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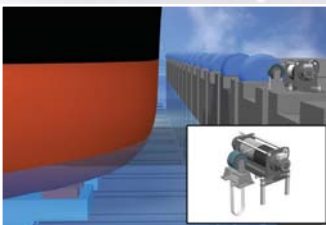


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BUSINESS CONTENTS

Ship's stores / Provisions supply

Stock Item Service

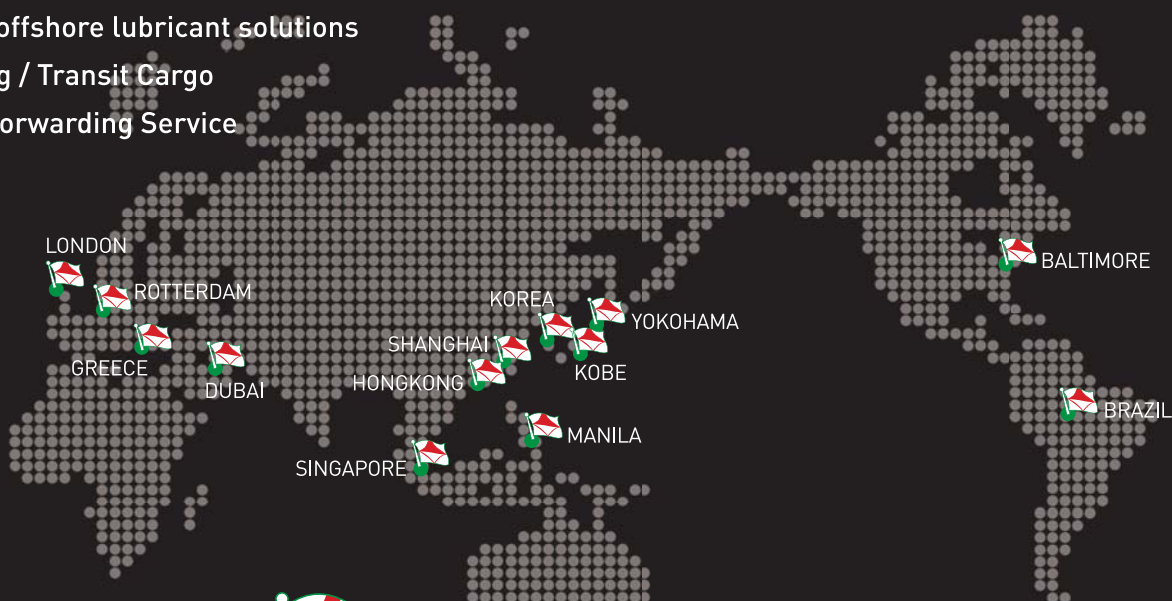
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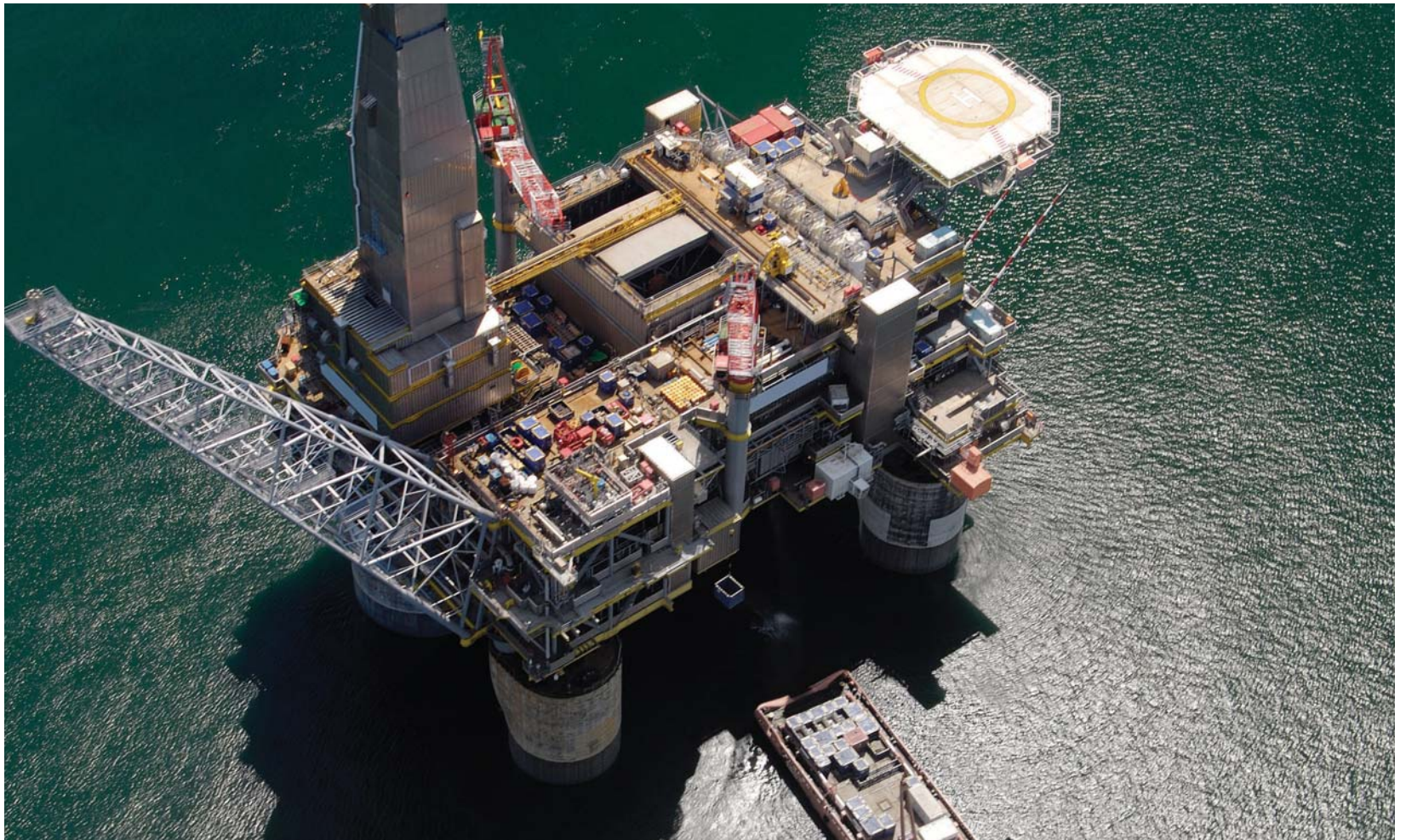
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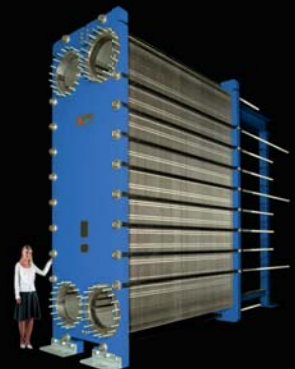
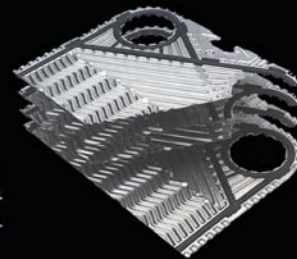
