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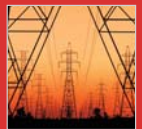
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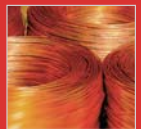
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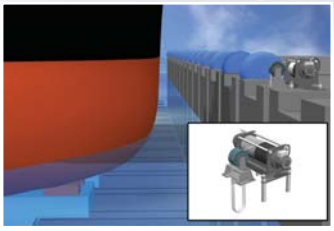

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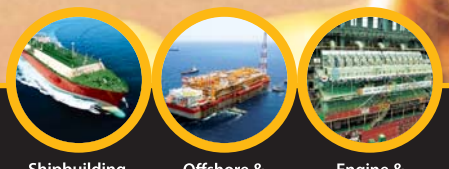

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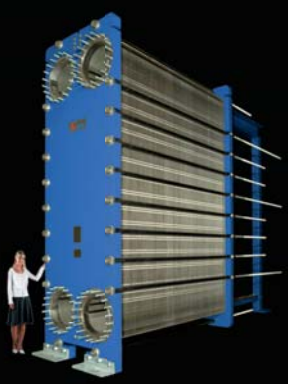

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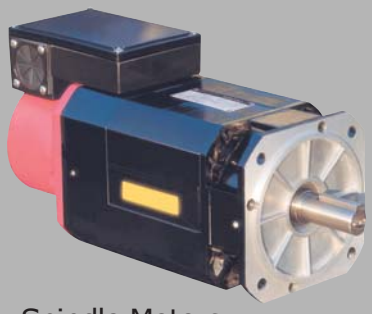

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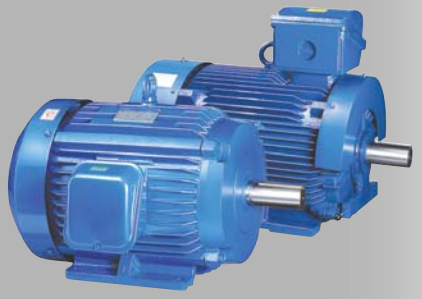

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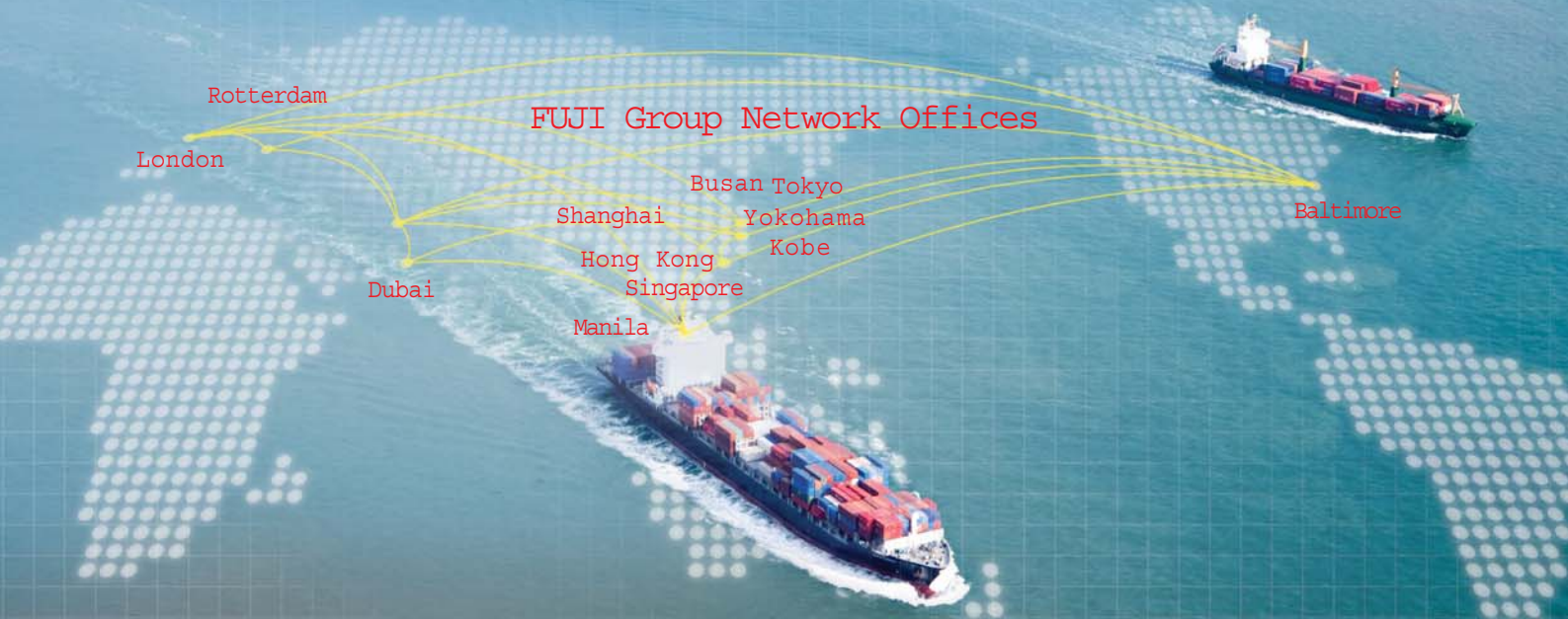

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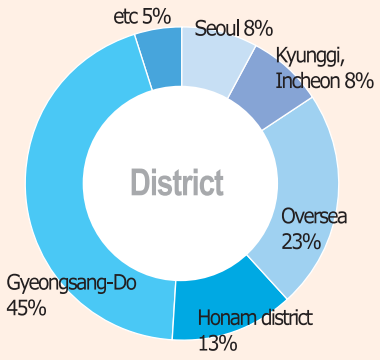

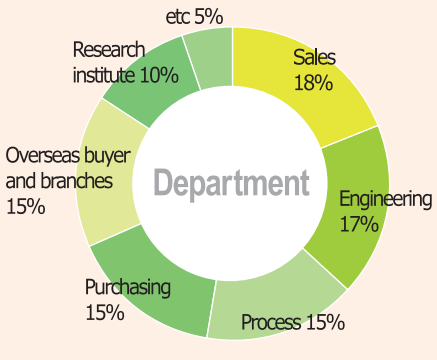

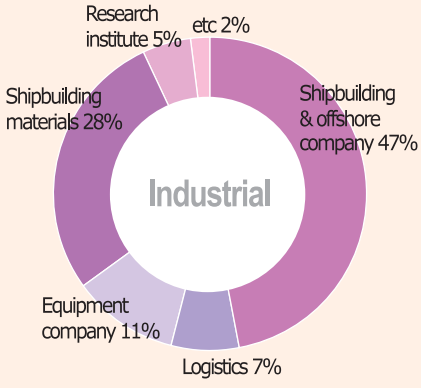

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KEIB offers KRW 1 trillion additionally to support the ship and offshore plant export

Korea Export-Import Bank (KEIB) will dramatically expand the ship financing support, offering KRW 1 trillion in additional funding to bolster the export of ships and offshore plants and support the domestic shipyards and shipping companies grappling with difficulties arising from the Eurozone crisis.

KEIB CEO Kim Yong-hwan said in a meeting for CEOs of 14 major domestic shipyards and shipping companies, which were held at Seoul 63 Convention on 16 July 2012, "We will proactively provide financing support to shipbuilding and shipping industries, the nation's key export industries, to help overcome the crisis. Considering the difficulties facing domestic shipyards and shipping companies, we will offer KRW 1 trillion additionally to support the ship financing."

Domestic companies are recently encountering difficulties in securing the funds amid the slump in new order intake and the declining proportion of advance payment as a result of shift toward heavy tail payment terms. Under the heavy tail payment terms, a large proportion of payment is deferred until delivery. Furthermore, shipping companies are finding themselves in deep financial straits due to the declining cargo traffic, low freight rate, high oil prices, etc.

On the same day, KEIB CEO Kim Yong-hwan unveiled 3 new approaches to expanding the support for shipbuilding and shipping industries, i.e., more support for shipyards to spur the growth in order intake, expansion of liquidity supply to shipping companies, and greater leadership of KEIB in global ship financing sector. In the first place, KEIB will offer KRW 1 trillion in additional funding to support domestic shipyards in their export of ships and offshore plants and plans to decrease the performance guarantee ratio, such as refund guarantee (R/G), etc., by 5bp from current level in an endeavor to help build up competitiveness of domestic shipyards to win new orders.

To help small-to-medium and middle-standing shipping companies expand the fleets and overcome financial difficulties, KEIB will fully leverage the recently introduced system designed to help finance the purchase of the pre-owned vessels to be chartered out under the charter contract. Moreover, KEIB will actively promote the financial support system that offers the operation funds to domestic shipping companies providing international shipping services as part of effort to increase the growth potential of shipping industry. In addition, KEIB will play a catalytic role in encouraging domestic and overseas commercial banks to actively participate in the ship finance syndication (syndicated loan provided jointly) through its Finance Advisory Division which recently expanded in size.

By doing so, KEIB will take the lead in offering mid and long-term ship financing in the international financing market while filling the vacuum left by the European commercial banks which have less room than ever for the ship financing in the aftermath of Eurozone crisis.

KEIB CEO Kim Yong-hwan said during the meeting on the same day, "Shipping companies are facing difficulties due to the declining cargo traffic in the aftermath of global economic depression. The consequent decrease in new order placement has adverse effect on the entire shipping industry. KEIB will provide unsparing support to change this crisis to opportunity."

Lee Jai-sung, President of Hyundai Heavy Industries(HHI), said, "KEIB's effort to pay heed to the grievance of shipbuilding/shipping companies and practically expand the support will be of great help to domestic shipbuilding and shipping companies which have run into financial straits."

한국수출입은행, 선박 및 해양플랜트 수출 1조원 지원

한국수출입은행이 유럽 재정위기 여파로 어려움을 겪고 있는 국내 조선 및 해운사들을 지원하기 위해 선박 및 해양플랜트 수출자금으로 1조원을 추가로 공급하는 등 선박금융 지원을 대폭 확대하기로 했다.

김용환 한국수출입은행 행장은 지난 16일 서울 63컨벤션 센터에서 열린 14개 주요 조선 및 해운회사 대표(CEO) 긴급 간담회 자리에서 "수출 주력산업인 조선 및 해운 산업에 선제적인 금융을 제공해 위기 극복에 적극 앞장설 것"이라면서 "최근 국내 조선 및 해운사들의 어려움을 감안해 원래 계획보다 1조원대의 선박금융을 추가 제공할 것"이라고 밝혔다.

최근 국내 조선사들은 수주 부진 및 헤비테일(Heavy tail) 방식에 따른 선수금 비율 감소 등으로 자금 확보에 어려움을 겪고 있다. 헤비테일 방식이란 선주가 공정단계별로 선박대금을 지급할 때 인도시점에 지급액이 집중되는 대금지급 방식을 일컫는다. 또한 국내 해운사들도 물동량 감소와 저운임, 고유가 등 악화된 시황으로 자금난에 빠진 상황이다.

이날 김 행장이 밝힌 한국수출입은행의 조선 및 해운산업 지원강화 내용은 조선사의 수주 지원, 해운사 유동성 공급확대, 세계 선박금융 주도 등 크게 세 가지다. 우선 KEIB는 국내 조선사들의 선박 및 해양플랜트 수출자금을 당초 계획보다 1조원을 늘려 지원하고 조선사들의 수주경쟁력 강화를 위해 선수금환급보증(R/G) 등 이행성보증료율도 현재 보다 5bp 정도 인하할 계획이다.

국내 해운사들에 대해선 최근 신설한 중고선 구입자금 지원제도 – 중소·중견 해운사를 대상으로 용선계약이 체결된 중고선박 구매자금 지원하는 제도 – 를 적극 활용해 중소·중견 해운회사의 선대 확충과 자금난을 해소시켜줄 것으로 보인다. 또한 해운서비스를 수출하는 국내 해운사에 운용자금을 지원하는 금융 지원제도를 적극 활성화시켜 해운업의 성장잠재력 강화를 지원키로 했다.

더불어 한국수출입은행은 최근 조직을 확대 개편한 금융자문부를 통해 국내외 상업은행들이 선박금융 신디케이션(협조 융자)에 적극 참여하도록 주선기능을 강화한다. 이를 통해 유럽 재정위기 등으로 선박금융 지원 여력이 축소된 유럽계 상업은행의 공백을 채우는 동시에 한국수출입은행

이 국제금융시장에서 중장기 선박금융의 주도권을 확보하는 기회로 활용할 방침이다.
현재 유럽계은행은 유럽재정위기에 따른 부실규모 증가, 신용등급 하락에 따른 조달비용 상승, 바젤Ⅲ 등 글로벌 금융규제 강화로 금융지원 여력이 크게 위축된 상황이다. 선박금융 세계 3위이자 독일2위 코메르츠은행(Commerzbank)이 선박금융을 중단했고, 소시에테 제네랄(Societe Generale)은 선박금융 자산 10억 달러 규모를 미국 시티뱅크(Citibank)에 매각한 바 있다.
김 행장은 이날 간담회에서 "세계 경제가 침체되면서 해상물동량 감소로 해운회사가 어려움을 겪고 있고, 이것이 선박발주 감소로 이어지며 전체 조선산업에 악영향을 미치고 있다"면서 "선박의 심장인 엔진을 다시 달아 오대양에 힘찬 뱃고동 소리가 울려 퍼지게 한다는 심정으로 모든 지원을 아끼지 않을 것"이라고 밝혔다.
이에 대해 현대중공업 이재성 대표이사는 "최근 대외 환경이 좋지 못한 상황에서 수은이 이처럼 조선 · 해운사의 애로사항을 현장에서 직접 듣고 실질적인 지원방안을 적극 확대함에 따라 자금조달 등에 어려움을 겪고 있는 국내 조선 및 해운사에 큰 힘이 될 것"이라고 말했다.

Intergraph 2012 Korea slated for September

Intergraph has arranged a meaningful occasion to share various issues and latest information related to the market for design solutions targeting the shipbuilding and offshore sectors. Intergraph Korea will hold the 'Intergraph 2012 Korea' conference at EL Tower, Yangjae-dong, Seoul, from September 4 to 5.
Intergraph Korea will use this conference to offer important information, tips and solutions for the design of offshore plants which have recently attracted much attention in industries. This conference will provide a unique platform for experts to present useful information and technologies related to the shipbuilding and offshore plant design/construction, offshore equipments and facilities, etc.
Also, this conference will touch on a variety of issues, including 3D and Process Design, Plant Information Management, Facility Safety, Construction and WorkFace Planning, Enterprise Tools Integration, Piping Design Analysis, etc. Moreover, this conference will focus on SmartPlant®, the major SW design tool of Intergraph, and SmartMarine® Enterprise engineering solution. Meanwhile, Intergraph Korea is actively proceeding with the marketing activities through the in-house R&D center, education center, etc., besides the seminar and conference.
(For more information about Intergraph 2012 Korea Conference, visit http://www.intergraph.com/global/kr/events/intergraph2012.)

Intergraph 2012 Korea 개최

Intergraph는 조선 및 해양플랜트 설계 솔루션 시장에서의 다양한 이슈 및 최신 정보를 공유할 수 있는 뜻 깊은 장을 마련했다. Intergraph Korea는 오는 9월 4일~ 5일 서울 양재동 EL Tower에서 'Intergraph 2012 Korea' 컨퍼런스를 개최한다.
Intergraph Korea는 이번 컨퍼런스를 통해 최근 주목 받고 있는 해양관련 플랜트 설계를 위한 중요한 정보 및 팁, 해결책을 제공한다. 이 컨퍼런스는 선박 및 해양플랜트 설계/시공, Offshore 설비 등 각각 세션별 관련 전문가들이 유익한 정보 및 기술들을 발표한다. 3D and Process Design, Plant Information Management, Facility Safety, Construction and WorkFace Planning, Enterprise Tools Integration, Piping Design Analysis 등 다양한 주제를 다룰 예정이다. 아울러 Intergraph의 주력 SW 설계툴인 SmartPlant® 과 SmartMarine® Enterprise 엔지니어링 솔루션에 대해 집중적으로 다룰 예정이다. 한편 Intergraph Korea는 세미나 및 컨퍼런스 이외에도 자체 R&D센터와 교육센터 등을 통해 활발한 마케팅 활동을 펼치고 있다.
(&. Intergraph 2012 Korea 컨퍼런스 웹사이트 http://www.intergraph.com/global/kr/events/intergraph2012)

DHI starts operating the nation's first 3MW offshore wind power generation system

Doosan Heavy Industries (DHI) announced on July 10 that it completed the trial operation of 3MW offshore wind power generation system - which was installed off the coast of Jeju Island in a state-funded project of the Ministry of Knowledge Economy (MKE) and Institute of Energy Technology Evaluation and Planning (KETEP) - and successfully produced a power output of 3MW.
This offshore wind power generation system, located 1.5km from the coast of Jeju Island, measures 80m in height above the sea water surface, has the blades, each 45m long, and can produce enough power to meet the needs of more than 1000 households.
Only a handful of companies worldwide, such as Vestas of Denmark and Siemens of Germany, have successfully developed the offshore wind power generation system with a power output exceeding 3MW and possess the track record in offshore operations. DHI has laid an important cornerstone for advancing into the offshore wind power market based on the technology and expertise that it

secured through this offshore validation project.

The global offshore wind power market is expected to grow at an annual average rate in excess of 30%, and the cumulative installed capacity will jump from 4 GW in 2011 to 99 GW in 2025. Particularly, the offshore power system with a power output of 3 MW captured 60% share in the global wind power market in 2011.

This 3MW offshore wind power generation system was designated by the Ministry of Knowledge Economy as the state-funded project and completed the onshore validation operation in March 2011. This system acquired the nation's first international certification for 3 MW offshore wind power system from DEWI-OCC, the Germany-based professional certification body.

DHI has won orders for 15 wind power generators so far this year since it received an order in late 2010 for 3 wind power generators to be installed at Sinan wind farm in South Jeolla Province, and is currently producing and installing wind power generators. DHI plans to develop the follow-up models of offshore wind power system and build a 2.5 GW offshore wind power in the southwestern coastal regions as part of effort to further penetrate the domestic market and make foray into overseas markets.

3 MW offshore wind power generation system of Doosan Heavy Industries

두산중공업, 국내 첫 3MW 해상풍력 발전시스템 가동

두산중공업은 지난 10일, 지식경제부와 한국에너지기술평가원의 국책과제를 통해 제주도 앞바다에 설치한 3MW급 해상풍력 발전시스템이 시운전을 완료하고 3MW 정격출력에 성공했다고 밝혔다.

제주도 해안으로부터 1.5Km 떨어진 지점에 설치된 이 시스템은 해수면으로부터 높이가 80m, 블레이드 한 개의 길이가 45m에 이르는 규모로, 1000가구 이상 사용할 수 있는 전기를 생산할 수 있다.

세계적으로 3MW급 이상의 해상풍력 발전시스템을 개발하고 해상운전 실적을 보유한 업체는 덴마크 베스타스(Vestas), 독일 지멘스(Siemens) 등 소수에 불과한 상황이다. 두산중공업은 이번 해상실증을 통해 확보한 기술과 운영 노하우를 기반으로 해외 풍력발전 시장에 진출할 수 있는 중요한 발판을 마련했다.

세계 해상풍력 시장은 연 평균 30% 이상 성장이 예상되며, 누적 설치용량은 2011년 4GW에서 2025년 99GW로 커질 것으로 전망된다. 특히 3MW 해상풍력 시스템은 2011년 현재 세계 풍력시장에서 60%의 점유율을 차지하고 있는 주력 모델이다.

이번에 설치된 시스템은 지식경제부 국책과제로 선정된 3MW 풍력시스템으로 2011년 3월 육상에서 실증운전을 완료했으며, 독일의 전문 인증기관 데비오시시(DEWI-OCC)로 부터 국내 최초로 3MW급 해상풍력시스템에 대한 국제인증을 취득한 바 있다.

두산중공업은 2010년말 전남 신안 풍력단지에 들어갈 풍력발전기 3기를 수주한 것을 시작으로 현재까지 15기를 수주해 제작 및 설치를 진행중에 있다. 후속 해상풍력 시스템 모델 개발과 함께 향후 서남해 2.5GW 해상풍력 공급을 추진하는 등 국내 시장을 공략하고 해외시장에도 진출할 계획이다.

Alfa Laval to host 'Clean Technologies Seminar' at 2012 Yeosu EXPO

Alfa Laval, the Sweden-based world leading industrial equipment manufacturing company, held its 'Clean Technologies' Seminar at the Sweden pavilion at 2012 Yeosu EXPO on June 25th, 2012. Representatives from the industries, customers, and the media participated in the event.

During the Clean Technologies Seminar, Alfa Laval presented its innovative technologies and R&D efforts for industry's greener future such as, heat exchanger, ballast water treatment solution and cleaning system for exhaust gases.

The company first exhibited Alfa Laval's compact heat exchanger technology, which contribute to better energy utilization, resulting in reduced emissions. Alfa Laval's compact heat exchanger enables energy savings of up to 50 percent and substantial decrease of CO_2, SOx and NOx emissions. There is an ongoing technology conversion where an increasing number of companies replace their traditional shell-and-tube heat exchangers with Alfa Laval's compact heat exchanger technology. Furthermore, Alfa Laval's heat exchanger technology for renewable energy sources, such as second generation bio fuel and solar power was also introduced.

Alfa Laval also introduced its ballast water treatment solution and its new product PureSOx and PureNOx, which were developed in order to comply with the new regulations and provide cost effective premium solu-

tions. PureBallast was first launched in 2006 and it is recognized as the market leader with the most sold systems in the world today. PureSOx will be launched commercially in 2013, it reduces sulphur exhaust emissions to a level that complies with stringent regulations. PureSOx also offers a cost effective solution to ship owners as it enables them to continue using the cheaper high sulphur content fuel. PureNOx was developed in collaboration with MAN Diesel, the world's largest manufacturer of diesel engines for large cargo vessels. It is a cleaning system for large two-stroke diesel engines which reduces the formation of NOx in the engine. PureNOx will be launched commercially in 2014 and the solution is based on Exhaust Gas Recirculation (EGR) technology.

Alfa Laval's Clean Technologies Seminar

"Alfa Laval is committed to providing customized solutions and sustainable technical expertise to the marine industry and the content of today's seminar fully reflects our efforts" said Peter Calberg, CEO of Alfa Laval Korea. He also added, "We will continue to develop an innovative product portfolio and solutions for related fields to strengthen our leadership in the global market as well as in Korea".

알파라발, 2012 여수엑스포서 '클린 테크놀러지스' 세미나 개최

알파라발은 지난 6월 25일 주요 고객 및 미디어를 대상으로 여수엑스포 내 스웨덴 국가관에서 '클린 테크놀러지스(Clean Technologies)' 세미나를 개최했다.

이 세미나에서는 효율적인 에너지 사용으로 탄소 배출량을 저감시킬 수 있는 열교환 기술을 비롯해 알파라발의 독보적인 기술력으로 탄생한 밸러스트 수처리 시스템과 배기가스 정화시스템 등 미래산업 시장을 선도할 친환경 어플리케이션과 솔루션을 선보였다.

알파라발의 컴팩트 열교환기(Compact Heat Exchanger)는 에너지 소비를 최대 50% 감소시키고 CO2, 황산화물(SOx), 질소산화물(NOx)의 배출량 또한 제어가 가능해 기존의 다관식 열교환기 (shell-and-tube heat exchanger)의 친환경적 대안으로 부상하고 있다. 이외에도 바이오 연료와 태양열 등 재생 가능한 에너지원을 효율적으로 확보할 수 있는 열교환 기술도 소개되었다.

