companies playing a leading role in the industrial site to create the employer-employee culture, a crucial task for the current Administration, aiming to encourage the partnership between the employers and employees based on coexistence and promote the employer-employee cooperation throughout industrial sites in an endeavor to boost the competitiveness of companies and put the employer-employee relationship to a level on a par with that of advanced countries.

The prize awarded this time to Lee Jae-hwan came on the heels of the Grand Prize in the category of employer-employee culture which was awarded by the Minister of the Labor to JUNJINCSM Co., Ltd last October, and is meaningful for raising the status of the company setting the standard for the employer-employee culture of the Province, bolstered by the wholehearted devotion that Lee Jae-hwan, Representative Director of JUNJINCSM Co., Ltd, has shown to carry out a variety of communication activities with employees by standing firm on the principle of site management since the foundation of the company and the concerted efforts of the trade union which provided full cooperation with open-minded attitude to attain the growth of the company, the common goal of the employer and employees.

In the conference room of the Chamber Of Commerce and Industry of Northern Chungnam Province on December 17.



Award of the 'Prize of Job Creation' from Chamber Of Commerce and Industry of the Northern Chungnam Province.

Besides, Lee Jae-hwan, Representative Director of JUNJINCSM Co., Ltd was awarded the prize and plaque based on the results of the review by the award committee which were organized separately in the Chamber Of Commerce and Industry of the Northern Chungnam Province among the representatives of the member companies within the jurisdiction of the Chamber Of Commerce and Industry of the Northern Chungnam Province in recognition of his remarkable contribution to the regional development and the revitalization of regional industry.

Lee Jae-Hwan, Representative Director said that this prize would pave the way for the company to play a key role as the leading company and he would make the best effort for that, so that the company could achieve the growth together with the region. ⚓

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Jeong Woo Coupling Co., Ltd, the leader of multi-pipe-joint

Jeong Woo Coupling Co., Ltd.

The multi-pipe-joint products of Jeong Woo Coupling Co., Ltd are assembly-type products, which help shorten the duration of work and enables the connection of pipes made from different materials, differentiated from the products of other companies.

They can be installed as ordinary tools and safe from the hazard of fire.

Specifically, they absorb the impact, vibration, noise, etc, enabling the seismic design, and absorb the eccentricity (2~4") and gap (0~100mm), depending on the size of coupling. They have the advantage that the design can be made in a way to save the space as the locking device is positioned on one side.

1. Grip-Ring Type

Adopting the anti-disconnect joint method for fixing the pipe, it has the grip-ring inside the joint and was designed by new engineering technology substituting the welding joint, flange joint, union joint, groove joint and others.

It is used for new installation, temporary installation, and partial replacement, and has been used very commonly in advanced

countries, and uses the latest connection method that makes the processing of the end-most area of pipe unnecessary.

2. Flexible Type

It can absorb the impact, vibration, bending (2~4"), noise (noise reduction by more than 60% compared to welding), and elasticity as the inside of joint is made of rubber sleeve. It is used for new installation, temporary installation, and partial replacement.



MJS



MJL

3. Repair Clamp Type

It is commonly used when the leakage of water is occurred by the damage to the pipeline. The repair can be performed conveniently with the clamp when making the pipeline open toward a certain direction based on the cut-open area. It is used very often for repair.



MJS



MJGL



MJR



MJRL

4. Hinge Clamp Type

The hinge is installed on the opposite side of the locking device, and the rubber packing inside is cut open, which makes it ideal for small diameter repair. It is used for repair.



5. Double Clamp Type

The bolt locking devices are positioned on both sides, making the tolerance range wider. It enables the easy operation of large diameter, and provides excellent connection. In addition, the rubber packing inside is cut open, and is used very often for the repair of large diameter.



6. Elbow Repair Clamp Type

As a upward and downward detachable type, it can be used to fix the leakage of water caused by the damage to the elbow or welded area, and is used to repair the elbow and the welded area. ⚓



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main products : sewage treatment plant, welding positioning
equipment sys. parts former
TEL : +82 55-383-2300

JS CABLE LTD.