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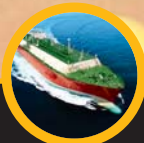
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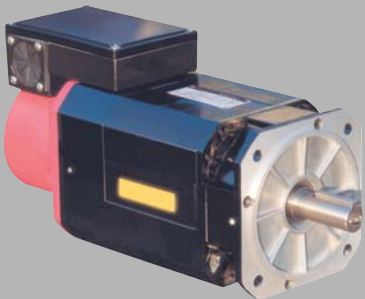
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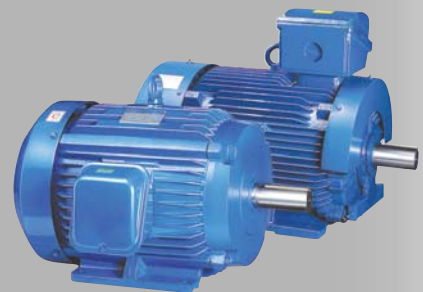
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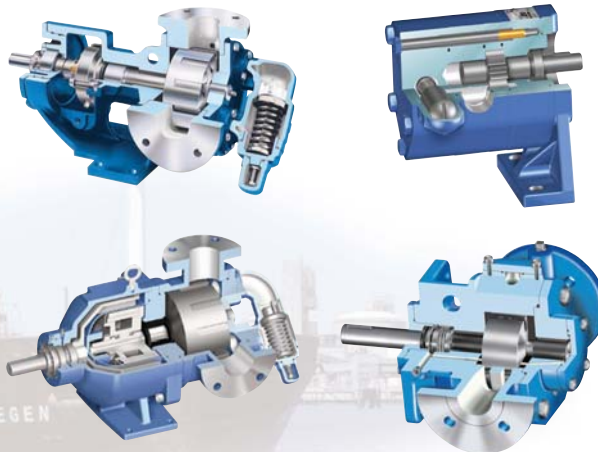
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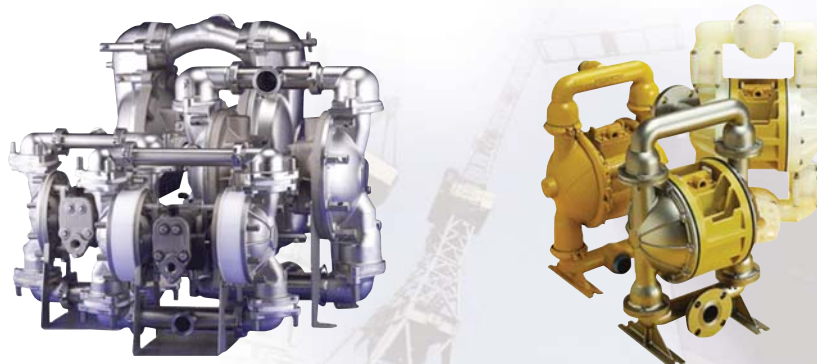
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Contents