알파라발은 점차 강화되는 환경규제에 탄력적으로 대응하고 효율적인 고품질 솔루션 제공을 위해개발한 PureBallast와 신제품 PureSOx, PureNOx도 함께 소개했다. PureBallast는 2006년 출시 이후, 지금까지 뛰어난 품질력으로 관련 업계에서 선도적인 입지를 차지하고 있으며, PureSOx는 선박의 황산화 배출량을 줄이는 동시에 저가의 연료사용을 가능하게 함으로써 비용절감의 혜택까지 제공한다. PureNOx은 알파라발이 세계적인 선박용 엔진제조사인 만디젤(MAN Diesel)사와 배기가스 재순환(EGR, Exhaust Gas Recirculation) 기술을 기반으로 공동개발한 디젤 엔진용 정화시스템으로 대기 오염물질인 질소산화물의 발생량을 줄일 수 있다. 이들 신제품은 각각 2013년과 2014년에 공급될 예정이다.

피터칼버그(Peter Calberg) 알파라발 한국지사장은 이날 세미나에서 "자사의 최첨단 클린 테크놀러지 솔루션은 해양환경에 관한 알파라발의 오랜 관심과 노력을 그대로 보여준다"며 "지속적인 솔루션의 개발을 통해 환경규제와 고객의 니즈를 동시에 만족시키는 더욱 다양한 제품 포트폴리오를 개발해 글로벌 시장은 물론 국내 시장에서의 입지를 더욱 공고히 할 것"이라고 강조했다.

HHI has bright prospects in the eco-friendly facility market

Hyundai Heavy Industries (HHI) developed the system that reduces the emissions from marine engine for the first time nationwide, brightening its prospects in the market for eco-friendly facilities. Recently, HHI entered into a contract with Rowan, a U.S.-based drilling company, to install a total of 18 units of marine engine emission reduction systems in 3 drillships that will be built at its Ulsan shipyard from August.

The eco-friendly Selective Catalytic Reduction (SCR) system can reduce NOx emissions by as much as 95% by using an HHI-developed catalyst to separate NOx into nitrogen and water.

HHI already developed the eco-friendly gas engine that reduces the CO2 and NOx emissions by over 20% and 97%, respectively, compared to diesel engines and is currently developing the Exhaust Gas Recirculation (EGR) type gas emission reduction system that recirculates the part of exhaust gas, in addition to the selective catalytic reduction (SCR) system.

According to the industry, the demand for marine engine emission reduction system will soar when the IMO(International Maritime Organization) 'TIER III' comes into force in 2016 which requires ships to reduce NOx emission by approximately 80% compared to

the current limit under IMO 'regulations for the prevention of air pollution from ships (TIER I)'. Meanwhile, the World Health Organization (WHO) classified diesel engine exhaust as carcinogenic to humans, sparking heightened interest among ship owners in the marine engine emission reduction system.

Hyundai Heavy's SCR Nox System

현대중공업, 친환경설비 시장진출 '청신호'

현대중공업은 국내 최초로 '선박용 엔진 배기가스 저감설비'를 개발해 친환경설비 시장 진출에 청신호를 밝혔다. 최근 현대중공업은 미국 시추전문회사인 로완(Rowan)과 계약을 맺고 오는 8월부터 울산조선소에서 건조되는 드릴십 3척에 총 18기의 '선박용 배기가스 저감설비'를 공급하기로 했다고 밝혔다.

HHI의 저감설비는 대기오염 주범인 배기가스를 통해 배출되는 질소산화물(NOx)을 현대중공업이 개발한 촉매를 이용해 질소와 물로 분해 방식(SCR: Selective Catalytic Reduction)함으로써 질소산화물 배출량을 95% 이상 줄일 수 있다.

현대중공업은 디젤엔진 대비 이산화탄소 배출량과 질소산화물 배출량을 각각 20%, 97% 이상 줄인 친환경 가스엔진을 개발한데 이어서, 이번에 수주한 SCR 방식 외에 배기가스 일부를 재순환시키는 방식(EGR: Exhaust Gas Recirculation)의 저감설비 개발도 진행 중이다.

업계에 따르면 2016년 '대기오염방지 1차 규제(TIER Ⅰ)' 대비 질소산화물 배출량을 약 80% 줄인 'TIER Ⅲ'가 발효되면, 선박용 엔진의 배기가스 저감설비 수요가 크게 증가할 것으로 전망하고 있다. 한편 세계보건기구는 디젤엔진 배기가스를 발암물질로 지정함에 따라 선박용 배기가스 저감설비에 대한 선주사의 관심이 더욱 높아질 것을 보인다.

KR began eco-friendly vessel certification in 11 items

Korean Register of Shipping (KR) began certification of eco-friendly vessel from July 1.

KR will evaluate ship's management, application of IMO's environment-related agreement, etc., and grant grades, GreenShip 1-4, in terms of eco-friendliness achievement. Any vessel, regardless of ship nationality, classification society, older or new vessels, etc., is qualified.

Kim Mahn-eung, President of New Growth Industry Division, said, "KR's eco-friendly vessel certification, which is granted based on the evaluation of environment-friendly performance of ships and ship management from the hardware and software aspects, will induce the construction of high energy efficiency vessels and contribute to enhancing the shipping companies' ability to manage their fleets in environment-friendly manners. Through that, shipping companies will be able to establish a system that reduces the fuel oil consumption and greenhouse gas emissions from ships."

Meanwhile, an official from Hyundai Merchant Marine of South Korea said, "We are considering five 13,100 TEU boxships, under construction at Daewoo Shipbuilding & Marine Engineering, to be green-ship certified by KR."

KR's eco-friendly vessel certification consists of ship management module (ISO 14001, greenhouse gas inventory, etc), ship operation module (SEEMP, ship fuel oil management, etc), and agreement enforcement module (EEDI, Ballast Water Management, etc), and includes a total of 11 items.

한국선급, 친환경선박 인증업무 개시

한국선급(KR)이 지난 7월 1일부터 친환경선박 인증업무를 시작했다.

한국선급의 친환경선박 인증이란 선주의 자발적인 요청에 따라 선박의 관리 및 운항 측면과 환경 관련 국제해사기구(IMO)의 협약 적용 등을 평가하고 선박의 친환경성 달성 정도에 따라 부기부호(GreenShip 1, 2, 3, 4)를 부여하는 제도를 말한다. 선박의 국적, 선급과 현존선 및 신조선에 관계없이 인증이 가능하다.

김만응 신성장산업본부장은 "한국선급의 친환경선박인증은 선박 및 선박 관리의 친환경성을 하드웨어 및 소프트웨어 측면에서 평가함으로써 에너지효율이 높은 선박의 건조를 유도하고 선사의 친환경적인 선박관리 능력 제고에 기여할 것으로 예상한다. 또한 이를 통해 선사는 연료유 절감 및 선박으로부터의 온실가스 배출을 감소하기 위한 체계를 확립할 수 있을 것"이라고 밝혔다.

한편, 현대상선 관계자는 "대우조선해양에서 건조중인 13,100 TEU 컨테이너선 5척에 대하여 한국선급의 친환경선박인증을 검토 중"이라고 말했다.

한국선급의 친환경선박인증은 선박관리모듈(ISO 14001, 온실가스 인벤토리 등), 선박운항모듈(SEEMP, 선박 연료유 관리 등), 협약적용 모듈(EEDI, Ballast Water Management 등)로 구성되어 있으며 총 11가지 항목이다.

Bureau Veritas launched Wind Farm Service Ships guidance

Leading international classification society Bureau Veritas published guidance for designers and builders of Wind Farm Service Ships.

Maxime Pachot, offshore service vessel manager at Bureau Veritas, said, "Although some of the existing Offshore Service Vessel fleet can perform the tasks necessary for developing and maintaining offshore wind farms, we see an increasing need for specialist craft. These will include specialised vessels for servicing offshore wind farms. These will have particular characteristics and to be efficient they will have to be new designs. That means they need new class rules and guidance for designers and yards."

BV NI 589 Wind Farms Service Ships is a service notation which covers ships specifically designed to operate in offshore wind farms for transfer of personnel from shore, mother ships or accommodation units to offshore wind farms and perform lifting operations required for wind turbine servicing. The note does not cover vessels built for installation and assembling of wind turbines or heavy maintenance and repair for which transportation of wind turbine main parts is needed. Bureau Veritas has already published specific guidance for these vessels.

Bureau Veritas' new guidance notation for Wind Farms Service Ships is aimed at maximising the efficiency of new offshore wind farm service vessels. "These vessels have to move people quickly in rough offshore sea conditions, transferring maintenance personnel from shore or mother ships onto turbines," explained Pachot. "That is why we have come up with a specific notation."

Bureau Veritas' note and guidance will help designers and yards use BV rules for steel ships and rules for High Speed Craft, combined with the rules for vessels under 500 gt, to develop new designs which will be light, fast, safe, and have good sea keeping abilities, while able to work close to turbines, yet will also be cost-effective.

Pachot said, "Typically they will have seating for up to 60 persons, a deck area for cargo, some form of device for connection and access to the turbine tower, lifting devices, a motion damping system, Dynamic Positioning system (DP) and a high service speed."

Bureau Veritas is a world leader in conformity assessment and certification services. Created in 1828, the Group has close to 52,000 employees in 940 offices and 340 laboratories located in 140 countries. Bureau Veritas helps its clients to improve their performance by offering services and innovative solutions in order to ensure that their assets, products, infrastructure and processes meet standards and regulations in terms of quality, health and safety, environmental protection and social responsibility.

Lloyd's an insight into the future energy management.

Emissions regulation and higher energy prices are the two leading factors changing the industry. New technologies and innovation will play a vital role in the immediate and long term future of shipping.

100 years ago a Lloyd's Register surveyor attended the sea trials of the first seagoing diesel powered merchant ship, the East Asiatic Company's innovative Selandia. The propulsion technology on trial a century ago now dominates the industry and, for most merchant ships, in the last 50 years, there has been a clear orthodoxy in engine room arrangements and the type of fuel used. Nearly all ships now use marine heavy fuel oil in diesel engines. Today Lloyd's Register stands on the brink of a new era.

Lloyd's Register has talked about this as a 'new paradigm'. Any evolution will be gradual but already Lloyd's Register sees changes happening. New fuels, new engines and new designs are becoming available. The difficulty for shipowners, builders, equipment makers and, financiers is not only what technology to support but when to invest. The future is further clouded by the weak market outlook and the hangover of the biggest boom in new ordering in history - the new ships still being built are, in the main, little different to the ships in demand a decade or more ago.

Most new technology being brought into operation now has been developed for relatively small or niche markets such as ferries and inland waterways - sectors where exposure to new regulation is most concentrated and where local emissions and other factors are felt most keenly.

More clarity needs to be brought to the differ-

ences between local air emission benefits and the greenhouse gas impacts of shipping. At present the real driver is local air emissions. The introduction of the Energy Efficiency Design Index (EEDI) is the first global greenhouse gas regulation in any industry, setting mandated minimum requirements.

At Lloyd's Register, what constantly strives to provide is impartial technical guidance. And as well as guidance, verification is crucial. Many claims are being made about performance, about greenhouse gas emissions and about safety of new arrangements. Owners and operators need data and they need it verified - what you can't measure, you can't manage. Lloyd's Register helps the industry manage the changes we face by providing the independent insight that is required. (www.lr.org/future)

STXOS strengthens cooperation with Russia's USC for LNG carriers

STX Offshore & Shipbuilding (STXOS) and Russia's state-owned shipyard United Shipbuilding Corp (USC) strengthen their cooperation for the development of Russian shipbuilding industry.

STX revealed that it signed a joint venture agreement with USC at 2012 SPIEF (Saint Petersburg International Economic Forum), to set up a joint venture company, in order to jointly win LNG-carrier orders awarded from Russian owners. The signing ceremony was attended by Gang Deok-soo, Chairman of STX Group, Shin Sang-ho, President of STXOS, Roman Trotsenko, President of USC, etc.

The joint venture will support USC's New Admiralty Shipyard project in design, staff training, etc., as well as jointly ink newbuilding LNG carriers ordered from Russia.

According to STXOS, USC selected as the partner in recognition of the excellent design and quality of STXOS' LNG carriers delivered to Sovcomflot, the shipping company.

Now STX has prepared to take off in participating Russian Arctic LNG development projects, in a long period. With around 30% of global LNG reserves, energy majors are actively participating in LNG development projects in Russian Arctic region.

JVC signing ceremony between STXOS and Russia's state-owned shipyard USC

USC which signed JVA with STXOS this time is a 100% state equity corporation created by Russian President Putin in 2007 and taking the lead in modernizing Russia's shipbuilding industry at a policy level while moving ahead with integration by region and various investments.

An official from STX Group said, "Signing this JVA is an important step forward to strengthen a relationship of trust between STXOS and USC and expanding the area of economic cooperation between Korea and Russia. Furthermore, a synergic effect is expected which will stimulate the supply of Korea's excellent equipment for the successful completion of Russia's shipyard construction projects."

STX조선해양, 러시아 USC와 LNG선 협력 강화

STX조선해양과 러시아 국영조선업체인 USC (United Shipbuilding Corporation)이 러시아 조선산업 발전을 위한 협력 강화에 나섰다.

STX조선해양은 지난 21일부터 23일 러시아 상트페테르부르크에서 열린 2012 SPIEF(Saint Petersburg International Economic Forum, 상트페테르부르크 국제경제포럼)에서 강덕수 STX그룹 회장, 신상호 STX조선해양 사장, 로만 트로첸코(Roman Trotsenko) USC 사장 등이 참석한 가운데 러시아 지역에서 발주되는 LNG선 공동수주를 목적으로 하는 조인트벤처 설립에 대한 JVA(Joint Venture Agreement)를 체결했다고 밝혔다.

양사가 설립하는 조인트벤처는 USC가 건설을 추진중인 어드미랄티 조선소(New Admiralty Shipyard) 프로젝트를 위한 설계, 인력 트레이닝 등을 지원하는 한편 러시아에서 발주하는 LNG선에 대한 공동 수주영업활동을 수행하게 된다.

STXOS에 따르면, USC가 STX를 파트너로 최종 선정한 배경에는 운영선사인 소브콤플로트(Sovcomflot)를 통해 STXOS의 LNG 선에 대한 설계와 품질의 우수성이 인정 되었기 때문이다.

STX조선해양은 이번 JVA를 통해 러시아 북극지역의 LNG 개발 프로젝트에 장기적으로 참여할 수 있는 발판을 마련했다. 러시아 북극지역은 전세계 액화천연가스(LNG) 매장량의 30%가 매장되어 있어 글로벌 에너지 메이저업체들이 개발 프로젝트를 활발히 진행하고 있는 지역이다.

이번에 STX조선해양과 JVA를 체결한 USC는 지난 2007년 푸틴 러시아 대통령에 의해 설립된 러시아 정부가 100%의 지분을 보유하고 있는 국영회사로 러시아 조선산업의 현대화 정책개발, 권역별 통합 및 각종 투자 등의 업무를 총괄하고 있다.

STX그룹 관계자는 "이번 JVA를 통해 STX조선해

양과 USC가 상호 신뢰를 돈독히 쌓는 것은 물론 한국-러시아 간 경제협력 분야를 한층 다각화했다"며 "러시아 조선소 건설 프로젝트에 국내의 우수한 기자재가 활발히 공급되는 시너지 효과도 기대하고 있다"고 밝혔다.

DSME signed a MOU with the Global Core Research Center

Daewoo Shipbuilding & Marine Engineering (DSME) entered into a MOU (Memorandum of Understanding) on July 3 with Global Core Research Center for Ships and Offshore Plants (GCRC SOP) of Busan National University at its Okpo Shipyard to promote the joint research and technology development as part of university-industry collaboration to enhance technological capabilities in shipbuilding and offshore plant sectors.

GCRC SOP of Busan National University was selected for the global core research center project supported by the Ministry of Education, Science and Technology, and recently held an opening ceremony for its research center within the campus. This Research Center is part of the R&D project that has been driven forward since last year to develop world-class research teams inside the campus.

GCRC SOP of Busan National University will be operating with a budget of KRW 100 billion funded by the government, industries, and local governments over the next decade until February 2021 and aims to secure core technologies for the construction of offshore plants based on a variety of researches associated with shipbuilding and offshore plant industries over the upcoming 10 years.

MOU signing ceremony between DSME and GCRC SOP MOU

In the first place, DSME will proceed with the university-industry collaboration over the next 6 years to carry out the 7 research projects to develop FLNG cargo tank, high-efficiency and eco-friendly ship propulsion and power generation system, complex materials for shipbuilding and offshore industries, icebreaking vessels, etc.

Having signed this MOU, DSME is expected to secure the cutting-edge shipbuilding technology and core technology for offshore plants, thus building up competitiveness to become the world's undisputed No. 1 player in the shipbuilding and offshore industries, improve technological reliability and attract excellent workforce in the shipbuilding and offshore sectors.

Meanwhile, DSME and GCRC SOP signed a MOU with GCRC-SOP of Busan National University in relation to the application of intellectual property rights to the joint research projects at the seminar room of the University on July 2.

대우조선해양, 글로벌핵심연구센터와 MOU 체결

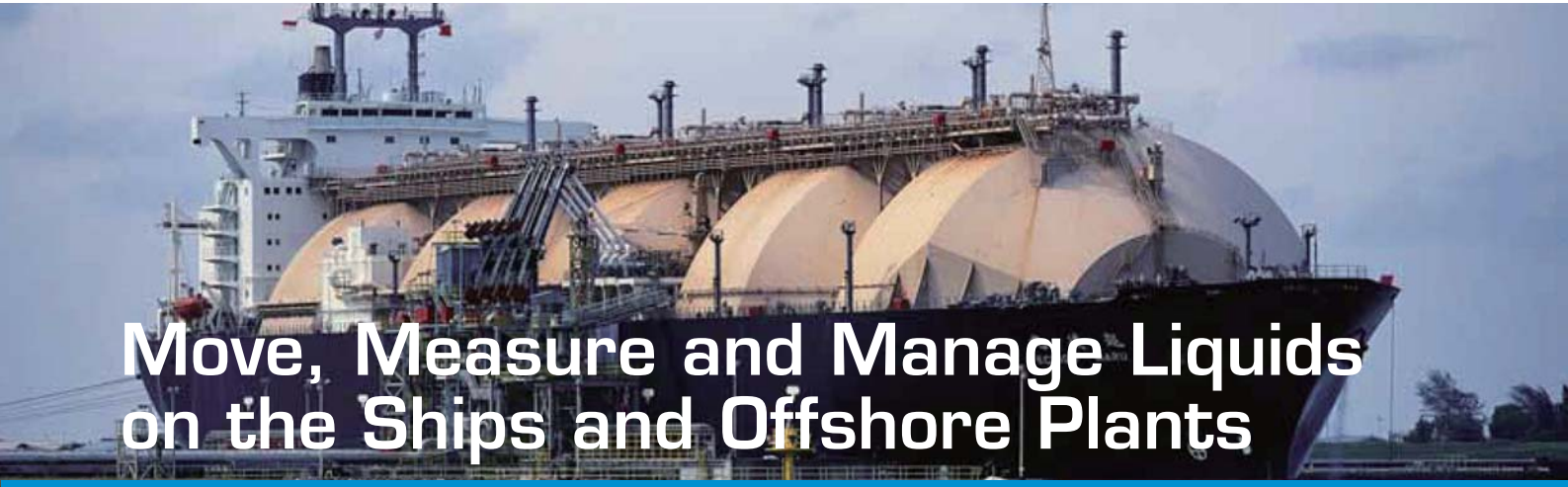
대우조선해양은 부산대 조선해양 글로벌 핵심연구센터(GCRC SOP: Global Core Research Center for Ships and Offshore Plants)와 지난 7월 3일 조선해양플랜트 분야의 기술력을 높이기 위한 '공동연구 및 기술개발'에 대한 산학공동연구 MOU을 옥포조선소에서 가졌다.

교육과학기술부 글로벌 핵심연구센터 사업에 선정된 부산대 GCRC SOP는 지난해 학내 연구동에서 개소식을 가졌다. 이 센터는 대학 내 자생력을 갖춘 세계 수준급의 연구팀을 육성하기 위해 지난해 처음으로 시행된 연구개발(R&D) 프로젝트다. 부산대 연구센터는 오는 2021년 2월까지 10년간 정부, 산업체 및 지자체 지원금 등 총 1000억원의 예산으로 운영되며, 향후 10년 동안 조선해양플랜트 산업과 관련된 다양한 연구를 통해 해양플랜트 건조를 위한 핵심 원천기술 확보를 목표로 하고 있다.

대우조선해양은 우선 1단계로 6년간 산학 공동연구기관으로 참여해 FLNG 화물창, 고효율·친환경 선박추진 및 발전시스템, 조선해양분야 복합소재 개발, 빙해 선박에 관련한 기술개발 등 7개 연구과제를 수행할 계획이다.

이번 협약 체결로 DSME는 첨단 선박 건조기술과 해양플랜트 핵심기술을 확보해 세계 1등 조선해양 산업의 경쟁력을 갖추고, 대외적인 기술 신뢰도 향상과 함께 조선해양플랜트 분야의 우수인력을 확보할 수 있을 것으로 보인다.

한편 대우조선해양과 GCRC SOP는 이에 앞서 지난 7월 2일 오전 부산대학교 GCRC-SOP 세미나실에서 '공동 연구과제 지식재산권 출원에 관한 양해각서'를 교환했다.



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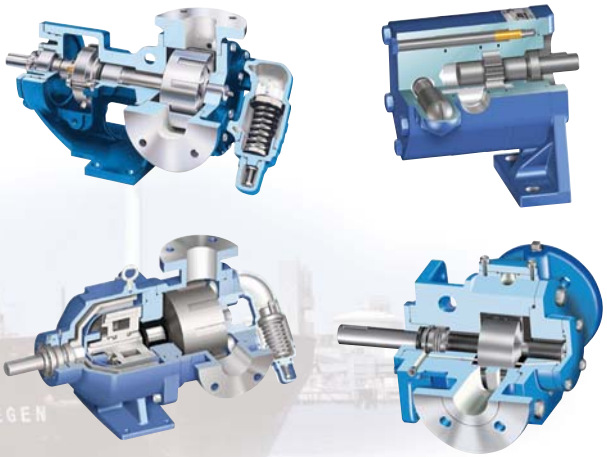

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An insight into the market for ship and offshore plant coatings

- Eco-friendly and fuel-saving solutions

Coatings are important materials that determine the service-span of ships and offshore plants. Coating companies are striving to develop innovative coatings suited for marine environment. As various issues have been recently highlighted such as fuel efficiency and eco-friendliness of ships, etc., the coatings market is turning a new turn. Anti-fouling paint is applied to the ship or offshore structures to prevent foreign matter from being attached to the external surface, and particularly, coatings manufacturers are focusing on enhancing the performance of coatings while refraining from using the materials harmful to the environment and human amid rigorous marine environment standards and regulations.

Eco-friendly coatings for ships and offshore plants have become a trend. International regulations on marine environment are more stricture than ever, and EU already announced that the tax would be levied on carbon emissions from January 1, 2013. Ship owners are also focusing on eco-friendly ships that can reduce consumption of fossil fuel and

emissions of exhaust gas amid sustained high oil prices and rigorous environmental regulations.