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

KANGRIM HEAVY INDUSTRIES CO., LTD.

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

KANGRIM INSULATION CO., LTD.

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

KUNSUL CHEMICAL IND. CO., LTD.

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

KYUNG EUN CERAMICS CO., LTD.

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

KUKDONG ELECTRIC WIRE CO., LTD.

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

KUMKANG PRECISION CO., LTD.

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

KUMOH MACH. & ELEC. CO., LTD.

head office : Gijang Busan
homepage add : www.komeco.net
main products : eng. & t/c tachometer system, vibration measuring
system, d/g engine control panel
TEL : +82 51-724-5070

KEYSUNG METAL CO., LTD.

head office :
homepage add : www.keysungmetal.com
main products : valves for marine & offshore plant, cryogenic
valves, strainer
TEL : +82 51-831-3391

K. C. LTD.

head office :
homepage add : www.iccp-mgms.com
main products : I.C.C.P. System, Anti-fouling System(M.G.P.S.),
Shaft Earthing Device
TEL : +82 51-831-7720

KSP CO., LTD.

head office :
homepage add : www.kspvalve.com
main products : Engine Valve, Flange
TEL : +82 51-831-6270/7

KTE CO., LTD.

head office :
 homepage add : www.kte.co.kr
 main products : Marine Switchboard(high, low), Marine Control Console, Alarm Monitoring System, Thruster
 TEL : +82 51-265-0255

KOKACO CO., LTD.

head office :
 homepage add :
 main products : Exhaust Valve & Valve Seat Grinding Machine, Nozzle Lapping Machine
 TEL : +82 51-403-4114/6

KONGSBERG MARITIME KOREA LTD.

head office :
 homepage add : www.km.kongsberg.com
 main products : IAS, DP, K-Chief 500, Auto Chief c20, K-Gauge, K-Bridge, MIP, MBB
 TEL : +82 51-749-8600

KEYSTONE VALVE(KOREA) LTD.

head office : Anseong Gyeonggi
 homepage add : www.tycovalves.com
 main products : Butterfly Valve, Ball Valve, Safe Valve
 TEL : +82 31-670-2500

KEON CHANG IND. CO., LTD.

head office :
 homepage add : www.keonchang.co.kr
 main products : marine equipment, ladle turret, roll stand assy, side trimmer & chopper, bloom c c, screw conveyor, etc.
 TEL : +82 51-203-0161

KWANG SAN CO., LTD.

head office :
 homepage add : www.kwangsan.com
 main products : heating coil, sus spool, air vent head, expansion joint
 TEL : +82 51-974-6301

KEUMYONG MACHINERY CO., LTD.

head office : Buk-gu, Daegu
 homepage add : www.keumyong.com
 main products : exhaust valve complete with valve spindle, axial vibration damper
 TEL : +82 53-608-8110/6

KWANG SUNG CO., LTD.

head office :
 homepage add : ikwangsung.com
 main products : t-girder, panel, stair, handrail, inclined ladder,
 TEL : +82 55-338-9973

KUK DONG ELECOM CO., LTD.

head office : Saha-Gu, Busan
 homepage add : www.kukdongelecom.com
 main products : marine & offshore light fixtures, explosion-proof lights, flood & search lights, mgf packing system
 TEL : +82 51-266-0050

KYUNGSUNG INDUSTRY CO., LTD.

head office : Gangseo Busan
 homepage add : www.e-clamp.com
 main products : clamp, sus corner, anchor strip
 TEL : +82 51-831-4960

LS CABLE LTD.

head office :
 homepage add : www.lscable.co.kr
 main products : marine shipboard & offshore cable, bare conductor wire, (pvc/pe/xlpe/rubber) power & control cable
 TEL : +82 2-2189-9114

LEE YOUNG INDUSTRIAL MACHINERY CO., LTD.

head office : Ulsu Ulsan
 homepage add : www.leeyoung.co.kr
 main products : engine casing, corr. bhd, upper deck, built-up longitudinal, chain locker, lashing bridge
 TEL : +82 52-231-5800