20 Business News

30 Feature Story
Current marine and offshore equipment industry of Korea
- Increased focus on offshore plant and LNG market

Issue

40 Intergraph's engineering automation solution makes a clean sweep in the offshore plant market

42 SSME successfully built an offshore facility on land

43 ISA100 expands the market for industrial process automation

46 Shipbuilding industry will reduce 14,896 tons of VOC emissions over the next 5 years

48 DSME proves its unmatched technology in the construction of offshore plants

50 Company & Comment
A leading manufacturer of the equipment for shipbuilding & offshore industries
- DHP Engineering Ltd.

Technology

56 Why the focus is on LNG as fuel?
- GL Academy, Kil-su Yun Manager / Coordinator

Application

60 Marine Fuel Management
- Emerson Process Management Korea

64 Energy efficiency, application leadership and integrated solutions - **Alfa Laval**

68 Special Focus
The Challenge of Total Marine Service Solution
- Hanil-Fuji (Korea) Co., Ltd.

72 New Orders

75 The Shippbuilding Marketshare

76 Offshore Plant Orders

80 Major Performance Gallery
The land where the ships are born and grow

New Product

86 GenerationX Engines offer a shorter route to greater profits - **Wärtsilä Korea**

88 New NI CompactRIO Expansion Chassis
- National Instruments Corporation

89 NX 8.5 delivers customer-driven enhancement to help reduce time to market - **Siemens PLM Software**

Member List

90 KOMEA (Korea Marine Equipment Association)

94 KOSHIPA (The Korea Shipbuilder's Association)



Advertisers Index

Darmattech PFP, Inc.cover1	Lloyds Register8	NATIONAL INSTRUMENTS38
Rainhocover2	KROHNE9	NATIONAL INSTRUMENTS39
HANIL-FUJI KOREAcover3	KR10	Munters Korea44
Germanischer Lloydcover4	Nexans11	FLIR Sytems Korea45
Intergrah korea1	HIGEN Motor12	ABB Marine49
Sungdong Shipbuilding & Marine Engineering2	Vacon Korea13	TANKTECH54
SPX Flow Technology Korea3	IDEX KOREA14	Parker Hannifin Connectors59
MARINE TECH KOREA 20124	IDEX KOREA15	EUNHA MACHINERY INDUSTRIAL63
ABB5	EMERSON17	AlfaLaval Korea67
JS cable6	Gardner Denver Korea19	ITW PP&F korea Limited78
Hyundai Heavy Industries7	RINA28	DAE AH Co.,Ltd.79
	Honeywell Analytics29	