Thus, the coatings industry has placed primary focus on developing eco-friendly coatings that are not harmful to human while minimizing the impact on the marine environment and emissions of volatile organic compounds (VOCs). Along with that, researches have been vigorously conducted to improve the coating operations that cause the discharge of largest amount of VOCs in the production process.

Fierce competition in the coatings market

Generally, coatings for ship provide protection to the external hull or ship steel from the highly corrosive marine environment. Oil-based coatings are commonly used, rather than the water-based coatings, because the coating works are performed mostly outdoors.

Eco-friendly coatings basically require excellent rust-resistance to protect the steel susceptible to corrosion in marine environment. Particularly, special coatings or coating system that combines more than two types of coatings are used to provide chemical resistance or anti-fouling protection to the coated film. Therefore, the coatings market have focused on the water-based coatings that provide same performance as oil-based coatings while using the solventless coatings and water as diluents due to the regulations on the emissions of VOCs. For the bottom of ship, low-friction anti-fouling coatings made of the silicon or fluorocarbon resin offer wider applications as they can help reduce the hull resistance during the navigation at sea and decrease the emissions of CO_2, as well as provide anti-fouling functions.

According to Chokwang Jotun, new orders for eco-design ships which can maximize the fuel-saving have recently increased, spurring the demand for the anti-fouling coatings that incorporate the Silyl Acrylate technology based on the fuel-saving concept. Moreover, there has been an added emphasis on the need for the coatings - which are based on fire proofing concept - for energy production facilities that take the safety as top priority in the offshore sector.

Currently, many coatings manufacturers are launching the products that improved the eco-friendly and fuel-saving features and fiercely competing. In the Posidonia Exhibition - the world's largest trade fair for marine equipment - which was held in June last year, KCC showcased Silyl Type Anti-fouling paint "EgisPacific", the fuel-saving type, 'Korepox EH2030' which incorporated the nano technology, silicon-based Korexane ST1020', and others. LF-Sea - the eco-friendly anti-fouling coating - which is the flagship product of Nippon Paint Marine Korea, provides excellent functions, improving the fuel efficiency of ship and reducing the CO_2 emissions. Furthermore, Seaquantum series anti-fouling coatings of Chokwang Jotun, which adopt the Silyl technology, have been highly recognized among the ship owners and shipping companies for a long time for its outstanding anti-fouling properties and fuel-saving effect.

- Chokwang Jotun
- Hempel
- KCC
- Nippon Paint Marine Korea

Chokwang Jotun

- 30% growth in offshore sector compared to the previous year

Chokwang Jotun, a joint venture between the Norway-based Jotun, the world's leading coating manufacturer, and Chokwang Paint, has supplied the coatings for ship and industrial applications to various industries such as containers, power plants, bridges, petrochemical industries, etc., as well as large domestic shipyards. Chokwang Jotun was at a turning point in 2009, poised to make another leap forward, when its manufacturing plant in Busan was completed, and is manufacturing high quality eco-friendly products based on relentless R&D.

Chokwang Jotun, which has the unmatched technology for anti-fouling coatings for ships, has carved out large share of the market and has maintained the leading position in the sector of coatings for marine applications over the last 3 years owing to the excellent performance of the special coatings targeting multinational oil companies. This year, Chokwang Jotun expects its sales to grow by 30% compared to the previous year amid the increased placement of the orders for offshore structures.

Figure 1. View of Chokwang Jotun (right) and inside the factory (left)

The ultimate fuel saver

Currently, high value-added coatings, which comply with environmental requirements such as CO_2 emissions and fuel economy requirement, are being applied to eco-design ships. Positive changes are expected in services, along with the competition in advanced technologies even for the monitoring system to validate the applicability of such high value-added coatings. Chokwang Jotun is recently focusing on developing eco-friendly anti-fouling coatings with full-blown efforts.

The ship's fuel efficiency is determined by anti-fouling coatings applied to the external surface. SeaQuantum series, the major anti-fouling coatings of Chokwang Jotun, have been highly recognized by shipping companies over the last several decades for its excellent fuel-saving effect and anti-fouling performance.

Figure 2. HPS technology of Seaquantum X200

SeaQuantum is based on the world's most advanced antifouling technology; a silyl acrylate polymer that hydrolyses when exposed to seawater. SeaQuantum's reliable long lasting protection is provided by a linear polishing rate and a low leached layer - ensuring a controlled release of biocides over time. A predictable and reliable performance is extremely

important for a vessel to keep speed without increase in fuel consumption.

SeaQuantum offers reliable long lasting protection by:

- *Controlled and linear polishing*
- *Low leached layer*
- *Good resistance against mechanical damage*
- *Smoother coating surface over time*
- *Excellent performance during outfitting periods in fresh water*
- *Low water ingress into the coating - directing the hydrolysis only towards the surface*

Table 1. SeaQuantum series

Product	Typical vessel type
Seaquantum Ultra (For vessels trading at 0 - 14 knots)	- Offshore Supply Vessels - Coastal Vessels - Lower voyage factor <50%
Seaquantum Classic (For vessels trading at 12 - 28 knots)	- Bulk Carrier - General Cargo Carrier - Product Carrier - VLCC / LNG
Seaquantum Plus (For vessels trading at 18 - 28 knots)	- Container carriers - Ro-Ro vessels - Medium speed container vessels - Vessels sailing at 18-28 knots with medium to high level of activity
Seaquantum Plus S (For vessels trading at more than 18 knots)	- High speed container vessels - Vessels sailing above 18 knots with a voyage factor >70%

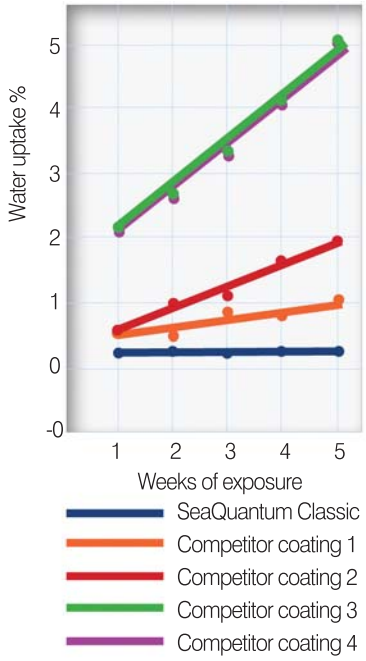

Figure 3. Fuel Saving: Water uptake in Seawater

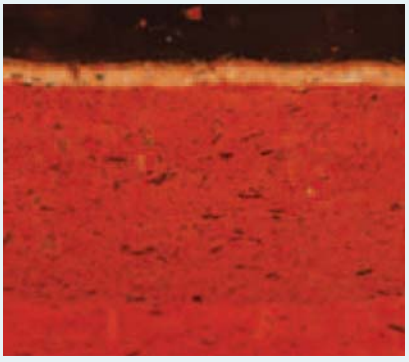

Figure 4. SeaQuantum: thin leached layer

Specifically, Seaquantum X200, which incorporates the new technology called 'HPS(Hull Performance Solutions)' presents the optimized fuel-saving measures based on the type and operating route of ship, thus minimizing the emissions of greenhouse gas emissions(CO_2) from ships. According to the officials of Chokwang Jotun, the fuel-saving concept, the vital part of the coatings for ship, can bring the benefits to users, as well as provide high performance and reduce the carbon footprint.

Eco-friendly coatings specialized for each sector

Chokwang Jotun also developed 'Jotacote Universal', the coatings for the tank of ballast water that provides balance to the ship during the navigation. Jotacote universal 80 is one of the coatings for water ballast tank - containing 80% of solid constituents - which are used most commonly at the shipyards in Korea.

Moreover, shipyards' use of water-based coatings that can

reduce the environmental impact has steadily increased. Jotatop EP W10 is a water-based one-coat system for the engine room onboard ship. It makes one coat sufficient for the area where two coats are usually recommended and therefore the efficiency is enhanced. Furthermore, this system was developed as water-borne coating system, significantly reducing the emissions of VOCs. Besides, the company has constantly launched a variety of eco-friendly products, such as the VOC-free Tankguard DW, the solvent-free coatings for fresh water tank of ship, biocide-free anti-fouling coatings and others.

Targeting KRW 200 billion in sales by 2015

Chokwang Jotun is keeping close eye on the growth potential of marine coatings market. The development of special coatings for high-priced offshore plants has gathered momentum over the last several years, leading to the emergence of the market for new coatings capable of creating high value-added. Chokwang Jotun has set a target of KRW 200 billion in sales by 2015 and plans to focus its capabilities on the market for LNG carriers, chemical tankers, and particularly, offshore plants, as well as containerships and bulk carriers.

Due to the regulations prohibiting the use of toxic materials, Chokwang Jotun is proceeding with the development of eco-friendly materials such as LC (Lead Chromate) and solvent-free and water-based coatings for water ballast tanks to comply with the environmental standards and expanding its market. In addition, Chokwang Jotun plans to move ahead with the development of non-toxic anti-fouling coatings such as FRC (Foul Release Coating) to protect the marine environment and satisfy the needs of customers.

Hempel

- A leader in the sector of the coatings for ships

Hempel is world-leading coatings supplier for protective, marine, container, decorative and yacht markets. Hempel coatings help enhance and protect our customers' valuable assets, from wind turbines, bridges and infrastructure, to ships, power stations and homes. With a strong focus on R&D, advanced production techniques and professional coating advice, the company work around the globe to help keep its customers' investments safe, attractive and corrosion-free for longer.

Low in solvents and biocides, big on value and sustainability, our high-performance waterborne coatings help customers hit their environmental targets; and the company's advanced marine coatings can help shipping companies save fuel and reduce the carbon footprint of their ocean-going vessels.

According to the officials of Hempel, the marine coatings market was once again affected by the uncertainty in the global economy. Many newbuilding projects were delayed or cancelled, and more vessels were taken out of service. By the end of 2011, the number of newbuilding orders globally had fallen to 2006 levels. Nevertheless, Hempel Korea has shown 20% sales growth and modest profits. It is probably because there's time gap between order contract & shipbuilding.

Stronger competitiveness in major business area

As a global supplier of high-quality marine/offshore paints and coatings, Hempel's superior coating systems keeps its customers properties in prime condition, both inside and out, throughout its lifetime - from the building yard and through many years of efficient operation.

- ***Under water hulls***

Hempel's coating systems (including Dynamic, Globic &

Hempasil X3) for the underwater hulls offer superior anticorrosive protection and fouling-free performance for up to 90 months. With a range of fouling release coatings, all designed to reduce vessels' fuel consumption, the company assures that Hempel is the shipping industries no. 1 fouling release supplier.

- ***Ballast Tanks***

The condition of the ballast tanks can be decisive for the vessel's service-life. With a full range of proven and certified coating systems (Hempadur Quattro 17634), Hempel can keep ballast tanks safe from corrosion. Ballast tanks often make up the largest area of the steel structure of a marine vessel - and the structural integrity of the tanks is integral to the vessel's operational safety, efficiency and service life. That's why Hempel makes choosing the optimum ballast tank protection system a priority.

- ***Cargo Tanks***

During their service life, cargo tanks transport a wide range of liquid cargoes, from crude oil and refined products to inorganic chemicals. As a result, they need a coating solution that not only protects the steel from corrosive cargoes, but also removes any danger of contamination from previous cargoes. The tank coating also needs to offer full cargo sequencing flexibility to accommodate the various transportation patterns of each vessel. Hempel can protect any cargo tank from even the most chemically aggressive cargoes with a full range of pure epoxy, phenolic epoxy and zinc silicate coatings.

Silicone-based HEMPASIL X3

Hempel's Silicone-based fouling release coatings create a smooth non-stick surface on the hull so fouling organisms can't attach. The result is less drag in the water, lower fuel consumption and fewer CO2 emissions.

HEMPASIL X3, the fouling release coating with a fuel saving guarantee Based on advanced hydrogel technology, the award-winning HEMPASIL X3 offers shipowners unrivalled fuel-saving potential. A completely biocide-free product, HEMPASIL X3 not only reduces fuel consumption, but also cuts associated CO2 emissions without leaching any harmful chemicals into the marine environment - on any type of marine vessel.

In one sense HEMPASIL X3 works much like convention alfouling release technologies. The coating's non-stick properties prevent fouling from attaching to the hull, lessening resistance and thereby improving fuel efficiency.

HEMPASIL X3's enhanced self-cleaning capability is a result of its pure silicone composition while its fouling revention superiority stems from its use of special nonreactive polymers that create a hydrogel layer between the paint surface

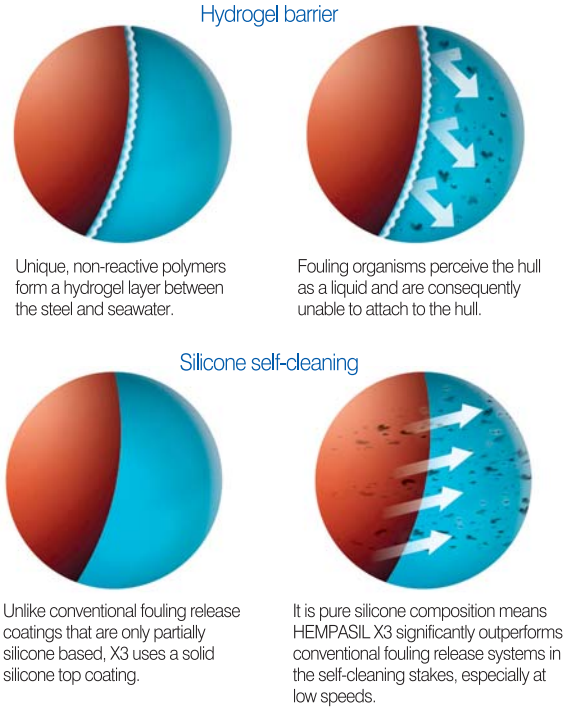

Figure 5. Hydrogel barrier of HEMPASIL X3 and slicone self-cleaning function

No slime to hang around

The pictures above demonstrate the dramatically improved slime prevention performance of HEMPASIL X3 over second generation technologies. Both pictures are photographed after 60 weeks idleness. The superiority of HEMPASIL X3 is clear to see.

Figure 6. Comparison of the functions of HEMPASIL X3

and the seawater. The hydrogel tricks fouling organisms into perceiving he hull as a liquid instead of a solid surface, greatly hindering their ability to settle. The hydrogel layer is effectively backed up by the silicone, known for its self-cleaning properties. Factor in HEMPASIL X3's ability toper form equally as potently from 8 knots and the result is a fouling release coating that, to put it simply, works better than any other on the market.

Satisfying the needs of customers

As the coatings industry continues to change, and with customers, suppliers and competitors becoming larger and operating costs on the rise, Hempel needs to grow if it is to continue delivering the most efficient coating solutions to customers.

That is the purpose of its strategy, called One Hempel - One Ambition, which had its first full year in action in 2011. Despite the ongoing economic turmoil worldwide and the drastic increase in raw material prices, Hempel believes that its 2015 goals are still realistic, even if ambitious. Hempel still has the capacity to further develop and improve the solutions and services it offers to customers.

Hempel says that it needs to adjust its path to account for these changes in external factors, as the company does not expect them to dramatically improve in the coming year. Therefore, Hempel plans to become more efficient and work faster on new solutions that will create more value for its customers.

With the strategy now firmly in place, Hempel is seeing a galvanizing effect on then tire company, which is helping the company to achieve its growth targets and get closer to customers. All of this is moving Hempel closer to a place among the world's ten largest coating suppliers by 2015.

Figure 7. UASC's newbuild Umm Salal seen at Hamburg in June after receiving the Hempasil X3 application.

Development of innovative technologies

The shipping industry in general was affected by low freight rates throughout the year. One bright point was the total volume in the global marine transportation industry, which grew by more than 5%. This had a positive effect on our marine maintenance revenue, which fully counter-balanced the drop in newbuilding.

And also the shipping industry is facing increasing pressure from governments and legislative authorities to reduce greenhouse gas emissions. In response, many shipowner shave set their own environmental targets in an effort to reduce CO_2 emissions.

But finding effective ways to meet these targets can be a challenge, and that's where Hempel's complete fouling control concept can help. Hempel is targeting these markets as growing opportunity and trying to find the best solution to meet and fill its customer's requirements.

Particularly, Research and Development received a significant boost in 2011. This lead to the introduction of a new strategy and new organization which were better aligned to support the Group's strategic goals as set by One Hempel - One Ambition.

According to the officials of Hempel, the company continued developing innovative technologies across all its segments in 2011, with 16 new solutions delivered during the year. The company's biocide-free fouling release product portfolio is designed to reduce fuel consumption, lower CO_2 emissions, and reduce the amount of solvents released into the marine environment.

But Hempel R&D is not just about developing products. The company is a customer-focused organization that listens to the needs of the market.

In addition to developing solutions that are based on its customers' various needs, the company's work also involves constantly looking for new ways to optimize costs and increase efficiencies. Hempel is always tried to be true potential for the benefit of its customers and stakeholders all over the world.

KCC

- Epoxy anti-corrosive with the largest market share

The coating is one of the classical and economic ways to protect the metal from external environment and keep the structures, etc., corrosion-free, and has been widely used. Anti-corrosion coatings provide protection from corrosive environments. Particularly, excellent anti-corrosive performance is required for the coatings which are applied to the offshore structures and ships exposed to highly corrosive main environment including the seawater, in addition to the essential requirements for the films formed after the application.

Currently, many research institutes and companies are attempting various applications of new technology in order to enhance the functions and performance of anti-corrosive coatings widely applicable to ships and offshore plants. In this context, KCC has reexamined the technological changes and levels of current anti-corrosive coatings and has launched high-performance ship coatings applying new technologies such as nano technology and Nanocomposites.

KCC Ship Coatings has supplied the coatings for ships, developed with indigenous technology, to domestic small-to-medium shipyards such as Sungdong Shipbuilding & Marine Engineering, SPP Shipbuilding & Marine Engineering, etc., as well as large domestic shipbuilding heavyweights such as Hyundai Heavy Industries, Hyundai Mipo Samho Heavy Industries, and Daewoo Shipbuilding & Marine Engineering, and has established a leading position in global market for the ship coatings.

The market has a growing demand for ship coatings that can reduce the impact on marine ecosystem and energy consumption, as well as possess essential physical properties such as anti-fouling, anti-rust functions and durability enhancement. KCC Ship Coatings has developed high-performance products to cope with the changing needs of the market and has further improved the properties of existing products, thus maintaining a leading position in the market for ship coatings.

Figure 8. Application of the coatings to the ship

A leader in the coatings market

The red lead-based coatings were widely used from late 1940s to early 1950s, but gave way to the epoxy-based coatings after the introduction of zinc-based coatings due to the growing demand for the coatings that can withstand highly corrosive environment such as offshore plants, petrochemical plants and chemical plants for a long time.

The epoxy-based coatings evolved from the coal tar-based coatings to tar-free epoxy-based coating, and have been the most widely used thus far. The tar-free epoxy coating mentioned above is 'Korepox EH2350'.

EH2350 is the major anti-corrosive coating applied to the cargo tank filled with the seawater and various cargoes, and has bright color. It is easy to inspect after being applied to the seawater tank and provides excellent resistance to various chemicals. Containing 80% solid constituents, EH2350 is an eco-friendly product conformant to VOC standards.

Furthermore, EH2350 is capable of being hardened at low temperature and therefore maintains the same operability and physical properties under various weather conditions. EH2350 has been applied to the water ballast tanks on board 989 ships thus far, proving its excellent performance. It was applied to 130 ships in 2010 and 132 ships as of June 2011, creating a stable revenue stream for the company even amid sluggish ship market conditions.

EH2350 has met the needs of customers based on constant improvement of physical properties and has stood out in the market for anti-corrosive coatings. KCC plans to add the unique physical properties to its products to cope with the changing needs of the market and further set its products apart from competitors'.

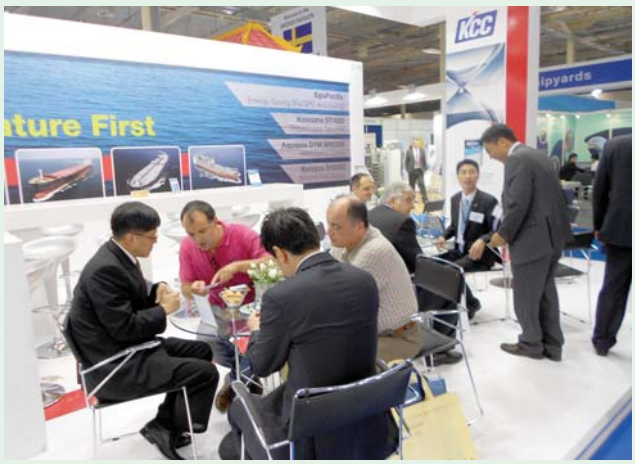

Figure 9. KCC show Silyl Type Anti-fouling paint "EgisPacific", the fuel-saving type, 'Korepox EH2030' which incorporated the nano technology, silicon-based Korexane ST1020', and others.

Silyl acrylate SPC anti-fouling coating

KCC recognized the need to develop Silyl acrylate SPC technology from early 2000s and began to develop the technology independently. As the ship owners had a growing interest in fuel costs, KCC embarked on the development of 'EgisAtlantic' and 'EgisPacific', the Silyl acrylate SPC anti-fouling coatings, in 2009.

According to the officials of KCC, the polymer of Silyl acrylateSPC has relatively less polarity and therefore the hydrolysis occurs more stably. The hydrolytic stability leads to the uniform abrasion of film. As a result, the increase in the surface roughness during the navigation is only moderate and therefore the friction resistance decreases.

Silyl acrylate SPC anti-fouling has the advantage of abrasion stability but has the disadvantage of relatively low abrasion amount. The antifoulant elution is important to achieve the anti-fouling performance beyond a certain level. Excessively low amount of abrasion results in the decrease of elution and degradation of the anti-fouling performance.

To resolve those problems, KCC introduced the monomer - which can adjust the hydrophilicity of film - into Silyl SPC polymer and developed Silyl acrylate SPC anti-fouling coating that provides excellent anti-fouling performance by introducing high elution antifoulant.

Table 2. Properties of KCC Silyl acrylate SPC anti-fouling coating

Category	EgisAtlantic	EgisPacific
Solids	50%	55%
Price	Relative high-cost	Relatively low-cost
Film thickness	Laminated type	Laminated type
Friction resistance reduction rate	9~10%	5~7%
Type of Coatings	Silyl acrylate SPC A/F	Modified Silyl acrylate SPC A/F

Investing 5% of sales in R&D

According to the officials of KCC, many research institutes and coatings manufacturers worldwide are investing a lot of manpower and resources to develop and improve the coatings for ship. As a result, the technology for anti-corrosive coatings for ship has reached parity worldwide.

KCC earmarks 5% of its sales for R&D to cement its leading position in the market for ship coatings and introduced new technologies, such as the nano complex application technology and the technology using the phase transition matter with surface modification, thus creating the anti-corrosive coatings that provide excellent performance. KCC plans to focus on R&D programs, spearheaded by its approximately 400 researchers, with an aim to capture larger share of the market for the next-generation coatings for ship.