MIN SUNG CO., LTD.

head office : Sasang Busan

homepage add : www.minth.co.kr
 main products : cable tray, hatch, electric cable box
 TEL : +82 51-305-8862

M&H CONTROL VALVES CO., LTD.

head office :
 homepage add : www.mth.co.kr
 main products : crankcase relief valve, main starting valve, pneumatic control valve, safety relief valve
 TEL : +82 51-974-8800

MSL COMPRESSOR CO., LTD.

head office : Pochon Giyeonggi
 homepage add : www.mslcomp.com
 main products : breathing air compressor, h.p air compressor, n2 gas booster
 TEL : +82 31-853-7000

MYCOM KOREA CO., LTD.

head office :
 homepage add : www.mycomkorea.com
 main products : screw compressor unit, reciprocating compressor unit, condensing unit, brine chiling unit
 TEL : +82 55-294-8678

MYCOM KOREA CO., LTD.

head office :
 homepage add : www.mycomkorea.com
 main products : screw compressor unit, reciprocating compressor unit, condensing unit, brine chiling unit
 TEL : +82 55-294-8678

Myung Sung Engineering Co., Ltd.

head office : Mokpo Jeonnam
 homepage add :
 main products : rudder & rudder stock, rudder horn, stern roller
 TEL : +82 61-276-7650

Marine Radio Co., Ltd.

head office :
 homepage add : www.mrcokorea.com
 main products : public address system, auto tel. exchanger sys. communal aerial sys. marine clock system
 TEL : +82 51-414-7891

NK CO., LTD.

head office :
 homepage add : www.nkcf.com
 main products : ballast water system, co2system, deck foam system, dry power system
 TEL : +82 51-204-2211/3

ORIENTAL PRECISION & ENGINEERING CO., LTD.

head office :
 homepage add : www.opco.co.kr
 main products : deck house, funnel & engine room casing, life boat davit, engine room crane
 TEL : +82 51-202-0101

OSCG CO., LTD.

head office : Sasang Busan
 homepage add : www.oscg.net
 main products : cable gland(eexd & e), adapter / reducer, flexible connectors
 TEL : +82 51-305-3910

PANASIA CO., LTD.

head office : Gangseo Busan
 homepage add : www.pan-asia.co.kr
 main products : cargo monitoring sys. tank level gauge sys. high & overfill alarm sys.
 TEL : +82 51-831-1010

SARACOM CO., LTD.

head office : Yeongdo Busan
 homepage add : www.saracom.net
 main products : gmdss, ship sound signal appliances, navigation equipment, fire detection system
 TEL : +82 51-600-9000

SAMGONG Co., Ltd

head office :
 homepage add : www.sam-gong.co.kr
 main products : oil purifiers, ships accommodation ladders, ships

windows
 TEL : +82 51-200-3040/1

SAMYOUNG MACHINERY CO., LTD.

head office : Daedeok Daejeon
 homepage add : www.sym.co.kr
 main products : cylinder head, cylinder liner, piston
 TEL : +82 42-625-4064

SAMYUNG ENC CO., LTD.

head office :
 homepage add : www.samyungenc.com
 main products : ais(si-30)-auto. identification sys. dsc vhf radio telephone(str 6000a)-gmdss equipment
 TEL : +82 51-601-6601

SUH HAN INDUSTRY CO., LTD.

head office :
 homepage add : www.suhhani.co.kr
 main products : cable tray others-steel, galvanized steel, stainless steel, aluminium
 TEL : +82 51-204-1920

SEOHAE MARINE SYSTEM CO., LTD.

head office :
 homepage add : www.seohae-ms.com
 main products : hatch-pontoon type, folding type, side rolling type, etc. lashing equipment-2/3tier
 TEL : +82 51-204-8408

SUNBO INDUSTRIES CO., LTD.

head office :
 homepage add : www.sunboind.co.kr
 main products : tank top unit, engine room unit, package unit
 TEL : +82 51-261-3454