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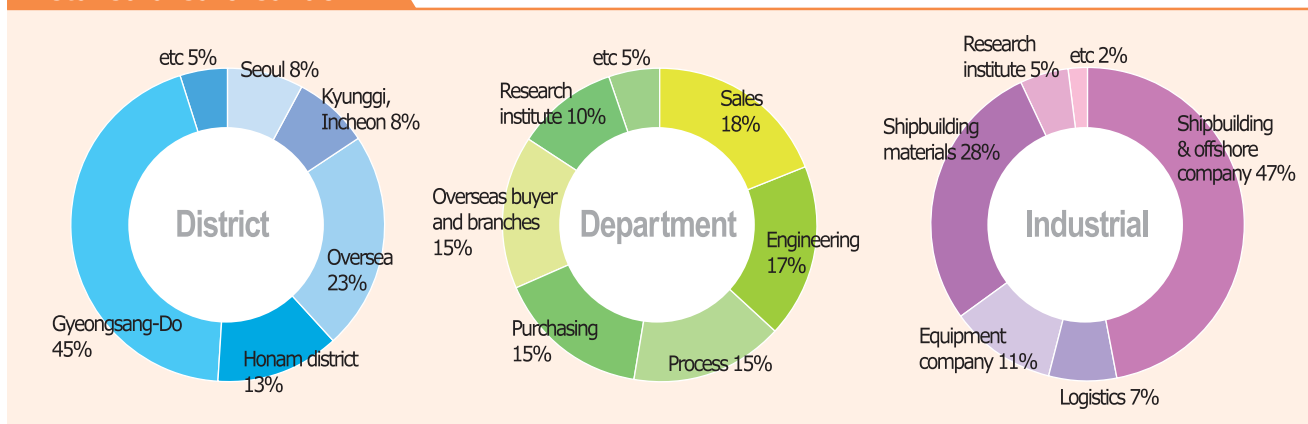
Product

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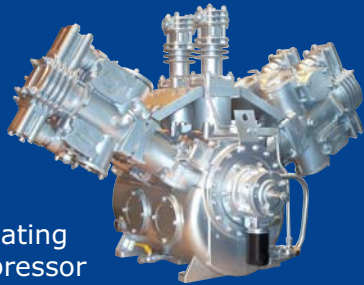
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● ● ● ATS-II Tongyeong, the first salvage and rescue ship for the Korean Navy, was launched

Daewoo Shipbuilding & Marine Engineering (DSME) held a launching ceremony for the Salvage and Rescue Ship(ATS), first built with indigenous technology for the Korean Navy, at its Okpo shipyard on September 4. The launching ceremony was attended by the officials from the Navy, Defense Acquisition Program Agency(DAPA), Tongyeong City, shipyards, etc., including Choi Yoon-hee, the South Korean Navy's chief of staff, Goh Jae-ho, President of DSME, and Kim Dong-jin, Mayor of Tongyeong.

ATS-II 'Tongyeong' will carry out various rescue missions, like rescuing the naval vessels stranded or inoperable due to malfunction, searching for and recovering the sunken naval vessels and aircraft, extinguishing the fire at sea, preventing marine pollution caused by oil spill, etc. Korean Navy has operated 2 salvage and rescue vessels to date, which were decommissioned from the U.S. Navy service in 1996.

ATS-II Tongyeong was launched 1 year and

11 months after DSME and DAPA entered into a contract in October 2010 to build the vessel as the Korean Navy is looking to replace old salvage and rescue vessels and add large vessels, including the mobile flotilla, to its fleet.

ATS-II Tongyeong will be delivered to the Navy by the second half of 2012 after the test and evaluation following the launching ceremony.

ATS-II Tongyeong, a 3,500-ton vessel which measures 107.54m in length and 16.8m in width, is larger than existing salvage and rescue vessels and fitted with the state-of-art equipments and can sail at a maximum speed of 21kts, and will carry out the rescue missions swiftly in case of various marine accidents.