Table 3. Fuel-saving and CO_2 emission reducing effect of EgisAtlantic

Size of ship	Fuel consumption (ton/day)	CO_2 emissions (ton/day)	Fuel-saving s (ton/day)	Reduction in CO_2 emissions (kg/day)	Annual fuel-saving (ton/yr)	Annual cost of fuel-saving (unit: USD 1,000)
8,600 TEU	260	813	7.8	24.4	2,278	775
8,000 TEU	250	782	7.5	23.4	2,190	745
6,800 TEU	230	720	6.9	21.5	2,015	685
4,500 TEU	185	580	5.5	17.3	1,621	551

** Annual fuel consumption and reduction in CO_2 emissions are based on the 70% operation rate.*
** Fuel cost (bunker C oil) based on USD 340/ton*

Nippon Paint Marine Korea

- LF-Sea applied to approximately 700 ships at home and abroad

Nippon Paint Marine Korea (NPMK) is the local representative office in Korea, invested by Japan's Nippon Paint, and is a technology leader in the eco-friendly coatings for ship. Currently, the company is supplying innovative products, such as the coatings for ships and offshore plants, offshore steel structures, etc. NPMK predicts that the demand for anti-fouling coatings which provide excellent anti-founding performance and reduce the fuel consumption will be spurred amid the heightened interest in eco-friendly ships and high oil prices.

NPMK's eco-friendly coatings have already been highly recognized in the market. The most prominent eco-friendly coatings of NPMK include 'NOA 60HS(Self-Indicating Coating). This product is applied to the ballast water tank on board ships. NOA 60HS one-coat system, an alternative system for PSPC (Performance Standard for Protective Coatings) that requires a minimum of two coats, slashes the emissions of VOCs from shipyard and reduces the processes by 30% at shipyard, and thereby leads to dramatic reduction of energy consumption in production

First in the world, "NOA 60HS One-Coat System" has been certified by ClassNK as an alternative system for PSPC (IMO: Performance Standard for Protective Coatings)

Figure 10. 'LF-Sea', NPMK's eco-friendly anti-fouling coating

'A-LF-Sea', an innovative mechanism

NPMK's LF-Sea, which was developed based on the mechanism differentiated from that of existing coating manufacturers, has attracted the attention as eco-friendly and fuel-saving coating. LF-Sea is an eco-friendly anti-fouling coating that enhances the fuel economy and reduces CO_2 emissions from ship. Anti-fouling coating is manufactured by adding the antifoulant to prevent the organisms from attaching to the external surface of the ship bottom during the navigation at sea.

According to NPMK, the friction resistance caused by the marine organism attached to the external surface of ship bottom results in higher operating cost and increased emissions of CO_2. However, the organic tin or cuprous oxide, etc., which have the anti-fouling properties may contaminate the marine ecosystem, and therefore, International Maritime Organization (IMO) banned the use of organic tin in anti-fouling coating in 2008. LF-Sea can realize about 4% reduction in fuel consumption compared to an identical vessel using conventional bottom paint.

Reducing the consumption of heavy fuel oil by 4% ensures a decrease in CO_2 emissions at the same rate. LF-Sea forms the water trap layer that reduces the friction-induced resistance during the navigation of ship at sea and is cost-effective compared to silicon coatings.

• Features

1. Hydrolytic A/F for 5 year life
2. Low friction / Fuel saving A/F
3. Lower friction by water trapping mechanism + Ecoloflex

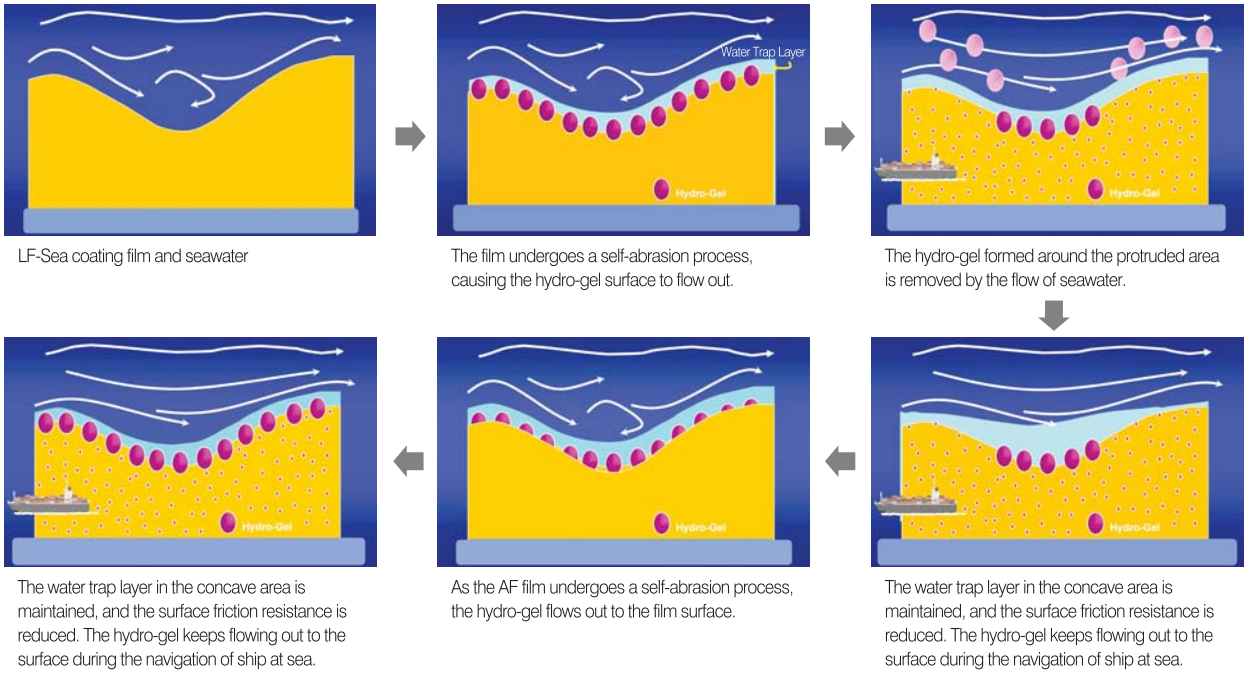

Figure 11. LF-Sea Mechanism

SPC (HyB) antifouling performance.

4. Much more cost effective silicone type and easy budgeting for ship manager.
5. Applicable directly on the existing tin-free antifoulings without blasting.
6. Applicable with current painting tools and conditions. No special workload needed.

NPMK successfully applied the coatings to approximately 400 vessels such as ferry, BC, tankers, etc in 2010, and has applied the coatings to about 700 vessels worldwide thus far. Japan's MOL announced that the application of LF-Sea to the 13,645CG ferry resulted in the fuel-saving worth JPY 1700 over the period of 9 month. Meanwhile, LF-Sea was selected at 7th Eco Product Award 2010. Eco Product Award is a prize for Eco- friendly products presented by Japanese government.

Nation's first introduction of water-based coating, eco-friendly certification

NPMK unveiled 'Odemarine PF', which dramatically reduced the emissions of VOC and protect the health of operators on board ship, for the first time nationwide in 2007. Odemarine PF, the water-based epoxy, was applied to the ships of STX Offshore & Shipbuilding (STXOS), a domestic shipyard, from 2007 to 2009.

This coating does not require the use of thinner and provides more excellent coating performance compared to Alkid coating used in existing E/R and residing area. It emits nearly zero volatile organic compounds (VOCs) even after the application and has no solvent odor harmful to the health of operator and significantly reduced the risks of explosion and fire. Odemarine PF received the eco-friendly certification from Korea Environmental Industry & Technology Institute (KEITI) in 2009.

Table 4. Product line and coating specification of LF-Sea

Product	Type of coatings	Type of ship	Specification
LF-Sea 150 HyB	Cu-Si Acrylate	PCC, BC, Container	60 M spec (17~24 knots) V/B: 3 x 120 mic F/B : 2 x 115 mic
LF-Sea 250 HyB	Cu-Si Acrylate	LNG, Tankers, BC	60 M spec (15~17 knots) V/B: 3 x140 mic F/B : 2 x 135 mic
LF-Sea 600 HyB	Cu-Si Acrylate	Coastal ships	24 M spec (8~15 knots) V/B: 2 x 115 mic F/B : 1 x 150 mic

The coating saving the fuel consumption by 10%, slated for sale from next year

Nippon Paint and MOL are jointly developing the sequel to LF-Sea, and the completion target is March 2013. This next-generation product will be an innovative product that can reduce the fuel consumption by up to 10% compared to existing product.

NPMK started applying this next-generation product to real ships from March this year, which will be officially launched in the market in March next year following the 1-year monitoring period. An official from NPMK commented that the new LF-Sea would be a breakthrough product that can effectively cope with the stringent international environmental regulations and soaring prices of oil.

NPMK plans to constantly develop and supply eco-friendly products that can meet the requirements of the shipbuilding/shipping companies and comply with international regulatory requirements.

NPMK's motto is making eco-friendly products that protect the earth and contribute to the sustainable development. This year, NPMK plans to focus on expanding its sales capability to broaden the application of its products to domestic shipping companies and shipyards.

Figure 12. NPMK is the first company that introduced 'Odemarine PF' (Engine Room, Machinery Space), the water-based coating which dramatically reduced VOC emissions, to Korea.

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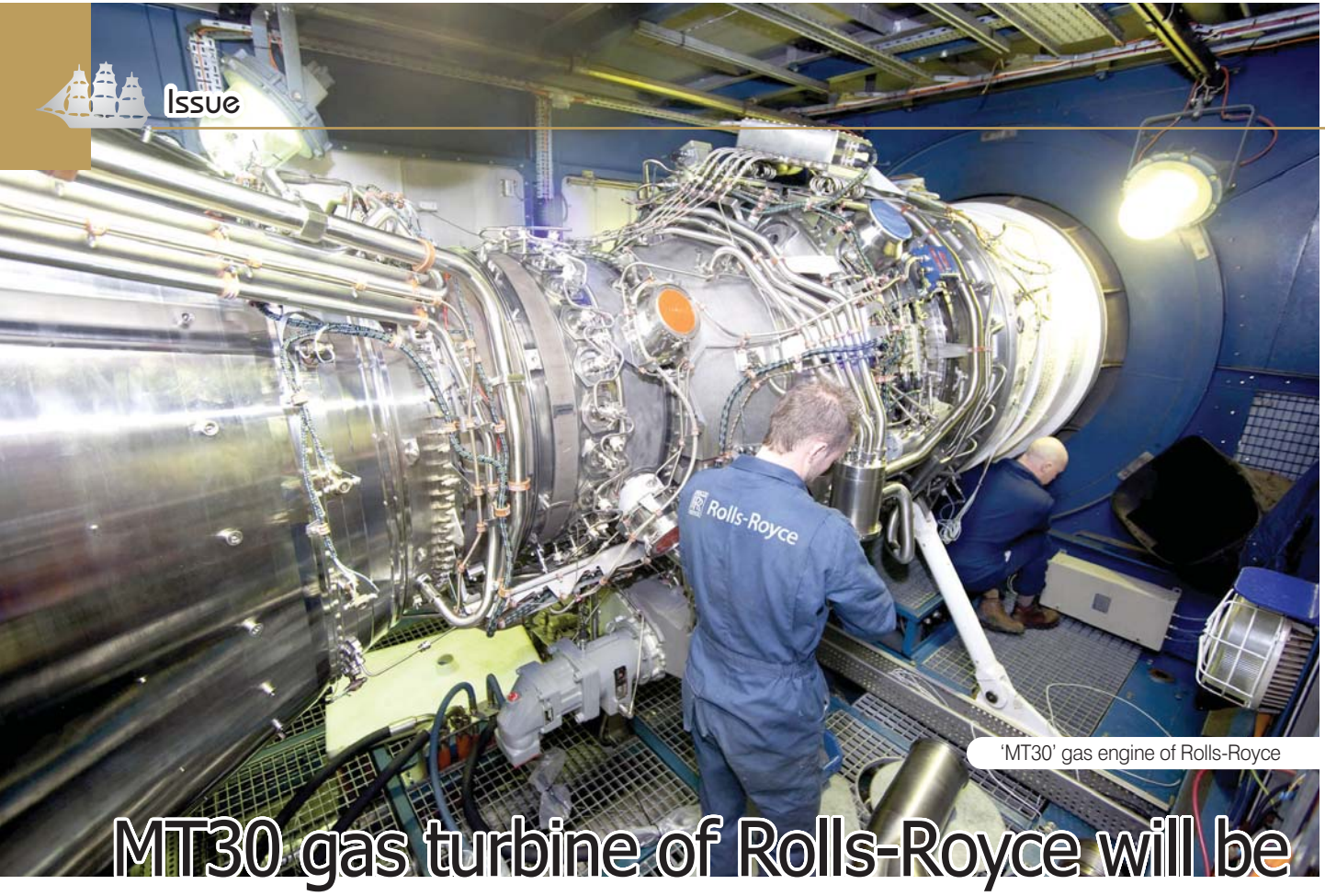


'MT30' gas engine of Rolls-Royce

MT30 gas turbine of Rolls-Royce will be installed in Korea Navy frigates

There has been an escalating interest in gas engine amid rigorous environment regulations on ships and energy efficiency requirements. Rolls-Royce offered a briefing in the British Embassy in Seoul on June 26 in relation to the selection of the supplier of power system for the Korea Navy's FFX frigates with the weight of 3000 to 3500 tons.

Rolls-Royce, the global power systems company, has been selected to supply its MT30 gas turbine to power a new FFX frigate for the Republic of Korea's Navy. This is the first order for the MT30 in Asia. The 'MT30' gas engine, which will be installed in these vessels, was developed under the ambitious plan of Rolls-Royce in 2000 and has been adopted in the warships of the United States, U.K., etc. This engine will be able to be installed as the gas engine for ships.

Andrew Marsh, Rolls-Royce, President - Naval sad, "We are delighted that the Republic of Korea Navy has selected the MT30 for the first ship in the FFX Batch II programme. The MT30 is the engine of choice to power the world's most advanced naval ships, where demand for power is increasing as more navies choose all-electric ships with sophisticated on board systems." He added, "We look forward to working with HHI, DSME and the Navy in delivering what will be the world's first frigate to feature the MT30."

John Yi, Rolls-Royce's Vice President of Rolls-Royce Marine Korea for Asia & Pacific Naval, said, "We are global military logistics company and this warship construction project of Korea and U.K is meaningful very much. I expect that the

Peter Luff MP, Defence Minister of UK Govemment

John Yi vice president naval - Asia & Pacific, Rolls-Royce Marine Korea

shipbuilding and engine technology of both countries will create synergic effects."

Peter Luff MP(Member of Parliament), Defense Minister of U.K. Government, said, "I am very delighted to see that my visit to Korea coincides with this announcement of Rolls-Royce." He went on saying, "I heartily welcome the partnership with Hyundai Heavy Industries(HHI) through this program and fully support the cooperation between the two countries for defense R&D program in the aerospace sector."

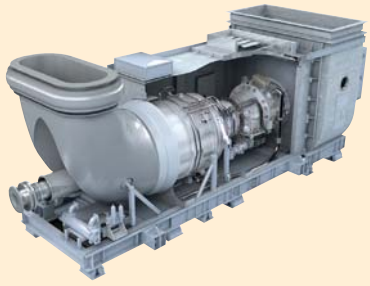
Rolls-Royce is a world-leading provider of power systems and services for use on land, at sea and in the air, and has established a strong position in global markets - civil aerospace, defence aerospace, marine and energy. As a result of this strategy, Rolls-Royce has a broad customer base comprising more than 500 airlines, 4,000 corporate and utility aircraft and helicopter operators, 160 armed forces, more than 4,000 marine customers, including 70 navies, and energy customers in more than 80 countries.

The Rolls-Royce MT30 marine gas turbine

The MT30 brings today's aero gas turbine technology to the marine market and gives operators of gas turbine-powered vessels efficiency and reliability improvements, with a highly competitive power-to-weight ratio and reduced operating and through-life costs. Designed with 50 to 60 per cent fewer parts than other aero-derivative gas turbines in its class, the MT30's power output is 36-40 MW is Lloyds approved and DNV design assessed.

The MT30 is a member of the Rolls-Royce Trent aero engine family that has accumulated over 45 million operating hours since entry into service in 1996. The MT30 is derived from the Trent 800 aero gas turbine, which powers the Boeing 777 aircraft.

Key facts



- The MT30 is the world's most powerful marine gas turbine.
- It is the most power dense marine gas turbine.
- The MT30 shares around 80% commonality with proven aero technology.
- It is a member of the Rolls-Royce Trent aero engine family that has accumulated over 45 million operating hours and reliability.
- The MT30 is the large gas turbine of choice for many of the world's naval ship building programmes.
- It's already powering the US Navy's Freedom class Littoral Combat Ships, and has been selected for the US Navy's DDG1000 destroyer, the UK Royal Navy's Queen Elizabeth class aircraft carriers and the Republic of Korea Navy's FFX Batch II frigates.
- The MT30 can be configured for mechanical or electric drive.

MT30 compact package

- Weight of gas turbine: 6500kg
- Total module weight, including enclosure and ancillary components in the order of 30,000kg - offering a highly competitive power-to-weight ratio.
- Width: 2680mm (enclosure & exhaust) - Height: 3400mm - Length: 8700mm

Deepwater offshore plant selected as leading technology for future

Hyundai Heavy Industries (HHI), Daewoo Shipbuilding & Marine Engineering (DSME), GS E&C, and Khan Consortium were selected to undertake the future flagship technology development project (offshore plant for deepwater resources exploitation).

The Ministry of Knowledge Economy (MKE) and R&D Strategic Planning Group held the launching ceremony for the Future Flagship Technology Development Project Group on June 11, which was attended by about 200 people, including Hong Seok-woo, Minister of Knowledge Economy, Hwang Chang-gyu, President of R&D Strategic Planning Group, delegates from companies and organizations which are the members of the Project Group, in parallel with the contract signing ceremony.

This project aims to identify the sectors that have high growth potentials, build up competitiveness and promote the balanced development of overall industries. In addition, the competition system was introduced to stimulate acquisition of essential technologies and increase the project's chances of success.

R&D Strategic Planning Group gathered opinions of about 700 experts from various fields and selected the deepwater offshore plant as the future flagship technology. Display and printing/electronics were also selected as the future flagship technology, besides the offshore plant.

These technologies will be commercialized over the next 6 years, and the government expects that the successful commercialization will result in KRW 102 trillion in sales and 115,000 new jobs by 2025. During the project period, a funding ranging between KRW 55 billion and 80 billion will be offered to support the project.

The offshore plant project aims at the localization of total solutions for deepwater offshore plants. This project encompasses the technologies for the integrated 3,000m deepwater and subsea/offshore engineering, related equipment, installation and facilities, as well as the drilling, separation, transfer, pretreatment, storing and unloading of deepwater resources.

Additionally, this project paves the way for co-growth based on the role-sharing among large companies and small-to-medium businesses.

Under this project, large companies will develop the technologies for intelligent deepwater oil & gas plant engineering and environment-friendly floating platform topside system while small-to-medium companies will develop technologies for subsea production & processing system and deepwater oil & gas plant installation.

The future flagship technology development project consists of 3 sectors (offshore plant, display, printing/electronics) and will be participated by 154 organizations (31 large companies, 77 small-to-medium or middle-standing companies, 31 universities, 15 research institutes, etc). In particular, the government plans to direct 67.5% of the funding for strengthening the technological competitiveness of small-to-medium companies.

Table. Offshore plant for deep sea resources exploitation

Task	Supervising Organization	Participating Organization
Overall management	HHI	
1st Detailed Task	DSME	HHI, Samsung Heavy Industries(SHI), STX Institute of Technology (STXIT), GS E&C, UIT, Taesung, Khan, Xinnos, HSS, DSR, Mirae Industrial Machinery, KAIST, KR etc.
2nd Detailed Task	GS E&C	HHI, SHI, DSME, STXIT, Korea Institute of Industrial Technology (KITECH), Korea Institute of Energy Research, Korea Advanced Institute of Science and Technology, Hanyang University, ABSfill, DMC, Kangrim Heavy Industries, Donghwa Entec etc.
3rd Detailed Task	Khan	HHI, DSME, KIGAM, ABS, Sungil, UIT, PSE, KAIST, POSCO, LS Cable & System, RIST, Steel Flower, Iljin Steel, Sejin Heavy Industries, Sungjin, KITECH, Korval, DMC etc.
4th Detailed Task	HHI	DSME, SHI, Hyundai E&C, KT Submarine, Khan, Aquadron, Suncom Information, Advact, Korea Ocean Research & Development Institute, KAIST, Hanyang University, GLND etc.

Emerson wins contract to deliver subsea instrumentation package

Emerson is supplying integrated automation solutions through Roxar, including the subsea oil/gas field and platform/floating production facilities, refinery and production.

Roxar's subsea instrumentation

Emerson Process Management has won a multi-million dollar contact to deliver its Roxar subsea instrumentation to Lundin Petroleum's Brynhild field in the North Sea.

The contract was awarded by Aker Solutions, one of the world's leading providers of oilfield products, systems and services, and covers Roxar subsea multiphase meters, subsea Sencorr pressure and temperature sensors, subsea chemical injection valves, and sand monitors. Aker Solutions will use the instrumentation as part of the rolling out of a complete subsea production system on Brynhild, with Emerson also delivering a number of downhole pressure and temperature gauges directly to Lundin Petroleum.

"This is a landmark agreement for a number of reasons," said Svenn Haugen, World Area Director Europe & North Africa, Roxar Flow Measurement. "Firstly, our instrumentation is to be deployed on a tie-back where key input measurements for fiscal allocation and production measurement will be carried out subsea, requiring the very best in accurate and robust subsea solutions. Secondly, it is a solution package covering both multiphase flow measurement and downhole monitoring, chemical injection and sand detection. We are delighted that Lundin and Aker Solutions put their trust in Emerson for such an important project."

The tieback from Brynhild to the Pierce field's FPSO (Floating, Production Storage & Offloading) platform in the UK sector is a cross-border subsea tie-back where key data for fiscal allocation and production measurement are gathered subsea. Combining the Brynhild and Pierce's tie-back flow will avoid the need for a dedicated riser for Brynhild. The Roxar subsea instrumentation will be crucial to generating accurate measurement and input to fiscal allocation from the different flow streams.

Emerson's solution for the Brynhild field will provide Lundin with high flow measurement accuracy, control and insight into their subsea operations;

- *The Roxar subsea Multiphase meter provides accurate and continuous on-line monitoring of the flow rates of oil, water and gas in subsea well streams.*
- *The Roxar subsea Sencorr pressure and temperature (PT) sensors are built for long-life operations in harsh subsea production environments. A silicon piezoresistive sensor measures both pressure and temperature from the same measurement bridge, giving complete temperature compensation of the pressure reading.*
- *The Roxar subsea Chemical Injection valve (High Flow) is a reliable, compact and robust retrievable solution providing total control over the injection of inhibitors; and*
- *The Roxar Sand monitor is a nonintrusive acoustic sand monitoring system that enables operators to optimize production by enabling the determination of maximum sand-free rates or maximum acceptable sand production rates.*

The Brynhild field is located northwest of the Ula field and 38 kilometers north-north-east of the Pierce field. The water depth is approximately 80 meters. In November 2011, Aker Solutions signed a US$122 million contract with Lundin Petroleum for the engineering, procurement and construction of a subsea production system for the Brynhild field.

SHI built the world's largest Windfarm Installation Vessel

Samsung Heavy Industries (SHI) built a Windfarm Installation Vessel (WIV). This WIV is a new type of specialized vessel which will see a growing demand amid the rapid expansion of offshore wind power market. SHI successfully constructed and delivered this WIV, and therefore can be better positioned in winning additional orders in the upcoming period.