SUNG KWANG BEND CO., LTD.

head office :
 homepage add : www.skbend.com
 main products : pipe fittings-butt. welding / socket welding / thread type/ flange
 TEL : +82 51-3300-200

SUNG MI CO., LTD.

head office :
 homepage add : www.sung-mi.co.kr
 main products : fire retarding doors, fire retarding wall, ceiling panel
 TEL : +82 55-329-1117

SUNGSIN INDUSTRIES CO., LTD.

head office :
 homepage add : sunsin.koreasme.com
 main products : hatch coaming, t-bhk block, fore mast & port, water separator
 TEL : +82 54-776-6441

SUNG IL CO., LTD. (SIM)

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 homepage add : www.sungilsim.com
 main products : pipe spool fabrication, induction pipe bending, marine engine pipe
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 homepage add : www.esab.co.kr
 main products : welding consumable, welding equipments
 TEL : +82 55-289-8111

SEUN ELECTRIC CO., LTD.

head office :
 homepage add : www.seunelectric.co.kr
 main products : battery charger and dist. board. full auto. charging sys. .lcd display monitor
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SE-WON INDUSTRIES CO., LTD.

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 homepage add : www.sewon-ind.com
 main products : high velocity p/v valve, gas free vent cover, flame screen
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SAEJIN INTECH CO., LTD.

head office :

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head office :
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SHINMYUNG TECH CO., LTD.

head office :
homepage add :
main products : air & electric winch-0.2ton ~ 10ton, air motor-1p ~ 25p, davit (all)-0.2ton ~ 5ton
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SHINSUNG DIESEL KIKI CO.

head office :
homepage add : nozzle.koreasme.org
main products : for marine engine-nozzle, plunger assy, delivery valve assy
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SHIN SHIN MACHINERY CO., LTD.

head office :
homepage add : www.sspump.com
main products : centrifugal pumps, gear pumps, screw pumps, submersible pumps
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SHINA METALTECH CO., LTD.

head office :
homepage add : www.shinametal.com
main products : white metal bearings-marine metal bearing, automotive metals
TEL : +82 52-298-2100/4

SHIN YOUNG HEAVY INDUSTRIES CO.,LTD

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homepage add : www.syhico.com
main products : oil & gas system, hydraulic system
TEL : +82 61-800-3700

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head office :
homepage add :
main products : cam & camshaft, valve spindle & seat ring, piston pin
TEL : +82 51-205-7411

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head office :
homepage add : www.samartkr.com
main products : control lever, control cable, hydraulic steering system, auto pilot system, stern drive system
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STX ENGINE CO., LTD.

head office :
homepage add : www.stxengine.co.kr
main products : marine diesel engine, military diesel engine, gas

engine, gas turbine
TEL : +82 55-280-0114

SIMULATION TECH INC.

head office : Geumcheon Seoul
homepage add : www.simulationtech.co.kr
main products : Emergency Shutdown System, Grease Extractor/de-Oiler, Operator Training Simulator
TEL : +82 2-3281-0960

SHINHAN MACHINERY CO., LTD.

head office :
homepage add : www.shinerpia.com
main products : deck house, engine casing & funnel, fore/after-end block & others
rudder, living quarters
TEL : +82 52-231-3525

SAMGONG INDUSTRIAL CO., LTD.

head office : Pyonghaek Gyeonggi
homepage add : www.samgong.com
main products : inflatable rubber products
TEL : +82 31-654-4805/6

SIN YOUNG ENTERPRISE CO., LTD.

head office : Gimhae Gyeongnam
homepage add : www.sy-ind.com
main products : main hole, access hatch, bollard
TEL : +82 55-346-0034

SUNG JIN GEOTEC CO., LTD.

head office : Namgu Ulsan
homepage add : sgtkor.co.kr
main products : bulbous bow, stern block, hull block, module, lng/lpg tank
TEL : +82 52-228-5801

STACO CO., LTD.

head office : Gangseo Busan
homepage add : www.staco.co.kr
main products : Wall Panel, Ceiling Panel, Unit Toilet, Cabin Door, Furniture,
TEL : +82 51-831-7000

STX ENPACO CO., LTD.