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ATS-II Tongyeong, the first salvage and rescue ship for the Korean Navy

remotely operated vehicle (ROV) which has the operational working depth of up to 3,000m, etc., ATS-II Tongyeong outperforms the existing salvage and rescue vessels in terms of the searching capability.

ATS-II Tongyeong opens the door to a new era in the construction of the rescue vessels with indigenous technology, such as Cheonghaejin, the submarine rescue vessel, and will play a significant part in rescue missions at sea, as well as military operations.

한국해군 최초 국산 수상함 구조함(ATS-II), 통영함 진수

국내 기술진에 의해 해군 최초로 건조된 수상함 구조함(ATS: Salvage and Rescue Ship)의 진수식이 지난 9월 4일 거제 대우조선해양 옥포조선소에서 개최됐다. 이번 진수식에는 최윤희 해군참모총장, 고재호 대우조선해양 사장, 김동진 통영시장 등 해군, 방사청, 통영시, 조선소 관계자 등 참가해 자리를 빛냈다.

ATS-II '통영함'은 고장으로 기동이 불가능하거나 좌초된 함정 구조, 침몰 함정 및 항공기 탐색 및 인양, 예인, 해상 화재진압, 기름유출 등 해상

오염 방제 등 다양한 구조임무를 수행하는 함정으로서, 한국 해군은 1996년 미국 해군에서 퇴역한 구조함 2척을 도입하여 운용 중이다.

이 통영함은 기동전단을 비롯한 한국 해군함정의 대형화 및 기존 구조함의 노후화로 인한 대체전력 확보 필요성에 따라 2010년 10월 방위사업청과 대우조선해양간 건조계약을 체결한 후 1년 11개월의 공정을 거쳐 이날 진수하게 되었고, 진수식 이후 시험평가 등을 거쳐 2013년 후반기에 해군에 인도될 예정이다.

통영함은 전장 107.54m, 전폭 16.8m, 경하톤수 3,500톤급으로서 기존 구조함에 비해 대형화 및

최첨단 첨단장비를 탑재하고, 최대 속력이 21kts로 각종 해난사고 발생시 보다 신속하게 구조임무를 수행하게 된다. 특히 사이드 스캔 소나(Side Scan Sonar)와 최대 수중 3,000m까지 탐색이 가능한 수중무인탐사기(ROV: Remotely Operated Vehicle) 등을 탑재하고 있어 기존의 구조함에 비해 탐색능력이 대폭 향상되었다.

해군은 통영함 건조로 인해 잠수함 구조함 청해진함 등 본격적인 국산 구조함 시대를 맞게 되었으며, 통영함은 앞으로 군 작전은 물론 각종 해난 사고에 있어 큰 역할을 할 것으로 기대된다.

● ● ● KR issued its first Eco-Ship certificate to 'M/V Pacific Pride' of Hyundai Merchant Marine

Korean Register of Shipping (KR) issued its first Eco-Ship certificate to 'M/V Pacific Pride' of Hyundai Merchant Marine on August 31. Eco-Ship certification refers to the system in

which the certificate is issued based on the ship's environmental performance and the shipping company's management capability which are evaluated at the voluntary request

of ship owner from the aspects of the ship management, operation, and IMO environmental conventions

Kim Mahn-eung, head of New Growth

Industry Division, KR, explained, "The Eco-Ship certification service of KR was developed to enhance the environmental-friendliness of ships and shipping companies and help build up environmental competitiveness. This certification will be conducive to the improvement of energy efficiency and eco-friendly ship management capability."

Hyundai Merchant Marine's 'M/V Pacific Pride', which received the KR's first Eco-Ship

certificate, is the 62K bulk carrier built at Hyundai-Vinashin Shipyard in Vietnam and meets the requirements of IMO's 2nd phase greenhouse gas regulations that will come into force after January 1, 2020 although this bulk carrier is not subject to the IMO convention on greenhouse gas emission which takes effect on January 1, 2013.