SHII successfully built 'PACIFIC ORCA', the world's largest WIV, and delivered it to the Singapore-based SPO(Swire Pacific Offshore), the ship owner. WIV is a new type of specialized vessel with a growing future demand as the focus of wind power market is shifting gradually from the onshore to the offshore wind power.

As there is an increasing interest in wind power worldwide, the WIV market is expected to expand gradually. Offshore wind power offers advantages over the onshore wind power because the wind is stronger and blowing constantly over the sea. WIV enables the installation of wind turbines even in harsh climate conditions and shorten the installation period compared to the offshore barge .

The installed capacity of offshore wind turbines worldwide currently stands at 3.5GW (1,000 units of 3.5MW power generators) and is expected to increase by as much as approximately 70 times to 239GW by 2030. In response to that, the shipbuilding industry focusing on securing the related technologies in anticipation of the soaring demand for the WIV.

This WIV, built by SHI this time, was ordered in 2010 and measures 161m in length, 49m in width, and 10.4m in height. It can carry and install 12 units of 3.6MW wind turbines at a time.

Furthermore, this WIV is the largest of its kind worldwide. It can install the wind turbine at a maximum water depth of 60m and can install even the ultra large wind turbine with the power output equal to or exceeding 10MW, the type of wind turbine being developed in the industry as the large wind turbines has become a trend.

'PACIFIC ORCA', the world's largest Windfarm Installation Vessel

Usually, WIV lowers the jack-up leg, fitted to the hull, into the sea and fixes it to the sea floor, and then floats the hull above the sea surface to minimize the effect of tides and waves when installing the wind turbine.

The WIV built by SHI uses 6 legs to float the vessel up to 17m above sea surface and then installs the power generator tower, power generation room, blades, etc., by operating the 1,200 ton crane fitted to the hull. Particularly, This WIV was designed to enable the installation of wind turbines even in harsh marine environment with the wind blowing at 20m per second and the wave reaching 2.5m in height.

Roh In-sik, President of SHI, said, "Having successfully installed this WIV, the world's largest, we are better positioned to win new orders in the period ahead. I expect the synergic effects to be created between the shipbuilding business of SHI and the wind power business based on the use of renewable energies."

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Shipbuilding & offshore industries won orders worth USD 14 billion in the first half of this year

Offshore energy exploitation is gathering steam despite global economic depression. Domestic shipyards are expected to win a wave of new orders until the end of this year in the sector of high value-added vessels such as LNG carriers, LPG carriers, and vessels related to the offshore resources exploitation. Although the placement of new orders around the globe decreased 58% year-on-year, domestic shipyards have maintained the top spot in new orders.

This Ministry of Knowledge Economy announced that the global orders for ships stood at 8.77 million CGT in the first half of this year, which is 42% compared to the same period of the previous year, and the orders placed at domestic shipyards amounted to 3.31 million CGT (USD 14 billion) which accounts for 37.7% of the orders placed worldwide in the same period. Meanwhile, the nation's export of ships in the first half of this year fell 20% year-on-year to USD 25.5 billion due to the decrease in the ship prices and quantity as the ships ordered during the depressed market period following the global financial crisis that began in 2008 were delivered to ship owners.

The shipbuilding market showed some signs of recovery from the second half of 2009 after the sluggish performance in the aftermath of global financial crisis in the second half of 2008. However, the shipbuilding market has been experiencing a downturn since 2011 due to the glut of ships in the market, slow global economic recovery, and Eurozone crisis. Particularly, the orders for commercial ships stood at only 4.9 million CGT in the first half of this year, which is similar to a level recorded in 2009, a year when virtually no orders were placed around the globe due to the difficulties arising from the global financial crisis. New orders for the types such as LNG carriers, LPG carriers, drillship, offshore plants decreased approximately 25% compared to the corresponding period of the last year. However, the placement of new orders for those types of vessels related to the offshore resources exploitation and transportation showed relatively smaller decrease compared to ordinary commercial vessels because of the existing market demand.

The prices of newbuilding vessels, which have inched up temporarily since March 2010, decreased for most types of vessels except LNG carrier amid the declining demand, and reached 133.8 point as of May 2012 (100 point in January 1988, 176.5 point in 2008, 137.7 point in 2009, 142.4 point in 2010, and 138.9 point in 2011).

Table. Trends of changes in the global shipbuilding market (Source: Clarkson)

Category	2009			2010			2011			From January to June, 2012		
New orders placed (unit: 1 million CGT)	1,646			4,456			3,225			877		
Major countries receiving the orders	Korea	China	Japan	Korea	China	Japan	Korea	China	Japan	Korea	China	Japan
Order intake (share %)	449 (27.3)	803 (48.8)	194 (11.8)	1,250 (28.1)	2,057 (46.2)	585 (13.1)	1,376 (42.7)	1,035 (32.1)	399 (12.4)	331 (37.7)	303 (34.5)	107 (12.3)

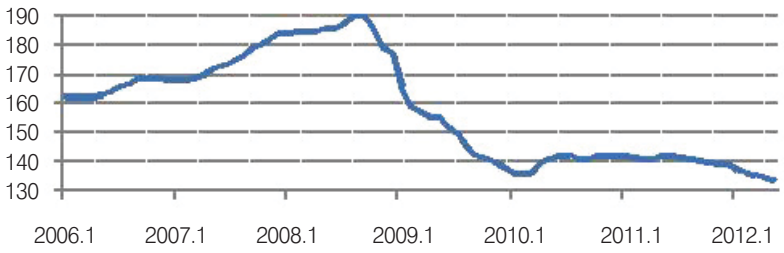

Figure. Trends in the prices of newbuilding vessels (Source: Clarkson)

Domestic shipyards won orders worth USD 14 billion

Domestic shipyards received orders worth 3.31 million CGT (USD 14 billion) for the vessels related to the resources exploitation and transportation such as drillship, FPSO, LNG carrier, LPG carrier, etc., sweeping 70% of new orders placed worldwide in this sector.

In the first half this year, 8 drillships, 2 LNG-FPSOs, 16 LNG carriers, 23 LPG carriers, and 64 tankers were ordered worldwide. Among them, domestic shipbuilding heavy weights won 1 FPSO (USD 2 billion), 1 LNG FSRU (USD 280 million), 7 drillships (USD 4.4 billion), 1 LNG-FPSO (770 million), 15 LNG carriers (3.1 billion), 16 LPG carriers (USD 800 million), 30 tankers (1.9 billion), etc., which reflect their global competitive edge in the sector of high value-added vessels.

Although Chinese rivals overtook Korean shipyards in new orders for bulk carriers, small-to-medium sized containerships, offshore supply vessels, etc., Korean shipyards which have differentiated the ship models still outpace the Chinese rivals by a wide margin. New orders placed at Korean shipyards stood at 3.31 million CGT worth USD 14 billion, while Chinese shipyards won new orders amounting to 3.03 million CGT worth USD 5.9 billion.

Domestic shipyards are maintaining the order intake at a level similar to last year's despite the decrease in new orders amid global economic recession (16.0 million CGT in 2010, 16.1 million CGT in 2011, 8.6 million CGT in the period between January and June, 2012).

However, the export of domestic shipyards is expected to fall 20% year-on-year to USD 43 billion in the first half of this year due to the decrease in the prices and quantity of ships as the ships ordered during the depressed market period following the global financial crisis that began in 2008 were delivered to ship owners. Last year, domestic shipyards registered USD 56.6 billion in export, the largest ever in history, thanks to the delivery of high value-added vessels, such as LNG carriers, offshore plants, large commercial vessels, etc.

DNV, MOU with Hoseo University

DNV signed a MOU with Hoseo University at Ah-san campus to cooperate on R&D and trainings related to fire and explosion On July 4th.

Base on this MOU, DNV and Hoseo University will cooperate on research and development activities regarding fire and explosion, development of training programs and engineers on fire and explosion for maritime and offshore plants, and evaluation of disaster effect of critical facilities. DNV will use the facilities of Hoseo University for the research and other tasks and joint conferences will be held semi-annually to evaluate the cooperation progress.

"It is very encouraging to see DNV contributing to the development of young professionals in Korea. With this MOU with Hoseo University on fire and explosion R&D and trainings, we, DNV, look forward to helping Hoseo University provide a high quality curriculum to the students and engineers and extend its academic expertise into fire and explosion area," states Jon Rysst, Regional Manager of DNV Korea and Japan.

KIOST opens the door to the era of oceans and polar regions

KIOST, recently established, will play a pivotal role in supporting the offshore resource exploitation and offshore industries. MLTM (Ministry of Land, Transport and Maritime Affairs) will inject approximately 3.6 trillion in funds to develop the science technologies for oceans and polar regions by 2020 in an endeavor to sharpen the nation's competitiveness in the offshore and polar regions.

KIOST(Korea Institute of Ocean Science &Technology) held an opening ceremony on July 4 in which it announced the vision and strategies to strengthen the nation's competitiveness in the offshore and polor region sectors, and unveiled the strategies that it mapped out to press ahead with the national R&D projects.

KIOST and its annexed Polar Region Research Center envision to become the global leader in the offshore science technology and the leading global research institute for polar regions, and will proceed with R&D focusing on large-scale programs aiming to secure world's best offshore science technologies, develop excellent research centers and conduct research into oceans and polar regions.

For that, the Ministry of Land, Transport and Maritime Affairs (MLTM) plans to inject approximately 3.6 trillion in funds to develop the science technologies for oceans and polar regions by 2020 based on MTRM(Marine Technology Road Map) established in December 2011, while expanding the support for the operations of KIOST.

KIOST will put its primary focus of R&D on the offshore plant sector to support the development of new offshore industries. In addition, KIOST will move ahead with the research to identify the cause of global climate change and prepare countermeasures, and furthermore, plans to expand its R&D related to the Arctic and Antarctic regions

The Arctic sea is estimated to have up to 25% of the world's untapped oil and natural gas reserves and will become a new foundation for the expansion of offshore resources exploitation and offshore plant industry in the period ahead. Meanwhile, KIOST will strengthen the open-type operating system for the data and specimens collected from the polar regions in addition to the research activities in the Arctic and Antarctic regions. Korea Polar Data Center (KPDC) and Polar Specimen Security Center are currently under construction.

MLTM held an opening ceremony in Ansan, Gyeonggi Province, for KIOST, the only national research institute nationwide in the field of offshore science technology, which is dedicated to the research and development (R&D) related to the offshore science technology and professional manpower development.

Finally, KIOST plans to expand its research infrastructure for offshore scientific survey and deep sea probe. It will complete the construction of a 5,000 ton state-of-art offshore research vessel by 2015 and develop the manned submersible capable of diving to a maximum depth of 6,000 m, thus accelerating the research related to the oceans and offshore resource exploration.

The outcome of the KIOST's R&D plan is expected to have an economic spillover effect worth approximately KRW 3.8 trillion by 2020. According to MLTM, the development effect in the offshore basic science technology sector and application/industrial technology sectors will be worth approximately KRW 1.2 trillion and 2.6 trillion, respectively.

An official from MLTM said, "KIOST will help stimulate the growth of offshore industry through the offshore resource development, the researches into the Arctic and Antarctic regions, and offshore plant development, which are vital for future growth, and lay a cornerstone for further building up the nation's competitiveness."

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Domestic and overseas trends of equipment technology development for green ship (1)

Green ship has become an irreversible trend worldwide. R&Ds related to green ship have been vigorously conducted in various fields such as the hull design, engine and propulsion system, navigation satellite system, etc., in Korea, too. Here, we will look into current technologies for green ship and future market trends both at home and abroad.

Sung-yoon Kim Senior Researcher
Energy & Marine Research Division
Korea Marine Equipment Research Institute

Definition of green ship

The pollutants from ships can be classified largely into the air pollutants(CO, NO, SO, etc) and marine pollutants (ballast water, anti-fouling coating, sewage, etc).

The IMO(International Maritime Organization) regulations have become more rigorous to control the greenhouse gas emissions(CO, NO, SO, VOCs, PM) amid the global warming that accelerates faster, and attempt to prevent the ships from operating if they fail to comply with regulations.

As a result, ship technologies are being developed to meet the regulations and the ships conforming to such regulations are defined to be the 'green ship'.

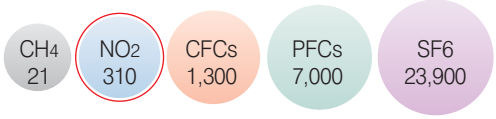


Figure 1. Global Warming Potential (GWP) - Number by matter when CO_2's GWP is 1

Emergence of green ship industry

As CO gas is cited as a major culprit in the rapid global warming, the discussion has been fueled about the reduction of CO emissions. In 2007, CO emissions from overall maritime sector stood at 1.046 billion tons. That represents 3.3% of the global greenhouse gas emissions, among which the emissions from international shipping sector account for 2.7% and the emissions from domestic shipping sector and fishing vessels comprise 0.6%.

The 37th Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO), held in London in September 1997, began the discussion about regulating the gas emissions from ships and the quality of fuel oil. The 59th MEPC of IMO, held in July 2009, discussed about the emission trading (ET) and carbon tax, thus injecting fresh momentum into the efforts to slash CO emissions from the shipping sector across the globe.

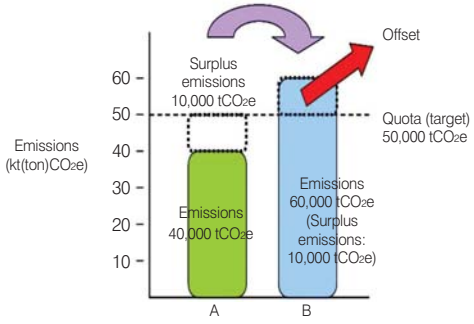


Figure 2. Schematic diagram of ET (Emission Trading)

The focus of shipbuilding has recently shifted from the cost to the safety and environment. The creation of new terms, such as green ship or clean ship, suggests that high efficiency and

eco-friendly ship has become the keyword of the shipbuilding industry. Countries worldwide are focusing on developing eco-friendly ships as the green ship market is expected to grow exponentially in the wake of the adoption of the international agreement which came into force and became compulsorily applicable by IMO. Additionally, the expansion of carbon emission trading market has led to the creation of new ship market as shown in Fig. 2, and as a result, the shipping industry is taking a new turn.

Core technology for green ship

The core technology of green ship is concerned with the enhancement of propulsion and ship model based on the outward appearance of existing ships in the first phase as shown in Fig. 3. The second phase involves the collection of high temperature waste gas(350℃) from ship engine which is used as the heat source of generator to produce electricity, a concept similar to that of hybrid car, thus reducing the fuel consumption of generator and CO generation. The third phase involves the construction of ships powered by fuel cells with zero emission of CO.

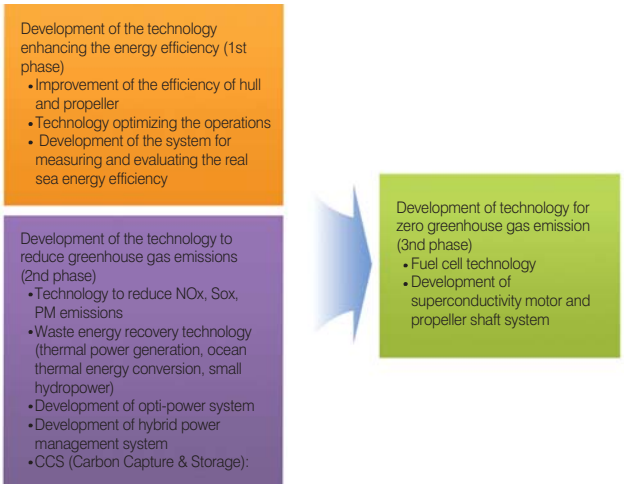


Figure 3. Core technology of green ship

1st Phase - Technology to improve energy efficiency

- ***Development of technology to enhance the ship model and efficiency of propeller***

1. Hull resistance reduction technology: The energy efficiency of ship can be enhanced by optimizing the shape of the bow and stern which has a significant effect on ship's resistance.
2. Technology to increase the efficiency of propeller (domestic/overseas technology and currently applicable technology): The propeller, which rotates to provide the forward thrust, has the drawback that it rotates in only one direction and the resultant rotation current impedes the ship's propulsion.

The Counter Rotating Propeller(CRP) uses 2 propellers in front or at the back of the existing propeller, each spinning in opposite direction to each other. As a result, CRP prevents the propeller from rotating in only one direction and straightens the flow of seawater to improve the propulsion force. However, CRP with a pair of propellers rotating in opposite direction to each other requires considerably complex mechanical system and incurs additional costs. Thus, domestic shipyards use the thrust pin or pre-swirl stator to actuate the existing 1 propeller and fit the wing to the propulsion wing or adopt the fixed propeller to straighten the flow of seawater to enhance the efficiency.

Figure 4. Thrust Fin by Hyundai Heavy Industries

Figure 5. Pre-Swirl Stator by Daewoo Shipbuilding & Marine Engineering

Operation optimization technology

1. Routing Service

Generally, ships are classified into the regular liners operating regular scheduled services on fixed routes and the irregular

liners operating with irregular schedules on routes that are not fixed. The economic speed and operations on efficient routes can increase the efficiency, along with the optimization of operation schedules of ships owned by specific or many different shipping companies. The ships navigating at sea are affected by weather and marine conditions such as the wind, wave, seawater, tidal current, etc. Therefore, it is important to forecast the weather and marine conditions and plan the optimized routes, which is called 'weather routing', and these services are called 'routing services'.

2. Real sea energy efficiency measurement and evaluation system

Real sea energy measurement and evaluation system refers to the system that measures and evaluates the efficiency of ship's operation. For this system, it is important to secure professional manpower and establish the Opti-Power and Power Management System. The real sea energy measurement and evaluation system needs to be operated by the shipping company, classification societies and third party public organizations.

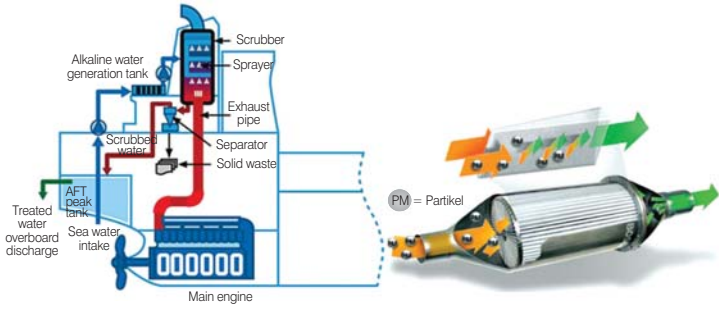


Figure 6. SCR & Scrubber

2nd phase - Development of technology to reduce greenhouse gas emissions

• *Technology to reduce SOx, NOx, and PM emissions*

Existing ships which use fossil fuels emit Sox and NOx. In addition, ships using low quality heavy oil emit large amounts of particulate matter(PM) which accelerates the melting of the polar glaciers. Thus, pretreatment technology ? which removes S(sulfur) during the refining process - is being used to reduce the emission of Sox. NOx is removed by the selective catalytic reduction (SCR) system fitted to the end of ship engine. PM is reduced by using the scrubber.

Waste energy recovery technology

1. Thermal power generation

The waste energy recovery system offers the benefits of energy-saving as the waste heat of exhaust gases, which would otherwise end up being thrown away, is recovered from ship's main engine(diesel engine) to actuate the steam turbine that rotates to produce electricity.

As the waste energy recovery system reduces the exhaust gases and carbon emissions, shipyards or engine manufacturers, etc., are attempting to enhance the system design or develop new waste heat recovery power generation system for ships.

Currently, power turbines, steam turbines, and heat recovery steam generator(HRSG) have been installed in approximately 20 large commercial vessels(VLCC and large containerships).

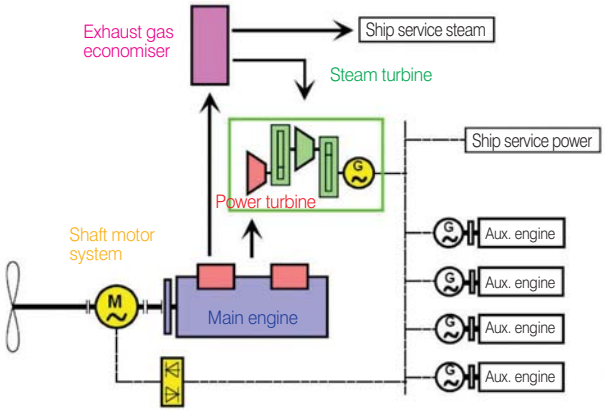


Figure 7. Diagram of Heat Recovery Steam Generator System Exhaust gas economizer Ship service steam Steam turbine

2. Ocean thermal energy conversion

Ocean thermal energy conversion (OTEC) uses the temperature difference of seawater at different depths to vaporize the actuation fluid and actuate the turbine to produce electricity and then condense the actuation fluid.

3. Small hydropower

Ships have many pipes inside, and the fluid(liquid and gas) flows inside the pipes. These flows inside the pipes have much energy but are simply lost. Small hydropower system generates electricity from the rotary motion of the small in-pipe turbine. This type of power generation reduces fuel consumption and CO_2 emissions.

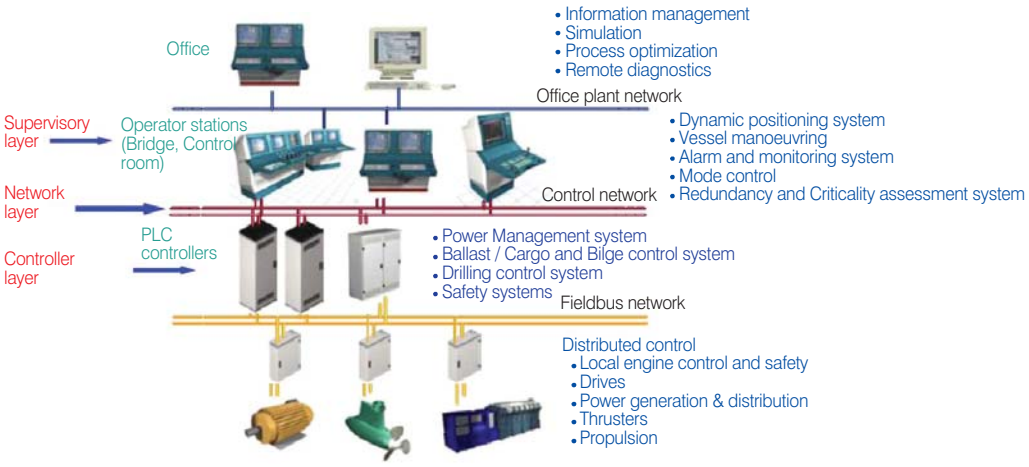


Figure 10. Diagram of integrated control system on board ship

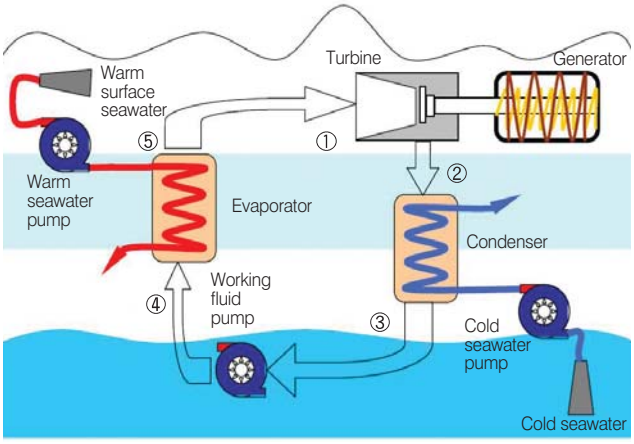


Figure 8. Diagram of Ocean Thermal Energy Conversion Cycle

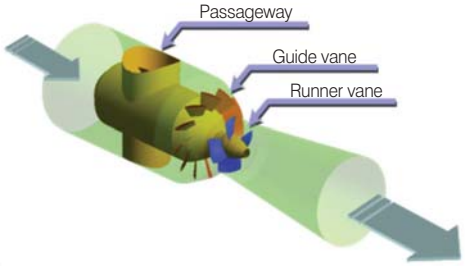


Figure 9. Small Hydropower

Opti-power & power management system

Opti-power & power management system refers to the integrated control system that enables the efficient use and control of all electric devices used onboard ships and ensures undisrupted communication between the ship and onshore facilities via the network. This system can be compared to the system that automatically illuminates or extinguishes the light when the vehicles enter or exit the basement parking lot in an apartment building. As the electricity necessary for the operation of auxiliary apparatus can be controlled from ship, Opti-power & power management system performs the automatic control to prevent unnecessary supply of electric power, thereby maximizing the efficiency. Moreover, stable shipboard network system is important to secure the system that evaluates the optimized route design and real sea energy efficiency, like the routing service.