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

SEOUL ELECTRIC CABLE CO., LTD.

head office : Eum-seong Chungbuk
homepage add : www.seoulcable.com
main products : offshore & shipboard cables, travelling cables, high voltage power cables
TEL : +82 43-879-7200

SMECO

head office :
homepage add :
main products : piston, piston liner, piston skirt
TEL : +82 41-864-3030

SURO PROPELLER & MACHINERY CO

head office : Yeongdo Busan
homepage add : www.suropump.co.kr
main products : Propeller(d : 2500mm), Shaft (l : 6m), Pump
TEL : +82 51-415-0444

SHIN-A ENTERPRISE CO., LTD.

head office : Saha Busan
homepage add : www.shina-ent.com
main products : navigation equipment, communication equipment, monitoring system equipment
TEL : +82 51-204-6221/5

TK CORPORATION

head office :
homepage add : www.tkbend.co.kr
main products : Elbow, Reducer, Tee, Cap
TEL : +82 51-831-6550

TAE YOUNG TRADING LTD.

head office : Junggu Seoul
homepage add : www.marine-material.com

main products : Receptacles & Wire Accessories, Floodlight, Deck Light, Reflected Lamps
TEL : +82 2-2272-1960

TANKTECH Co., Ltd.

head office :
homepage add : www.tanktech.co.kr
main products : High Velocity P/V Valve, Local Fire Fighting Sys. Tank Cleaning Machine
TEL : +82 51-979-1600

TECHMARINE S/W CO., LTD.

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

FRIEND CO., LTD.

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

TMC CO., LTD.

head office : Cheonan Chungnam
homepage add : www.tmc-cable.com
main products : marine cable, optical fiber cable
TEL : +82 2-771-3434

WARTSILA ACCOMMODATION SYSTEMS KOREA, INC.

head office : Goseong Gyeongnam
homepage add : www.waskorea.co.kr
main products : unit toilet, unit cabin, wall panel, ceiling panel, door
TEL : +82 55-673-7315

WOOCHANG IND. CO., LTD.

head office :
homepage add :
main products : steel door, ventilator, mooring fitting, h/c fitting, hand rail
TEL : +82 55-331-1651

WHA YOUNG CO., LTD.

head office : Miryang Gyeongnam
homepage add : www.whayoung.co.kr
main products : Supply Unit Assy, Collector Block Assy, Fuel & Exh. Movement, Fuel Pump Assy
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homepage add : www.wwkorea.com
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main products : package unit, group unit, module unit for industrial plant
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head office :
homepage add : www.yoowonind.com
main products : steering gear, auto filter, deck machinery
TEL : +82 51-205-8541

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HVAC technology –
meeting the toughest requirements for climate and efficiency.

MARINE TECH

KOREA 2010
International Exhibition for the Korea Shipbuilding,
Marine Technology Industries 2010



20(Wed) ▶ **23**(Sat) October 2010
CECO, Changwon, Korea

Mecca of World Shipbuilding Industry, Gyeongsangnam-do

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

Main Exhibits

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

Events

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

Invitation for Foreign Buyers

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

Organized by : GYEONGNAM PROVINCE CHANGWON CITY JINHAЕ CITY TONGYEONG CITY GEOJE CITY

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Samsung Compressor is an oil-free centrifugal compressor derived from aircraft engine technology.



Features

- Oil-free compressed air
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- Energy efficient design
- 24 / 7 Customer service

Model		SM 2000	SM 3000	SM 4000	SM 5000	SM 6000	SM 7000	SM 8000
Capacity	m ³ /hr	750 ~ 3,000	3,000 ~ 5,500	5,000 ~ 8,500	8,000 ~ 15,000	14,000 ~ 23,000	22,000 ~ 47,000	51,000 ~ 122,000
Motor	HP	125 ~ 20,000						
Discharge Pressure	Bar A	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
Weight	Ton	3.4	7	9	12	18	40	140