An official from Hyundai Merchant Marine said, "Many ports around the globe offer vari-

ous incentives, such as the reduction of navigation expenses, to eco-friendly ships. Previously, the Eco Ship certificate was not available even for the vessels that meet a certain environmental standards.

The Eco-Ship certificate of KR represents official recognition of the conformity to the international standards. So, ships can be verified as eco-friendly ships and benefit from the incentives."

KR, 현대상선 'M/V Pacific Pride'에 친환경선박 인증서 최초 발급

한국선급(KR)이 지난 8월 31일 현대상선 'M/V Pacific Pride' 호에 한국선급 최초의 친환경선박 인증서를 발급했다. 친환경선박 인증이란 선주의 자발적인 요청에 따라 선박의 관리, 운항 및 국제 해사기구 환경 관련 협약의 세 가지 측면에서 선박의 친환경성과 선사의 관리 역량을 평가하고 그 달성 정도에 따라 인증서를 발급하는 제도이다.

KR, New Growth Industry Division 김만웅 본부장은 "한국선급의 친환경선박 인증서서비스는 선사

및 선박의 친환경성 제고와 환경경쟁력 강화를 지원하기 위하여 개발되었다. 친환경선박 인증은 선박의 에너지효율 향상뿐만 아니라 친환경선박 관리역량을 확보할 수 있을 것"이라며 설명했다.

한국선급 최초의 친환경선박 인증을 받은 현대상선 'M/V Pacific Pride' 호는 베트남 소재 Hyundai-Vinashin Shipyard에서 건조된 62K 산적화물선으로서 내년 1월 1일부터 발효되는 IMO의 온실가스협약을 적용 받지 않는 선박임에도 불구하고 2020년 1월 1일 이후 적용되는 2단계 온실가스 규제를 만족할 수 있도록 건조된 선

박이다.

현대상선의 관계자는 "세계 여러 항만에서는 친환경선박에 대해 운항비 감면 등 다양한 인센티브 제도를 시행하고 있다. 그 동안에는 일정수준의 친환경선박을 건조하더라도 한국 내에서 인증제도가 없어서 아쉬움이 컸다. 하지만 한국선급의 친환경선박 인증제도는 국제적 기준에 의한 면밀한 검증을 통해 인증을 받는 제도이기 때문에 인센티브 수혜는 물론이며, 공식적으로 인정받았다. 데서 그 의미가 크다"라고 말했다.

The Ministry of Knowledge Economy reaffirms the determination to help overcome the crisis and make a new leap forward

The Ministry of Knowledge Economy (MKE) and the Korea Shipbuilders' Association (KOSHIPA) held 'the 9th Shipbuilding & Offshore Day' ceremony at the COEX Intercontinental Hotel on September 13. The ceremony drew about 300 officials related to the shipbuilding and offshore industries, including Vice-Minister Yoon Sang-jik of MKE and KOSHIPA Chairman Goh Jae-ho. The Shipbuilding Day was designated in 2004 to mark September 15, 1997, when Korea exceeded the milestone of 10 million tons in shipbuilding orders, and was renamed to the Shipbuilding & Offshore Day last year.

While delivering the words of encouragement, Vice-Minister Yoon Sang-jik of MKE explained the background that led to the government's ship financing support and called for the support of the small-to-medium equip-

ment manufacturers and an increase in the export through the expansion of green ship and offshore plant capabilities even amid the sluggishness in the shipbuilding market.

To help increase the shipbuilding orders and the export, the government recently announced new measures that would reduce the credit ceiling of Export Import Bank of Korea (EXIM Bank) and inject funds worth KREW 5.6 trillion from commercial banks for the pre-delivery loans which are offered at preferential rates to finance shipbuilding costs of export contracts.

During the ceremony, the shipbuilding and offshore industries pledged to serve as the backbone of the nation's economy. For that, they vowed to forge ahead with the development of futuristic green ship technology, such as LNG-powered vessel, to cope with the

IMO's Regulations on energy efficiency for ships, effectively respond to the changes in the shipbuilding environment and the structure of demand for energy such as shale gas, etc., and press ahead with the development of new markets for deepwater offshore plants and the Arctic market opportunities.