CCS(Carbon Capture & Storage)

CCS technology refers to a set of technologies to capture, recover and separate the CO generated by the combustion and processing of fossil fuels and other carbon fuels without releasing CO into the atmosphere. This technology is divided into the capture technology to collect CO from the source of CO emissions and the storage technology to store the CO below the ground or sea floor. The CO recovery costs account for approximately 70 to 80% of total CCS costs, although the costs vary, depending on the type of fuels, technology, situation of country, environmental regulations, etc. CCS technology has not yet been commercialized due to many problems in terms of cost-effectiveness, but will become the essential part of the shipbuilding and marine equipment industries in the period ahead.

< to be continued >

Five ferries in Norway are powered by Bergen gas engines and individual engines have now amassed some 25,000 operating hours.

LNG - a marine fuel of the future

As forward thinking shipowners are increasingly turning to gas as a marine fuel, operating hours are building up on vessels in-service powered by Rolls-Royce gas engines that already comply with IMO's 2016 Tier III regulations.

Rolls-Royce

The environmental benefits of LNG as a fuel are well documented, with near zero sulfur-oxide emissions and much lower CO2 as well significantly reduced nitrogen-oxide and particle emissions. In addition there appears to be greater reserves available than oil. Therefore it seems LNG has to feature as one of the potential solutions in helping the shipping industry cope with the challenge of emissions. It also deals with the problems of low quality liquid fuel associated with inferior bunkering in one stroke.

Bergen lean-burn gas engine technology was originally developed in the 1980s with a cross-fjord ferry application in mind. That particular route was replaced by a bridge, but the engine technology found ready acceptance in land power generation, to the extent that several hundred units were in service before the marine market saw the benefits of turning to gas. Five double ended passenger/vehicle ferries powered by Rolls-Royce gas engines have now been in operation since 1997.

The vessels are performing well, and individual engines have amassed some 25,000 running hours. In the meantime other types of ships fuelled with LNG have gone into operation or are under construction. These are coastal and short sea vessels for operation in European and Scandinavian waters where strict rules on marine exhaust emissions are in place.

One example is Coral Methane, owned by the Rotterdam based specialist shipowner Anthony Veder and on charter to Gasnor in Norway. The 117m ship is designed to carry 7,500m^3 of LNG, LPG or petrochemical gases at speeds up to15.5 knots.

It has a flexible propulsion system to meet various operating patterns. A combination of Bergen diesel and gas engines provide the power, two Azipull azimuth thrusters with pulling propellers are the main means of propulsion, linked by an electric transmission system.

Two Bergen B32:40 L8A diesel engines and two Bergen KVGB12G4 gas engines all drive generators. A variable frequency drive system feeds power to the electric motors that drive the AZP120 main thrusters. For manoeuvring there is a

The innovative gas carrier Coral Methane has a Rolls-Royce supplied electric propulsion system and can use either twin Bergen gas or diesel engines depending on the cargo carried.

The propulsion system for two new Sea Cargo vessels uses a single Bergen V12 gas engine driving a PROMAS integrated propeller rudder system for maximum efficiency and low environmental impact.

TT1650 CP tunnel thruster at the bow.

Rolls-Royce also supplied the complete 690V propulsion system.

Coral Methane's unusual engine combination was dictated by its cargoes. When carrying LNG as freight the ship burns this as fuel in the two gas engines. When the cargo is LPG or petrochemical gas, the diesel engines are used.

Roro vessel owners are also seeing the benefits of gas fuel and Rolls-Royce is there to meet their requirements, having expanded its capability from providing engines to designing, engineering and supplying complete ship systems 'from bunkering flange to propeller thrust.'

Experienced short sea operator Sea-Cargo has ordered two roro ships that are being built in India. The company currently operates a fleet of eight multi-purpose vessels offering roro, container, heavy lift, and general cargo services.

Vessel owners are also seeing the benefits of gas fuel and Rolls-Royce is there to meet their requirements, having expanded its capability from providing engines to designing, engineering and supplying complete ship systems 'from bunkering flange to propeller thrust.'

Rolls-Royce is responsible for the overall design of the new vessels, derived from Sea-Cargo's long experience with coastal and short sea shipping. All major equipment and systems are also in the Rolls-Royce scope of supply including main engine, reduction gear, PROMAS integrated rudder, shaft generator, bow thruster, automation, and the LNG fuel storage and handling system.

As the Bergen B35:40V12PG main gas engine is classed for the load/speed operational pattern that comes with mechanical coupling to a controllable pitch propeller, a conventional single engine system is possible. Liquid gas will be bunkered in two insulated flasks forward of the engine room, where the evaporator system is also located. The vessel's electrical load is supplied by a generator driven off the gearbox.

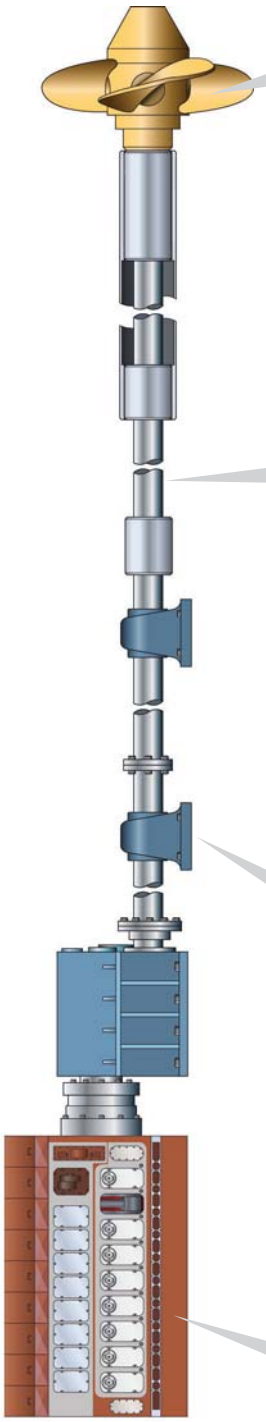
LNG has also been selected as the fuel for an unusual 70m ship that will be operated by NSK Shipping to supply fish farms along the Norwegian coast with fish food pellets. The vessel is designed by NSK's own design bureau Nordnorsk Skipskonsult. Rolls-Royce is to supply the complete propulsion system including the gas engine, gas system, PROMAS integrated rudder, shaft generator and automation.

With many of the European coastal cargo fleet now over 25 years old and due for replacement when political and financial conditions allow, owners are looking to a future where emissions regulations will be even stricter. Rolls-Royce is playing an active part in developing more energy efficient vessels with LNG fuelled propulsion. It is also producing designs for smaller LNG carriers that can help build up the coastal LNG distribution network.

One such design is an LNG carrier capable of transporting 16,000m^3 of liquefied gas, that is about 10 per cent of the size of the intercontinental LNG carriers. The vessel would also use LNG as fuel in its Bergen main gas engine.

Guidelines are now available for gas as a marine fuel. Compared to oil, natural gas has the advantage of excellent efficiency with a lower environmental impact, and its wider use in the marine industry can only be a matter of time.

Marine industry moves forward thanks to laser precision alignment

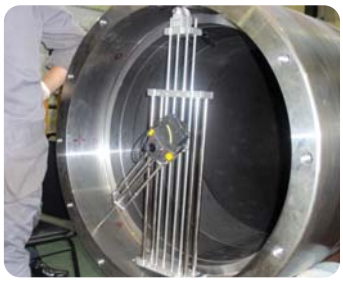


PROPELLER

LEVALIGN Ultra

STERN TUBE

CENTALIGN Ultra
(unmounted shaft)



LONG SHAFT

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(mounted shaft)

CENTRALIGN Ultra
(unmounted shaft)

MAIN ENGINE

ROTALIGN Ultra
(mounted crank shaft)

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WINGAS Selects RMG for Revolutionary European Pipeline Natural Gas Metering Project

"We partnered with RMG by Honeywell because the task of measuring and metering natural gas is critical. When the pipeline goes into operation, enormous amounts of gas will have to be measured and metered, and the supplies will be more than half of Germany's annual demand."

Klaus Haussmann

Project Manager, WINGAS TRANSPORT GmbH

Benefits

Germany-based WINGAS GmbH & Co. KG is embarking on a project to revolutionize the energy supply in Europe by providing a direct natural gas link between Russia and Germany. The project, called the Nord Stream Pipeline, will be completed in 2012, and construction relies on the latest technologies and safety and security measures.

When it's complete, the two parallel pipeline legs will be the longest "pipe in the water" in the world, each more than 1,200 kilometers long and carrying 55 billion cubic meters of natural gas per year. Measuring and metering such huge amounts of natural gas exactly is a challenge, so WINGAS needed a reliable partner with proven experience in the gas metering industry.

WINGAS chose RMG by Honeywell to install ultrasonic gas meters, flow computers and gas chromatograph systems in this groundbreaking project.

Working with RMG, WINGAS was able to install advanced ultrasonic meters ensuring the highest accuracy and stability available. Benefits included:

- Highly accurate measurements of gas reading data thanks to path geometry, six-path technology and signal amplitude.
- Conformance with all applicable international gas standards.
- High stability against turbulences thanks to six measuring paths in three levels.
- Long-term stability of measurements.
- Exchange of sensors without recalibration.

Background

WINGAS GmbH & Co. KG is a joint venture of Wintershall Holding AG, Germany's largest crude oil and natural gas producer, and Russia's OAO Gazprom. WINGAS has been active in gas distribution since 1993 and supplies natural gas to public utilities, regional gas suppliers, industrial companies and power plants in Germany and other European countries.

WINGAS relies on RMG by Honeywell for precise metering in the Nord Stream underwater natural pipeline project.

The WINGAS Transport pipeline network, which is over 2,000 kilometers long, connects major gas reserves in Siberia and the North Sea to the growing markets in Western Europe. In Germany, two pipelines called OPAL (Ostsee Pipeline Anbindungs Leitung) and NEL (Nordeuropaische Erdgasleitung) will take natural gas from the Nord Stream Pipeline and feed it into the existing European natural gas grid.

OPAL and NEL may well constitute the biggest energy infrastructure projects in Europe in the past few decades. They will guarantee a safe and secure supply of natural gas to Germany and Europe in the decades to come. The new connection between Russia and the European customers will be about 10 billion Euro.

Challenge

Starting in 2011, the Nord Stream Pipeline will transform energy supply to Europe. Two parallel legs will carry natural gas from Russia to the European Union. The intention is to secure the future natural-gas demand of the EU member states thanks to a direct link between Russia and Germany.

Because of the enormous amounts of natural gas involved, the biggest challenge for WINGAS is to plan and carry out precise metering of gas quantities and qualities and to handle data processing and communication safely and reliably.

"About 55 billion cubic metres of natural gas will flow through the meters every year, providing safe energy to the European market," said Klaus Haussmann, Project Manager WINGAS TRANSPORT GmbH. "The quality of the readings must not be compromised."

Solution

WINGAS awarded the contract to measure and meter the natural gas volumes and qualities to RMG by Honeywell because of the company's vast experience in the natural gas industry. WINGAS and RMG partnered closely to engineer and design the system, and have put the highest priority on measuring quality during the planning and implementation phases. The project managers of RMG by Honeywell and WINGAS cooperated closely and coordinated their schedules so as to make sure that all works are carried out smoothly and on time.

When complete, both the OPAL and NEL pipelines will be over 400 km long with a diameter of 1.4 meters each, and will have a combined transport capacity of 55 billion cubic meters of natural gas per year. RMG is providing the following metering and measuring equipment:

ERZ 2000 Flow Computer Series - Microcomputer for optimal flow correction, which provides parallel calculation of compressibility according to all established methods. When carrying out corrections using density and standard density, the speed of sound effect is measured and calculated.

PGC 9000 VC Process Gas Chromatograph - A system to analyze 11 different components and calculate calorific values, standard density, Wobbe index and density ratios of natural gases on the basis of standards and weight legislation.

USZ 08 Ultrasonic Gas Meter - A device for custody-transfer metering, which measures the flow velocity of the gas from which it calculates the flow rate at measurement conditions. The ultrasonic flow meter is an advanced measuring system meeting the requirements for accurate and stable measurements.

The RMG solutions will provide the following capabilities to the WINGAS Nord Stream Pipeline:

- Wide measuring ranges, allowing the ultrasonic flow meter to be used even in measuring stations where flow rates vary greatly.
- Virtually no pressure loss during operation due to the fact that no components are located within the cross section of the pipe.
- Safely protects against overloading since the gas meter has no sensitive components.
- Shortened response time due to the entirely electronic measuring method.
- High accuracy of measurement thanks to multistage correction methods.

Klaus Haussmann concluded, "When the pipeline goes into operation, enormous amounts of gas will have to be measured and metered. RMG has proven to be a very capable partner, helping to drive the success of the project."

Salamander Energy selects AVEVA for Enterprise Asset Management

Salamander Energy has selected an AVEVA Enterprise Asset Management solution to improve operational effectiveness across its assets in Indonesia and Thailand.

AVEVA Korea

Established in 2005, Salamander Energy is a fast-growing Asian oil & gas exploration and production company with over 300 employees, and offices in Singapore, Jakarta, Bangkok and Ho Chi Minh City. Production in 2011 is expected to average between 18,000 and 19,000 barrels of oil equivalent per day (boepd) from fields in Thailand and Indonesia.

Recognising the importance of best practice in its asset management, Salamander started to investigate suitable Enterprise Asset Management (EAM) solutions. After a thorough evaluation, the company selected AVEVA WorkMate and, in 2010, deployed it across all its operations for procurement, maintenance and materials management.

'AVEVA WorkMate was a strategic decision for Salamander,' explained Guus Harting, Regional Operations Director of Salamander Energy. 'It is helping us to create a highly efficient environment with straightforward multi-site operations and management,' he continued. 'Our initial WorkMate deployment is already reducing costs and improving productivity right across the business.'

Why AVEVA WorkMate?

AVEVA WorkMate is a powerful EAM solution for all types of process plant. It comprises integrated modules for procurement, materials management and maintenance. Together, these support all aspects of plant management, including Management of Change, inspection and preventive maintenance programmes, Work Order and Work Permit management, logistics and so on.

Equally important, a WorkMate deployment is extremely flexible and configurable, and integrates readily with other popular enterprise solutions such as SAP, Documentum or Primavera. This combination of power and flexibility makes it easy to deploy WorkMate in a progressive manner to meet the needs of any size of plant operating company.

The Bualuang production facilities in block B38/8 in the gulf of Thailand. Photograph courtesy of Salamander Energy.

WorkMate's Procurement module is particularly versatile, supporting not only the needs of full enterprise-level procurement, but also those of the occasional buyer of low-value items. Its Materials Management module provides comprehensive inventory and logistics management from receipt to consumption of all types of materials and equipment, even rental items. Finally, the Maintenance module is a management tool for maximising asset performance by optimising maintenance programmes and their execution for minimum cost and down time. It supports continual improvement strategies by maintaining detailed histories, and it can interface with specialist systems for Reliability-Centred Maintenance.

The Salamander deployment

Salamander had begun the search for an EAM solution early, recognising that it would be important for the company's long-term success. A member of the management team had had experience with WorkMate in a Canadian company and had been impressed with both the technology and the performance of AVEVA's EAM team in Norway (formerly ADB Systemer AS) in delivering and supporting the solution. The first discussion between Salamander and the EAM team took place in 2009.

Over the following few months, a formal proposal process was carried out and a number of systems from other vendors were evaluated. The result was a decision in early 2010 to implement WorkMate on Salamander's first operational assets. The implementation went according to plan and the system was immediately put into operation.

In Indonesia, WorkMate was implemented at Salamander's office in Jakarta for managing procurement, materials and maintenance of the offshore Kambuna wellhead, and for the existing and the planned new facility at the Glagah-Kambuna TAC onshore base and gas plant. In Thailand, WorkMate was implemented at Salamander's Bangkok office for procurement and materials management of the Sattahip onshore base, supporting the Bualuang wellhead. After first implementation, Salamander conducted a review of the system's performance and their future business requirements. Realising that WorkMate had much greater capabilities than they were initially using, Salamander decided to standardise on WorkMate for maintenance, procurement and materials management of all their assets. This initiated a second phase of implementation of WorkMate on the other operational assets, which was successfully completed in September 2011.

Guus Harting, Regional Operations Director of Salamander Energy. Photograph courtesy of Salamander Energy.

The future

During the second implementation project, many other opportunities were identified for additional WorkMate modules to further improve Salamander's business processes in areas such as integration with project management and financial systems, supplier management and so on. These opportunities are now being addressed as ongoing projects, with the support of the AVEVA EAM team.

The relationship between the two companies has proved highly successful and Salamander has now identified opportunities for widening its AVEVA deployment to cover the engineering and design disciplines and information management. We look forward to learning more about Salamander's growing success with AVEVA technologies.

About Salamander Energy

Salamander Energy is an Asia focused, independent, FTSE 250, upstream oil & gas exploration and production company. Salamander has a balanced portfolio of production, development and exploration assets with interests located in Indonesia and Thailand. For more information about Salamander Energy, visit www.salamander-energy.com.

Mega yacht with innovative HVAC solution

On their compressor system, Dometic's Marine Division needed a solution to minimize harmonic distortions and radio frequency interference without costly line filters and conditioners. Vacon Inc. in the US and Canada - in cooperation with their partners - provided a solution: a bypassable variable frequency drive

Vacon Korea

Dometic Group's Marine Division in Pompano Beach in Florida, USA, has 50 years' experience in producing seaworthy HVAC systems. On their compressor system, they needed a solution to minimize harmonic distortions and radio frequency interference without costly line filters and conditioners. Vacon Inc. in the US and Canada - in cooperation with their partners - provided a solution: a bypassable variable frequency drive.

The customers of Dometic's Marine division are primarily manufacturers of 24 - 240 foot (7.3 - 73 metre) pleasure boats and yachts. Dometic needed an AC-driven soft-starter for their air conditioning compressor that would not cause problems with harmonic distortion and radio frequency interference (RFI). Vacon's Manufacturing Representative Bob Darby of Darby & Associates and Vacon, Inc.'s Product Sales Specialist Jake Roeder looked at the specification to see if Vacon could provide a solution. After further testing and evaluations, Vacon Canada and its distributor partner GLC Controls were also asked for help.

Line Synchronization with enhanced soft stopping

GLC Controls was tasked to modify Vacon's standard Line Synchronization application with an enhanced soft stopping feature for Dometic. This new and much needed application for the Vacon NXP AC drives enabled Dometic to fill a longterm void in the Marine HVAC business.

"We have used variable frequency drives (VFDs) as glorified 'soft starters' and 'soft stops', because we have built our business around using hermetic scroll compressors that do not allow a wide range of speed control," said Matteo Giovanetti, Director of Engineering at the Dometic Group.

"Our customers, especially those in the mega yacht industry, have continually had problems with harmonic distortion and RFI caused by VFDs, regardless of their quality and despite heavy expenditure on elaborate filtering schemes. We knew that switching out the VFD once the compressor was up to speed was a feasible concept, especially with the advent of synchronizing inverters. However, no other VFD manufacturer was willing to work with us to find a new solution like Vacon," stated Giovanetti.

Bypassable VFD with unique capabilities

A VFD completely eliminates the large inrush current, when starting up the compressor, by ramping up frequency and voltage in a controlled time period. This prevents overload when on limited dockside power or on a generator, without causing noticeable voltage reductions throughout the rest of the yacht's electrical system. Until now, however, a VFD also created harmonic distortion and RFI on the yacht's electrical

and navigation systems, which required additional line filters and conditioners.

The bypassable VFD provides the ultimate solution. It elimi - nates the starting inrush of current, and then seamlessly dis- engages and reconnects the compressor to the main power once it is running at peak, thus eliminating all harmonic dis- tortion and RFI. There is also no need for line filters and con- ditioners. In addition, it reconnects to the compressor just before compressor shutdown for a smooth stop. It ac - com- plishes this with completely unique capabilities that have pre- viously never been available in a marine HVAC system.

Phase locking is the key

Before bypassing can take place, the VFD synchronizes the phase of its AC power sine wave with that of the main power source, a process called phase locking. Once phase lock oc - curs, the bypass is achieved by opening and closing a series of electrical switches, timed so precisely that there is no inter - ruption or overlap of current.

For smooth compressor shutdown, the bypassed VFD per - forms another phase lock, and then reconnects to the com - pressor by reversing the electrical switching. While in bypass mode, the VFD is available for connecting to another com - pressor for ramp up or ramp down.

Support and protection for up to four com- pressors

One bypassable VFD can support up to four compressors, making it especially cost effective for chillers with two, three or four stages. A standard VFD can run only one compressor.

In addition to its primary functions, the bypassable VFD also protects the compressor by monitoring input voltage and out - put current, and will shut down the system if a problem is detected. A display allows the user to monitor operation and faults. The bypassable VFD is pre-programmed from the fac - tory and no further setup is required. It is designed to operate in extreme environments, such as an engine room. However, the enclosure is ventilated and must be kept dry since any direct water contact can damage the unit.

Key benefits of Dometic's Bypassable VFD

- Eliminates inrush current at compressor startup
- Eliminates power spikes at compressor shutdown
- Bypasses the VFD once compressor is at peak speed for no electrical disturbances
- Eliminates the need for line reactors and RFI filters
- One unit can control up to four compressors
- Available in sizes from 5 HP (3.6 kW) to 25 HP (18.3 kW) for 208 V/240 V or 380 V/460 V systems
- Visit http://www.dometic.com/enus/Americas/USA/Marine/Marine-Products-Videos/New-Products-Videos/Bypassable-Variable-Frequency-Drives/ to view the revo - lutionary bypass- able VFD seamlessly disconnecting itself, eliminating all harmonic distortion and RF interference.

Dometic Group

Dometic Group is a customer driven, world-leading provider of leisure products for the caravan, motor home, automotive, truck and marine markets. Dometic Marine division's primary offer - ings include air conditioning systems, power systems, sanitation systems and kitchen equipment for pleasure boats. In addition, the division has started to target medium-large commercial ves - sels, such as tugboats or coast guard boats. Dometic Group's marine brands include Marine Air, Cruisair, SeaLand, Condaria and Dometic.

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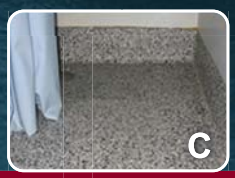

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ABB wins $80 million order from Samsung Heavy Industries

ABB won an order worth $80 million from Samsung Heavy Industries (SHI) to supply energy efficient drives, motors and electrical power systems for five drilling vessels and two liquefied natural gas (LNG) carriers to be built at Samsung's shipyard in Korea. The vessels will be used to extract, process and transport oil and gas. The order was booked in the second quarter of 2012.

SHI is building five drill ships (three for Seadrill Ltd. in Norway, one for Pacific Drilling S.A in Brazil and one for Ensco Plc in the UK) and two LNG carrier vessels for Golar LNG Ltd in the UK. The vessels will be used for oil and gas exploration and the transportation of liquefied natural gas. ABB's delivery will help the ships maximize their energy efficiency, as well as provide a reliable power supply to improve the use of onboard equipment.

"This project underscores ABB's excellent reputation for delivering comprehensive, reliable solutions that help our marine customers operate at the highest levels of efficiency," said Veli-Matti Reinikkala, head of ABB's Process Automation division. "Our vast oil and gas industry expertise and resources help us to address the unique process requirements and operational challenges of offshore and at sea operations."

ABB will deliver the complete electrical system for the seven vessels, including power generation and distribution equipment and systems, variable frequency drives and motors to power main propulsion systems and thrusters, as well as drives to power the topside drilling equipment. The project will be commissioned between 2014 and 2015.

Further development of technologies to facilitate oil and gas exploration, extraction and transport from deep sea and other new sources represents a key global megatrend that is an important focus area for ABB's long term growth. This project leverages the company's deep understanding of this industry, and its marine application expertise.

ABB (www.abb.com) is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 145,000 people.

'West Polaris' drillship by Seadrill

ABB, 삼성중공업으로부터 8000만 달러 수주

스위스 취리히에 본사를 두고있는 전력 및 자동화 기술의 선두주자인 ABB는 최근 삼성중공업으로부터 8000만 달러 규모의 계약을 체결했다. 삼성중공업에서 건조예정인 5척의 드릴쉽과 2척의 LNG선에 에너지 효율이 높은 드라이브, 모터 그리고 전기 전력 시스템을 공급할 예정이다. 이번 수주는 2012년 2분기에 계약되었다.

삼성중공업은 5척의 드릴십(노르웨이의 Seadrill사 3척, 브라질의 PDC사 1척, 그리고 영국의 ENSCO사 1척)과 2척의 LNG는 영국의 Golar사와 건조계약을 체결한바 있다. 이들 선박은 오일 및 가스 탐사 및 액화 천연가스 수송을 목적으로 건조되며, ABB가 공급하는 제품을 통해 선박의 에너지 효율을 극대화할 뿐만 아니라 선내 설비사용 향상을 위한 안정적인 전력 공급을 지원하게 된다.

ABB의 공정자동화 사업본부를 총괄하고 있는 벨리 매티 레이니칼라(Veli-Matti Reinikkala)는 "이번 수주 계약은 ABB의 솔루션이 제공하는 에너지 효율성 및 신뢰성, 특히 해양 분야에서 ABB의 명성을 다시 한번 입증해주었다."며 "ABB의 방대한 오일 및 가스 산업 관련 전문지식과 자원은 독특한 공정의 요구사항과 해상 및 해양 운항시 문제점을 해결하는데 도움이 된다"고 덧붙였다.

ABB는 7척의 선박에 발전 및 배전 설비 및 시스템을 포함해 상부 구조물의 시추장비에 전력을 공급하는 가변주파수 드라이브(VFD: Variable-Frequency Drive) 뿐만 아니라, 주 추진 및 쓰러스터에 전력을 공급하는 드라이브 및 모터 등 통합 전기 시스템을 공급하게 된다.

심해, 오일 및 가스의 탐사, 추출, 수송을 용이하게 하기 위한 ABB의 앞선 기술들은 향후 사업영역 확대 측면에서 시사하는 바가 크다. 이번 프로젝트로 ABB는 시장에서의 입지 및 전문성을 강화하는 기회를 얻게 되었다.

HHI wins USD 1.2 billion containership order

Hyundai Heavy Industries (HHI), the world's biggest shipbuilder, announced it won a USD 1.2 billion order to build ten 13,800 TEU containerships from a Greek shipowner. Evergreen Marine will charter megaships on 3 July.

The containership, measuring 368 m in length, 51 m in width, and 29.9 m in depth, are scheduled to be delivered from the second half of 2013 to the second half of 2014. The containerships order draws special attentions from the market.

HHI won high scores for its optimal ship design reducing the fuel consumption by over 10% and its extensive experience with the construction of containerships. Particularly, these orders herald a wave of new orders for ultra large containerships with the capacity exceeding 10,000 TEU in the market which has been recently dominated by offshore-related vessels such as LNG carriers, drillship, and semi-submersible drilling rigs, thus attracting attention from global shipbuilding and shipping industries.

An official at HHI said, "These orders are noteworthy considering the current sluggish shipbuilding market. With the extensive know-how and technology we have accumulated by building more than 500 containerships over the last 40 years, we will continue to build ships tailored to the needs of our clients and the market."

These vessels will be built at HHI's Ulsan shipyards and delivered to the ship owner consecutively from the second half of 2013 to the second half of 2014.

A 13,100 TEU containership HHI delivered to Rickmers in July 2010.

현대중공업, 13,800 TEU 초대형 컨테이너선 수주

현대중공업이 초대형 컨테이너선을 대량으로 수주하는 데 성공했다. 현대중공업은 지난 7월 초 영국 런던에서 그리스 소재 선주사와 13,800 TEU급 컨테이너선 10척, 총 12억 달러 규모의 수주계약을 체결했다고 밝혔다. 이 선박은 인도 후 에버그린그룹(Evergreen Group)에 장기 용선될 예정이다.

이번에 수주한 컨테이너선은 길이 368m, 폭 51m, 높이 29.9m로 축구장 약 4배 규모이며, 컨테이너 13,800개를 한 번에 실을 수 있는 초대형 선박이다.

현대중공업은 이번 수주전에서 풍부한 컨테이너선 건조 경험과 더불어 최적의 선형을 적용해 연료 소모량을 10% 이상 줄인 점을 높이 평가받은 것으로 알려졌다. 특히 이번 수주는 최근 LNG선과 드릴십, 반잠수식 시추선 중심의 해양 관련 선박이 주를 이루고 있는 시장에서, 1만TEU급 이상 초대형 컨테이너선의 수주 물꼬를 텄다는 점에서 세계 조선 및 해운업계의 관심을 모으고 있다.

현대중공업 관계자는 "현대중공업은 지금까지 500척이 넘는 컨테이너선을 건조하며 풍부한 경험과 독보적 기술력을 축적해 왔다"며, "이번 수주를 시작으로 LNG선, 드릴십을 비롯해 초대형 컨테이너선 부문에도 영업력을 집중해 시장을 이끌어 나갈 것"이라고 밝혔다.

현대중공업은 이 선박들을 울산 본사에서 건조, 오는 2013년 하반기부터 2014년 하반기까지 순차적으로 선주사에 인도할 예정이다.

Upswing in the order intake in offshore industries

STX Offshore & Shipbuilding(STXOS) and Russia's Sovcomflot signed an option contract for 4 units of 170,000 CBM LNG carriers during the 2012 SPIEF(Saint Petersburg International Economic Forum) held in Russia from June 21 to 23.

Having signed this contract, STXOS will build a total of 10 LNG carriers for Sovcomflot, including the 6 vessels that were contracted earlier. In addition, Sovcomflot entered into a long-term charter contract with Royal Dutch Shell for the 2 LNG carriers which it ordered to STXOS. The vessels will be delivered to Sovcomflot in the second half of 2014. The charter contract with Shell, the global oil and gas heavyweight, attests to the world's best quality and unmatched technology of STXOS.

Peter R. Voser, CEO of Royal Dutch Shell, said,

"Liquefied natural gas (LNG) has become very important to meet the rising demand for energy worldwide. This charter contract will help Royal Dutch Shell vigorously move forward with its development strategy in LNG sector."

조선해양, LNG선 수주 순항!

STX조선해양과 러시아 소브콤플로트(Sovcomflot)는 지난 6월 21일부터 23일까지 러시아에서 열린 2012 SPIEF(Saint Petersburg International Economic Forum, 상트 페테르부르크 국제경제 포럼)에서 170,000 CBM급 LNG선 4척의 추가발주 옵션계약을 체결했다.

이번 계약을 통해 STXOS은 기존 계약분 6척을 포함, 소브콤플로트에 총 10척의 LNG선을 건조하게 된다. 더불어 소브콤플로트는 STX조선해양에 발주했던 LNG선 2척에 대해 로열더치쉘과 장기용선계약을 체결했다. 해당 선박은 2014년 하반기에 소브콤플로트로 인도될 예정이다.

세계적인 Oil & Gas 메이저인 쉘(Shell)과의 용선체결은 STXOS의 품질과 기술 수준이 세계최고 수준에 있음을 다시 한 번 입증시켰다.

로열 더치 쉘(Royal Dutch Shell) 피터 보저(Peter R. Voser) CEO는 "액화천연가스(LNG)는 세계 에너지 수요를 맞추기 위해 아주 중요한 위치를 차지하고 있다"면서 "이번 용선 계약이 로열더치쉘의 LNG 분야 발전 전략에 도움을 줄 것"이라고 말했다.

Charter contract signing ceremony between Sovcomflot and Shell for the LNG carrier to be built by STXOS

HHI was awarded a USD 800 million contract to build offshore facilities and vessels

Hyundai Heavy Industries (HHI) announced on June 18 that it received the Letter of Award(LOA) from an oil company in Southeast Asia to build a gas compression platform worth USD 420 million and signed a contract valued at approximately 360 million with 2 domestic shipping companies for the construction of 5 pure car carriers.

NR2 platform similar to the gas compression platform ordered to HHI from a client in Southeast Asia

This gas compression platform will be installed in Cakerawala offshore gas field approximately 150km northeast from Kota Bharu Bharu situated in the northeastern part of Malaysia and process 1.1 million m^3 of gas per day. The final contract for this facility will be concluded in August. This facility will be delivered to the client in the second half of 2015.

In addition, HHI recently clinched an order from Korea-based Glovis and Eukor for the construction of 3 pure car carriers with a carrying capacity of 7,300 cars (to be built by Hyundai Samho Heavy Industries) and 2 pure car carriers with a carrying capacity of 7,400 cars.

HHI successful won the deals based on excellent quality and customer service despite sluggish shipbuilding market conditions. These pure car carries will be delivered consecutively from the fourth quarter of 2013 to the second quarter of 2014.

Meanwhile, HHI have won orders worth USD 2 billion in July alone, including 10 ultra large containerships ordered on July 2, and is giving fresh impetus to its efforts to win additional orders.

현대중공업, 해양설비 및 선박 8억 달러 수주

현대중공업은 동남아시아의 석유회사로부터 4억2000만 달러 규모의 가스가압플랫폼에 대한 발주통보서(LOA, Letter of Award)를 접수했으며, 국내 선사 2곳과 3억6000만 달러 규모의 자동차운반선 5척을 계약했다고 지난 18일 밝혔다.

이번에 현대중공업이 수주한 가스가압플랫폼은 말레이시아 북동부 코타바루(Kota Bharu)에서 북동쪽으로 약 150km 떨어진 차카라왈라(Cakerawala) 해상 가스전에 설치되며, 하루 110만㎥의 가스를 처리하게 된다. 이 설비는 8월 중 최종 계약을 체결하고, 오는 2015년 하반기 발주처에 인도될 계획이다.

또한 현대중공업은 최근 우리나라 글로비스(Glovis)와 유코(Eukor)로부터 7,300대급 자동차운반선 3척(현대삼호중공업 건조분)과 7,400대급 자동차운반선 2척을 각각 수주했다. 현대중공업은 침체가 이어지고 있는 조선시장에서 뛰어난 품질과 앞선 고객 서비스를 내세워 수주에 성공했으며, 이번에 수주한 자동차운반선은 2013년 4분기부터 2014년 2분기까지 차례로 인도될 예정이다.

한편 현대중공업은 지난 2일 수주한 초대형 컨테이너선 10척을 포함, 7월 들어서만 총 20억 달러를 수주하는 등 하반기 수주에 박차를 가하고 있다.

STX secured USD 650 million contract

STX announced that it was awarded USD 650 million contracts from European shipping companies to build 10 units of 5,000 TEU containerships and 1 unit of 160,000 CBM LNG carrier on June 27.

The Unit price of the containership that will be built by STX Dalian for the European shipping company is USD 45 million and the contract is valued at SD 450 million. These containerships will be built at the STX Dalian Shipbuilding Complex and delivered to the ship owner from the third quarter of 2014 on a staggered basis.

Along with that, STXOS won a contract worth approximately USD 200 million from another European shipping company to build 1 unit of 160,000 CBM LNG carrier. This contract includes an option for 1 vessel of same class, raising the expectation of additional order. This LNG carrier will be built at Jinhae Shipyard of STXOS and delivered to the ship owner by the first quarter of 2015.

Including the vessels to be built under these contracts, STX has won the orders for a total of 68 vessels worth USD 3.7 billion so far this year. According to the report recently published by Alphaliner, the analyzer of global shipping market, STX Dalian swept the global orders for containership this time, surpassing the 15,700 TEU ordered worldwide until May this year by wide margin.

173,600 CBM LNG carrier built by STXOS

An official from STX said, “Our strong relationship of trust with existing customers has been vital for winning this large-scale contract despite sluggish shipbuilding market.”

STX, 6.5억 달러 수주

STX는 지난 6월 27일 유럽 선사로부터 5,000 TEU급 컨테이너선 10척과 160,000 CBM급 LNG선 1척을 총 6.5억 달러에 수주했다고 밝혔다.

STX다롄이 유럽 선사로부터 수주 받은 컨테이너선의 척당 선가는 4,500만 달러 규모이며, 총 발주 금액은 4.5억 달러이다. 컨테이너선은 STX다롄 조선해양생산기지에서 건조되어 2014년 3분기부터 차례로 인도될 예정이다.

이와 함께 STX조선해양은 다른 유럽 선사로부터 160,000 CBM급 LNG선 1척을 약 2억 달러에 수주했으며 동형선 1척에 대한 옵션 계약도 함께 체결함으로써 추가 발주가 예상된다. LNG선은 STX조선해양 진해조선소에서 건조되어 2015년 1분기 인도할 계획이다.

이번 수주를 포함해 STX의 올해 수주실적은 총 68척으로 37억 달러를 기록하게 됐다. 특히 컨테이너선의 경우 글로벌 해운시황 분석기관인 알파라이너(Alphaliner)의 최근 보고서에 따르면 올해 들어 5월 말까지 신규 발주 규모가 15,700 TEU에 불과, STX다롄의 이번 수주가 올해 세계 시장에 발주된 컨테이너선 총 물량을 합친 것보다 훨씬 많은 셈이다.

STX 관계자는 “세계 조선경기가 좋지 않은 가운데 대규모 수주에 성공할 수 있었던 가장 큰 요인은 기존 고객들과의 굳건한 신뢰 관계가 있었기 때문에 가능했다”고 밝혔다.

STX OSV won a KRW 100 billion contract to build 2 PSVs.

STX OSV announced that it won a contract worth approximately KRW 100 billion from Island Offshore to build 2 platform supply vessels(PSVs). These vessels will measure 84.3 m in length and 17 m in width with the dead weight tonnage of 3,800 and adopt the UT 717 CD design of Rolls-Royce.

STX OSV will build the hulls of these vessels at Braila shipyard in Romaina, which will be then towed to Brevik shipyard in Norway for the remaining works. The newbuilds will be delivered to the ship owner in the fourth quarter of 2013 and the second quarter of 2014, respectively.

The Noway-based Island Offshore, the ship owner, has come to prominence in the drilling projects in Americas and North Sea and has maintained close cooperative relationship with STX OSV which has delivered more than 25 vessels to the ship owner over the last decade.

Platform supply vessel built by STX OSV

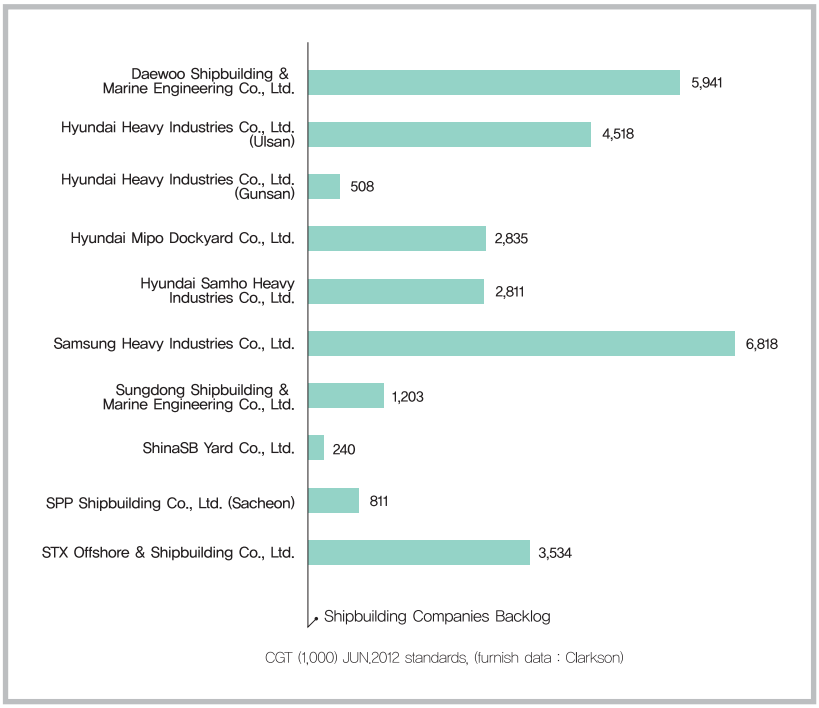
STX OSV, 1,000억원 규모 해양작업지원선 2척 수주

STX OSV는 아일랜드 오프쇼어(Island Offshore)사로부터 해양작업지원선(PSV, Platform Supply Vessel) 2척을 약 1,000억원 규모에 수주했다고 밝혔다. 이번에 수주한 PSV는 길이 84.3m, 폭 17m에 3,800 DWT 규모의 선박으로 롤스로이스(Rolls-Royce)의 UT 717 CD 디자인이 적용될 예정이다.

STX OSV는 루마니아 소재 브라일라(Braila) 조선소에서 선체 부분을 건조한 뒤 노르웨이 브레빅(Brevik) 조선소에서 후반 작업을 진행할 계획이며, 이들 선박의 인도예정일은 각 2013년 4분기와 2014년 2분기다. 선주사인 아일랜드 오프쇼어사는 미주지역과 북해지역 시추 프로젝트에서 두각을 나타내고 있는 노르웨이 선사로, STX OSV로부터 지난 10년간 25척 이상의 선박을 인도받으며 우호적인 협력관계를 구축해오고 있다.

Ship prices fell to their lowest level since 2004 as new orders, delivery, and order backlog, the 3 major indicators of the shipbuilding industry, showed a significant decrease in the first half of 2012. According to Clarkson Research, the global order backlog decreased 30% year-on-year to 147 million CGT and the prices of newbuilding vessels fell from 190p in 2008 to 132p in June this year.

New orders stood at 3.9 million DWT (77 vessels) in May, an increase by 100% from 1.8 million DWT (58 vessels) recorded in the previous month. However, the industry expects that the quantity will increase due to the low cost competition from Chinese shipyards. This year, new orders for newbuilding vessels stood at 16.5 million DWT (373 vessels) worth USD 22.3 billion in the period between January and May this year, which is a 47% decrease compared to the previous year.



In May 2012, new orders placed at Chinese shipyards amounted to 6.5 million DWT, and the new orders placed at the Korean shipyards and the Japanese shipyards stood at 5.7 million DWT and 3.7 million DWT, respectively. Based on CGT, Korean shipyards won the orders amounting to 2.8 million CGT while the Chinese shipyards and Japanese shipyards won the orders amounting to 2.1 million CGT and 0.8 million CGT, respectively, which represent an approximately 50% decrease compared to the previous year. Meanwhile, new orders for tankers were valued at USD 3 billion (70 vessels) in the same period, which represents a 14% increase compared to the previous year.

Photo : Hyundai Mipo Dockyard Co., Ltd.

Offshore plant orders awarded to domestic shipyards in 2011-2012

Date		Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard
2011	January	Drillship	1 vessel (including 1 optional vessel)	KRW 590 billion	Diamond Offshore Drilling Limited, U.S.A	Mid 2013	Hyundai Heavy Industries
		Offshore Plant	-	USD 900 million	RasGas, Qatar	Late 2013	Hyundai Heavy Industries
		Drillship	2 vessels (including 2 optional vessels)	KRW 1 trillion 140 billion	Noble Drilling, U.S.A	On a staggered basis until late September 2013	Hyundai Heavy Industries
		Deepwater drillship	1 vessel	-	Atwood Oceanics, U.S.A	Second half of 2013 Marine Engineering	Daewoo Shipbuilding &
	February	Offshore facility carrier FPSO for the North Sea	1 vessel -	KRW 265 billion USD 1.2 billion	Dockwise, Netherlands BP (British Petroleum), U.K	October 2012 Early 2015	Hyundai Heavy Industries Hyundai Heavy Industries
		Platform Supply Vessel	1 vessel	-	-	2012	STX OSV
		Fisheries Research Vessel	1 vessel	EUR 35 million	Ministry of Fisheries and Marine Resources, Republic of Namibia	Early 2012	STX Finland
	March	Offshore Platform (North Sea Drilling & Production platform, Quarters & Utilities platform)	1 unit each	USD 600 million	BP (British Petroleum), U.K	Late 2014	Hyundai Heavy Industries
		Deepwater drillship	2 vessel (including 2 optional vessels)	KRW 1 trillion 200 billion	Aker Drilling, Norway	Second half of 2013	Daewoo Shipbuilding & Marine Engineering
		Drillship	2 vessels	USD 1.1 billion	Ship owner, U.S.A	-	Samsung Heavy Industries
		Platform Supply Vessel	1 vessel	-	Norsea Group AS, Norway	June 2012	STX OSV
		Platform Supply Vessel	1 vessel	-	-	2012	STX OSV
	April	Drillship	1 (including 1 optional vessel)	-	Fred Olsen Energy, Norway	August 2013	Hyundai Heavy Industries
		Drillship	2 vessels	USD 1.12 billion	Maersk, Denmark	-	Samsung Heavy Industries
		Drillship	1 vessel	USD 680 million	Ocean Rig, Greece	October 2013	Samsung Heavy Industries
		Shuttle Tanker	2 (including 2 optional vessels)	USD 200 million	European Navigation, Greece	2013	STX Offshore & Shipbuilding
	May	Drillship	2 (including 1 optional vessel)	USD 1.12 billion	Rowan, U.S.A	Second half of 2013	Hyundai Heavy Industries
		Deepwater drillship	1 (including 1 optional vessel)	-	Vantage Drilling, U.S.A	Late May, 2013	Daewoo Shipbuilding & Marine Engineering
		Offshore Platform (Top side of offshore platform)	-	USD 414 million	Statoil, Norway	-	Samsung Heavy Industries
		FPSO	1 vessel	USD 636 million	Teekay Petrojarl, Norway	Mid 2013	Samsung Heavy Industries
		Platform Supply Vessel	2 vessels	Around KRW 120 billion	Farstad Shipping, Norway	First half of 2013	STX OSV
		FSO	1 unit	-	PTSC, Vietnam	Early 2013	Sungdong Shipbuilding & Marine Engineering
		LNG-FPSO	1 unit	USD 3.026 billion	Royal Dutch Shell, U.S.A	2016	Samsung Heavy Industries
	June	Platform Supply Vessel	2 vessels	Around KRW 150 billion	Island Offshore, Norway	First quarter, third quarter of 2013	STX OSV
		LNG-FSRU	2 units (including 2 optional vessels)	USD 500 million	Höegh LNG, Norway	Second half of 2013, first half of 2014	Hyundai Heavy Industries
		Multifunctional Deep Water Anchor Handling, Offshore Service Vessels	2 vessels	KRW 240 billion	Farstad Shipping, Norway	From the second quarter of 2013	STX OSV
		Drillship	1 vessel	USD 680 million	Ocean Rig, Greece	November 2013	Samsung Heavy Industries
	July	Drillship	2 vessels	USD 1.1225 billion	Maersk, Denmark	July 2014	Samsung Heavy Industries

2011	August	LNG-FSRU (Floating Storage and Regasification Unit)	1 vessel	USD 280 million	Excelerate Energy, U.S.A	First quarter of 2014	Daewoo Shipbuilding & Marine Engineering
	September	Semi-submersible Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Second hallf of 2014	Daewoo Shipbuilding & Marine Engineering
		Well Intervention Vessel	2 vessels	USD 420 million	Eide Marine Services AS, Norway	2013	STX Finland
		Drillship	1 unit (optional vessel awarded on January 19)	Approximately KRW 600 billion	Noble Drilling, U.S.A	Second half of 2014	Hyundai Heavy Industries
	October	Fixed Offshore Platform	–	USD 1.4 billion	Chevron, U.S.A	Second half of 2014	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 unit	Approximately USD 550 million	Offshore drilling company, Americas	–	Daewoo Shipbuilding & Marine Engineering
		Platform Supply Vessel	1 unit	–	Troms Offshore Supply AS, Norway	First half of 2013	STX OSV
		Offshore Plant Module	2 units	–		First half of 2012	STX Finland
		Platform Supply Vessel	4 units	KRW 2 trillion	Island Offshore, Norway	Consecutively from the 3rd quarter of 2013 to the 1st quarter of 2014	STX OSV
	November	Pipe Laying Support Vessel	2 units	USD 500 million	Odebrecht, Brazil	August of 2014	Daewoo Shipbuilding & Marine Engineering
	December	Offshore facilities (Gas platform and various facilities)	–	USD 900 million	Major multinational oil companies	2nd half of 2014	Hyundai Heavy Industries
2012	January	CPF (Central Processing Facility)	–	KRW 2.6 trillion	Australia / INPEX	4th quarter of 2015	Samsung Heavy Industries
		Semi-submersible rig	1 unit	USD 620 million	Norway / Odfjell	by mid 2014	Daewoo Shipbuilding & Marine Engineering
	February	LNG-FSRU		–	Norway / Hoegh	–	Hyundai Heavy Industries
	March	Offshore Platform	1 unit	USD 560 million	Danish / DONG E&P A/S	April 2015	Daewoo Shipbuilding & Marine Engineering
		FPSO	1 unit	USD 2.0 billion	INPEX / Australia	April 2016	Daewoo Shipbuilding & Marine Engineering
	April	Drillship	1 vessel	USD 645 million	Ensco plc	Third quarter 2014	Samsung Heavy Industries
	May	Semi-submersible Drilling Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Mid 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 vessel	USD 600 million	Seadrill, Norway	Second half of 2014	Samsung Heavy Industries
		Drillship	1 vessel	USD 655 million	Diamond Offshore Drilling Limited., U.S.A	4th quarter of 2014	Hyundai Heavy Industries
	June	Semi-submersible drilling rig	1 unit	USD 700 million	Fred Olsen Energy, Norway	March 2015	Hyundai Heavy Industries
		LNG-FPSO	1 unit		Petroliam Nasional Berhad, Malaysia	June 2015	Daewoo Shipbuilding & Marine Engineering
	July	Drillship	1 vessel	USD 645 million	Ensco plc	–	Samsung Heavy Industries
		Gas Compression Platform	1 unit	USD 420 million	(Letter of Award)	Second half of 2015	Hyundai Heavy Industries

*Note : Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until July 15, 2012)

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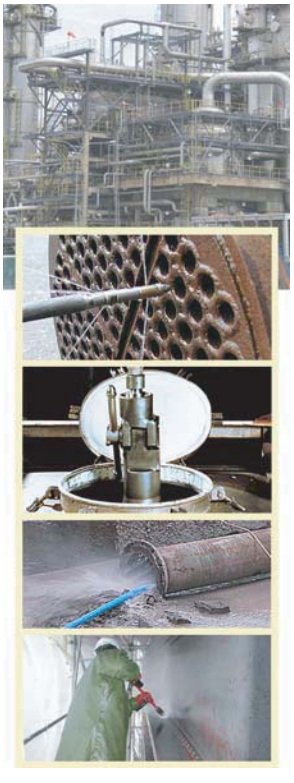

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Spotlight

'Deepwater Champion', a drillship which was built and delivered for the first time by Hyundai Heavy Industries(HHI) in 2010.

'Drillship' crisscrossing the oceans around the world

Drillship is a high-value added vessel with amazing performance in terms of mobility, loading and drilling capacity compared to jack-up or semi-submersible.

Domestic shipyards have the world's best technology in the drillship sector. Samsung Heavy Industries (SHI) has won orders for 6 drillships this year alone and has clinched orders for 54 drillships out of 109 drillships ordered worldwide since 1996.

Drillship is capable of operating in water depths exceeding 3,000m, which is the greatest competitive edge. Recently, drillship can operate in water depth of 2.2 mile and drill up to 7 miles below sea level. For that reason, drillship is called 'DreamShip' in the offshore energy development industry.

STX Dalian recently delivered 'Noble Globetrotter II' to Noble, the global oil and gas drilling company.

The Discoverer Enterprise of Transocean is the first ultra- deepwater drillship with dual activity drilling technology.

Ultra-deepwater drillship by Vantage Drilling, built by Daewoo Shipbuilding & Marine Engineering (DSME).

1 2

3

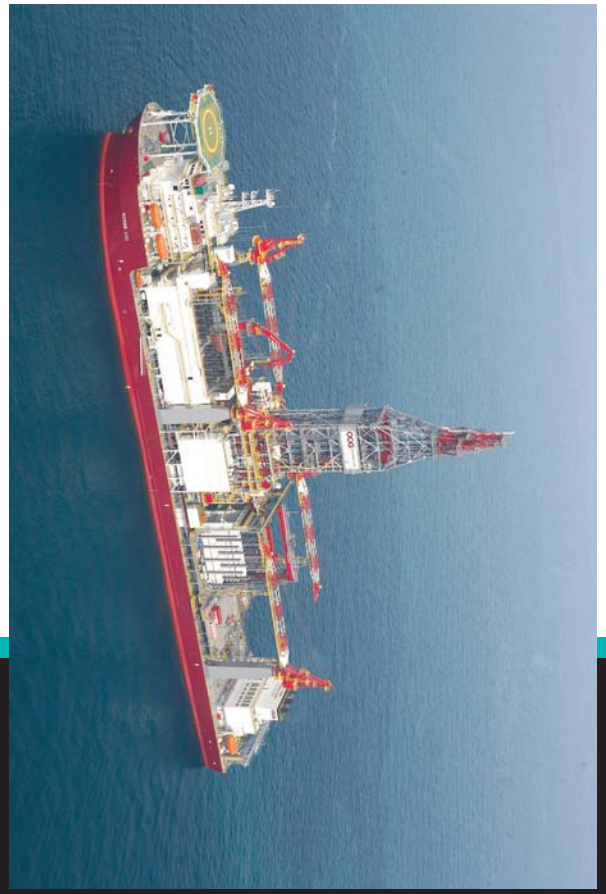
By Seadrill, West Capella (1), West Navigator (2), West Vela (3). Seadrill has 61 vessels, including 47 drillships, including those currently under construction, as of 2011. West Vela is currently being built by Samsung Heavy Industries (SHI).

Daewoo Shipbuilding and Marine Engineering (DSME) won order to build 1 drillship from Vantage Drilling, American drilling company on 9th May 2011.

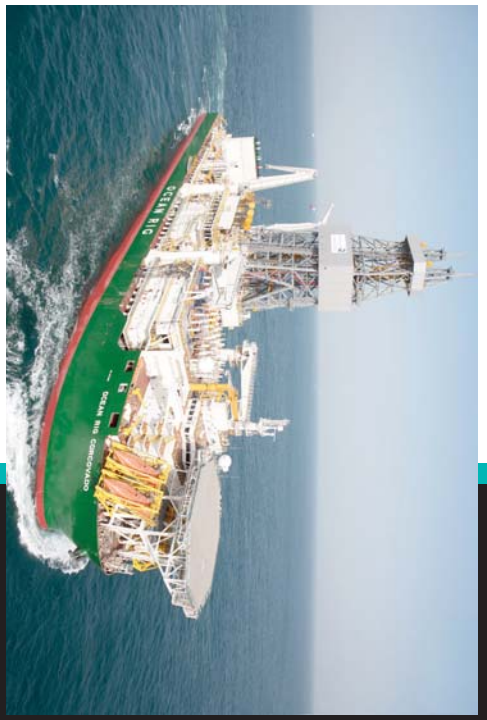
'Stena Drillmax' is the world's first drillship for polar regions, built by Samsung Heavy Industries (SHI). 'Stena Drillmax measures 228m in length, 42m in width, and 19m in height, and can drill up to 11km below the sea level even in the harsh marine environment with the waves of 16m in height, strong wind at the velocity of 41m per second and temperature of 40oC below zero. This vessel will be deployed to the Arctic Ocean and start drilling oil wells this year.

'Leo Segerius' of Noble

The Jack Ryan is a 10,000 feet ultra deep-water Drillship. The recent oil discovery, Astraea-1, in Angola, was drilled by the Jack Ryan.



'Norbe VIII', a drillship built with the independent technology (DSME-10000 type) of DSME, can operate in water depth of up to 10,000 feet. It is equipped with the cutting-edge position control system and drill up to 12km below the sea surface, drilling deeper than the height of Mt. Everest (8848m).



The Ocean Rig Corcovado drillship has now commenced revenue-generating drilling operations in Brazil. This drillship built by SHI was delivered to the ship owner on December 21, 2010.

New Product

New FOUNDATION Fieldbus Linking Devices for Plantwide Process Control

Rockwell Automation Korea

Two new linking devices from Rockwell Automation provide PlantPAx process automation system users with connectivity to FOUNDATION Fieldbus devices. The Allen-Bradley 1788-EN2FFR and 1788-CN2FFR linking devices provide a direct link from EtherNet/IP or ControlNet networks to the FOUNDATION Fieldbus H1 device-level network, making the integration of FOUNDATION Fieldbus devices intuitive and seamless.

The 1788-EN2FFR and 1788-CN2FFR linking devices offer simplified setup into RSLogix 5000 software from Rockwell Automation, thanks to an Add-On-Profile (AOP) and auto-configure tool. The auto-configure tool helps save hours of setup time by applying the most frequently used configuration, while the AOP provides a graphical environment for more detailed field device configuration. In addition, the AOP provides built-in diagnostics, including information on network voltages and currents, internal temperature, and device status, which also can be viewed directly from the on-device display, simplifying troubleshooting for plant operators. A built-in webserver also provides remote access to network and field device data.

Both devices support up to 16 field devices on a single H1 segment and feature multiple redundancy configurations, including redundant linking devices, H1 media, ControlNet media, and EtherNet/IP Device-Level Ring. No external software or user licenses are required for operation, and each device features a built-in power conditioner, which minimizes the equipment's installed footprint.

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Vacon 100 AC Drives - Simply superior

Vacon Korea

Vacon 100 is bursting with smart new features. Benefit from functional safety with Safe Torque Off, which prevents the motor from generating torque on the motor shaft, Safe Stop 1, and ATEX certified motor over-temperature protection. Vacon 100 also has a unique feature with built-in Ethernet to make integration to plant automation easy and efficient via integrated ModBus TCP, Ethernet I/P or Profinet IO.

Vacon 100 is ideal for a wide range of constant power/torque applications including pumps, fans, compressors and conveyors. These are applications where energy efficiency and productivity improvements often result in a rapid return on project investments. In addition to several standard features such as built-in I/Os with 3 option slots, integrated RS485 and Ethernet based field bus support, varnished boards and robust motor control features for reliability, Vacon 100 also has dedicated features for each of these key applications.

Vacon 100 is available in the power range of 0.55 to 90 kW (0.75 - 125 HP) 230 V and 1.1-160 kW (1.5 - 200 HP) 500 V. The wall-mountable drive modules are easy to install and operate, with IP21/UL Type1 provided as standard. Options include IP54/UL Type12 and flange (through hole) mounting. Frame sizes MR8 and MR9 are also available as compact IP00 for easy installation to cabinets or enclosures. Vacon 100 allows you to do much more than you would expect from a standard drive. At Vacon, we aim to exceed your expectations.

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New Product

VLT® Frequency converter: compact size and marine approved

Danfoss Ltd.

The more compact D-frame construction design of the VLT® Frequency converter is now fully available in the 90 to 250 KW output range. VLT® frequency converters are available in protection classes up to IP 66, making the products ideal for the refurbishment of older vessels. Danfoss VLT® frequency converters for marine applications possibly hold the highest number of class certificates on the market today, and are certified by a total of eight authorities within the maritime and off-shore area, including DNV RINA, Lloyds, CCI and others. The certificates contain information about products and manufacturers found to comply with international standards, regulations and the class rules. This gives the customer the best possible choices when selecting drives for their application.

Depending on the output range, the new compact frame size can be up to 68 percent smaller than the former frames. Additional options are available for these devices on the power input side, from fuses and load circuit breakers to electric contactors. These devices save a large amount of cabinet space. The greatest savings are achieved by the 250 KW VLT® frequency converters. They require only 0.14 m^3 compared to the 0.450 m^3 formerly needed. Danfoss converters remain among the smallest products in their performance classes and are available in a wide power range designed for all applications, marine and other.

The VLT® frequency converters have a vast number of functions developed to meet the diverse needs of all kinds of applications: It is the perfect match for pumps, fans and compressors e.g. in vessels that are fitted with increasingly sophisticated solutions. The power range goes from 1.1 to 1400 kW with voltage ranges 200, 380 ~ 480/500 V, 525 ~ 600 V and 690 V. The product is available up to protection class IP66, depending on the version.

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HAEAN MACHINERY IND. CO., LTD.
head office :
homepage add : www.haean21.com
main products : Marine Crane, Deck Machinery(Outfitting). Special Equipment
TEL : +82 55-345-2024

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

HYUNDAI MARINE MACHINERY CO., LTD.
head office :
homepage add : www.hmmco.kr
main products : Hyundai-Atias Incinerator. Hyundai-Jowa 15ppm Bilge Separator, Auxiliary Blower, Ventilation Fan
TEL : +82 32-583-0671

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

KANGRIM HEAVY INDUSTRIES CO., LTD.
head office : Changwon Gyeongnam
homepage add : www.kangrim.com
main products : boilers, marine & industrial, inert gas system(i.g.s.), i.g.g. & $n_2$generator
TEL : +82 55-269-7701

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MIN SUNG CO., LTD.
head office : Sasang Busan
homepage add : www.minth.co.kr
main products : cable tray, hatch, electric cable box
TEL : +82 51-305-8862

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

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

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

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

Myung Sung Engineering Co., Ltd.
head office : Mokpo Jeonnam
homepage add :
main products :rudder & rudder stock, rudder horn, stern roller
TEL : +82 61-276-7650

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

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

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

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

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

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

SAMGONG Co., Ltd
head office :
homepage add : www.sam-gong.co.kr
main products : oil purifiers, ships accommodation ladders, ships windows
TEL : +82 51-200-3040/1

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

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

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

SMS CO., LTD.
head office : Saha Gu Busan
homepage add : www.sms-marinesystem.com
main products : hatch-pontoon type, folding type, side rolling type, etc. lashing equipment-2/3tier
TEL : +82 51-290-1000

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

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

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

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

SUNG IL CO., LTD. (SIM)
head office :
homepage add : www.sungilsim.com
main products : pipe spool fabrication, induction pipe bending, marine engine pipe
TEL : +82 51-831-8800

ESAB SeAH CORP
head office :
homepage add : www.esab.co.kr
main products : welding consumable, welding equipments
TEL : +82 55-289-8111

SEUN ELECTRIC CO., LTD.
head office :
homepage add : www.seunelectric.co.kr
main products : battery charger and dist. board. full auto. charging sys. .lcd display monitor
TEL : +82 51-208-4641

SE-WON INDUSTRIES CO., LTD.
head office :
homepage add : www.sewon-ind.com
main products : high velocity p/v valve, gas free vent cover, flame screen
TEL : +82 51-728-4191

SAEJIN INTECH CO., LTD.
head office :

homepage add : www.sjhind.com
main products : emergency towing system, telescopic radar post, deck fittings(mooring fitting), industrial m/c & etc.
TEL : +82 55-328-1770

SE JIN IND. CO., LTD.
head office : 61-68 Ungnam-dong, Changwon-si, Gyeongsangnam-do.
homepage add : www.sejin89.co.kr
main products : piping, h.f.o supply unit, purifier module each kind
TEL : +82 55-239-4700

SPECS CORPORATION
head office :
homepage add : www.specs.co.kr
main products : system division-oil mist detector, portable level temp/oil
TEL : +82 31-706-5211

SHIN DONG DIGITECH CO., LTD.
head office :
homepage add : www.shindong.com
main products : satellite tv sets-satellite communication equipments, draft buoy(1m, 1.6m, 2.4m discus buoy)-ocean information technology division
TEL : +82 51-467-5001

SIL LA METAL CO., LTD.
head office :
homepage add :
main products : propeller(f.p.p.), c.p. propeller blade & hub, propeller shaft, inter shaft
TEL : +82 51-831-5991/8

SHINMYUNG TECH CO., LTD.
head office :
homepage add :
main products : air & electric winch-0.2ton ~ 10ton, air motor-1p ~ 25p, davit (all)-0.2ton ~ 5ton
TEL : +82 55-363-7091

SHINSUNG DIESEL KIKI CO.
head office :
homepage add : nozzle.koreasme.org
main products : for marine engine-nozzle, plunger assy, delivery valve assy
TEL : +82 51-264-8829, 262-8869

SHIN SHIN MACHINERY CO., LTD.
head office :
homepage add : www.sspump.com
main products : centrifugal pumps, gear pumps, screw pumps, submersible pumps
TEL : +82 51-727-5300

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

SHIN YOUNG HEAVY INDUSTRIES CO.,LTD
head office :
homepage add : www.syhico.com
main products : oil & gas system, hydraulic system
TEL : +82 61-800-3700

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

S.A. MART CO., LTD.
head office :
homepage add : www.samartkr.com
main products : control lever, control cable, hydraulic steering system, auto pilot system, stern drive system
TEL : +82 32-815-6314

STX ENGINE CO., LTD.
head office :
homepage add : www.stxengine.co.kr
main products : marine diesel engine, military diesel engine, gas engine, gas turbine
TEL : +82 55-280-0114

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

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

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

SIN YOUNG ENTERPRISE CO., LTD.
head office : Gimhae Gyeongnam
homepage add : www.sy-ind.com
main products : main hole, access hatch, bollad
TEL : +82 55-346-0034

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

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

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 Accessaries, 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
TEL : +82 55-359-1100

WILSON WALTON CORRPRO KOREA
head office :
homepage add : www.wwckorea.com
main products : i.c.c.p system, m.g.p.s, s.g.d
TEL : +82 51-831-0131

YOUNG KWANG MACHINE CO., LTD.
head office :
homepage add : www.ykme.co.kr
main products : package unit, group unit, module unit for industrial plant
TEL : +82 54-776-5456/9

YOOWON INDUSTRIES LTD.
head office :
homepage add : www.yoowonind.com
main products : steering gear, auto filter, deck machinery
TEL : +82 51-205-8541

YOUJEON STEEL CO., LTD.
head office : Changwon Gyeongnam
homepage add : www.youjeon steel.co.kr
main products : Marine Engine Parts-Engine Bed
TEL : +82 55-297-2121

HYUNDAI HEAVY INDUSTRIES CO., LTD. (HHI)

- Address : 1, Jeonha-dong, Dong-gu, Ulsan, Korea • Tel : +82-52-202-2114 • Fax : +82-52-202-3470 • http://www.hhi.co.kr
- *Products : Bulk Carriers, Containerships, Tankers, VLCCs, Product Carriers, Multi-purpose Cargo Ships, OBO Carriers, Pure Car Carriers, LPG Carriers, Ro-Ro Ships, Chemical Tankers, Offshore Rigs/Barges, LNG Carriers, Passenger Ships, Drill Ships, Special & Naval Ships, FPSO, FSO, Semi-submersible Drilling Rig, Other Vessels*

DAEWOO SHIPBUILDING & MARINE ENGINEERING CO., LTD. (DSME)

- Address : 85, Da-dong, Jung-gu, Seoul, Korea • Tel : +82-2-2129-0114 • Fax : +82-2-2129-0077~8 • http://www.dsme.co.kr
- *Products : LNG Carriers, LNG-RVs, LNG-FPSOs/FSRUs, LPG Carriers, LPG-FPSOs, ULCCs, VLCCs, Suezmax/Atramax/Panamax Tankers, Shuttle/Chemical Tankers, Product Carriers, Containerships, Capesize/ Kamsarmax/ Supramax Bulk Carriers, Ore Carriers, VLOCs, Ro-Ro Ships, PCTCs, Passenger Car Ferries, FPSOs, FSOs, FPUs, Drill Ships, Semi-Submersible Drilling Rigs, Fixed Platforms, Submarines, Submarine Rescue Vessels AUVs, Destroyers, Battle Ships*

SAMSUNG HEAVY INDUSTRIES CO., LTD. (SHI)

- Address : 1321-15, Seocho-Dong, Seocho-Gu, Seoul, Korea • Tel : +82-2-3458-7312 • Fax : +82-2-3458-7319
- http://www.shi.samsung.co.kr
- *Products : Arctic Shuttle Tankers, VCLLs, Crude Oil Tankers, Container Vessels, LNG/LPG Carriers, FPSO, FSO, Drillships, etc., LNG FPSO, Offshore Platforms, TLP, SEMI, Cruise Ships & Ferries, Steel Structures, Bridges & Building, Cargo & Material Handing Equipment*

HYUNDAI SAMHO HEAVY INDUSTRIES CO., LTD. (HSHI)

- Address : 1700, Yongdong-ri, Samho-eup, Yeongam-gun, Jeollanam-do, Korea • Tel : +82-61-460-2114 • Fax : +82-61-460-3701
- http://www.hshi.co.kr
- *Products : Tankers, VLCCs, Product Carriers, Chemical Tankers, Containerships, LNG Carriers, LPG Carriers, Pure Car Carriers, Bulk Carriers, Other Vessels*

STX OFFSHORE & SHIPBUILDING CO., LTD.

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