Vice-Minister Yoon Sang-jik of MKE awarded prizes to those who made significant contribution to the advancement of the shipbuilding and offshore industries. A total of 28 persons received official commendation from the government, including Hyundai Mipo Dockyard (HMD) President Choi Won-gil who was awarded the Silver Tower Industry Medal of Honor and Sunbo Industry President Choi Geum-sik who received the Bronze Tower Industry Medal of Honor.

지경부, 위기극복과 함께 새로운 도약을 다짐

지식경제부와 한국조선협회는 지난 13일 COEX 인터콘티넨탈 호텔에서 윤상직 차관과 고재호 협회장 등 조선해양 관련 인사 300여명 등이 참석한 가운데 '제9회 조선해양의 날' 기념식을 가졌다. '조선해양의 날'은 선박수주 최초 1000만톤을 돌파한 1997년 9월 15일을 기념하여 2004년부터 '조선의 날'을 제정했으며, 작년부터 '조선해양의 날'로 변경됐다.

이날 윤상직 지식경제부 차관은 격려사를 통해 최근 정부의 선박금융 지원배경을 설명하고, 어려운 조선시황 하에서도 그린십, 해양플랜트의 역량 강화를 통한 수출확대와 함께 중소기업자재 업체 지원을 당부했다.

최근 정부는 수출입은행의 신용공여 한도를 완화하고, 수출입은행과 시중은행이 제작금융 5조 6000억원을 지원하는 내용의 선박수주·수출 지원방안을 내놓은 바 있다.

이날 조선해양 업계는 국제해사기구(IMO)의 연비

규제 도입과 셰일가스 등 에너지 수요구조 변화 등 향후 조선환경변화에 대응하여 LNG 추진선 등 미래형 녹색선박 기술개발과 함께 심해저 해양플랜트, 북극해 등 새로운 시장 개발을 통해 국가경쟁력의 든든한 버팀목이 될 것을 다짐했다.

지식경제부 윤상직 차관은 유공자 포상을 통해 조선해양 업계의 그간 노고를 치하했다. (주)현대미포조선의 최원길 사장이 은탑산업훈장을, 선보공업(주)의 최금식 사장이 동탑산업훈장을 수상하는 등 총 28명에게 정부표창이 수여됐다.



Progressive Barge Line of Westwego, the first MID-certified marine bunker measurement solution in North America

W&O and Emerson Process Management are pleased to announce that a Micro Motion® MID-Certified (Measurement Instrument Directive) Marine Bunker Measurement Solution has been installed on a barge operated by Progressive Barge Line, Inc. in the Port of New Orleans, La. Emerson's bunkering solution provides highly accurate, transparent bunker fuel deliveries. This installation by W&O on the 27,000-ton Progressive barge PBL2402 is the first in North America.

Progressive Barge Line, Inc. (PBL), family owned and operated since 1977, specializes in the supply of bunkers and line-haul movements in the port of New Orleans. PBL owns and operates 11 double-skinned barges ranging from 11,000 barrels to 30,000 barrels with containment rails around each tank, and five push boats ranging from 1570 to 2400 Horsepower. PBL handles around 25 percent of all the bunker deliveries made in the

Port of New Orleans.

"Due to our customers' requirements for more accurate, certified fuel delivery, the Emerson certified bunkering solution was installed on our barge several months ago," said Terry Boffone, owner of Progressive Barge Line, Inc. "We are already seeing an increase in the accuracy and reliability of our deliveries. Disputes have been eliminated, allowing us to avoid any unnecessary delays in vessel movements and to process payments quickly."

The system includes a Micro Motion® ELITE® Coriolis flowmeter, Series 3000 transmitter with Marine Bunker Transfer Package, and a bunker delivery ticket printer to generate a receipt that includes the time, date and the total quantity transferred. This receipt can be used as a legal (Weights & Measures) document. The globally certified Micro Motion® bunker custody transfer solution meets International Organization for Legal Metrology

(OIML) standards.

The system on the Progressive barge was a turnkey installation led by Warren Garner and Tony Calamia of W&O, with Emerson completing the commissioning and certification. W&O, based in Jacksonville, Fla., is one of the world's largest suppliers of valves, pipe, fittings, engineered products, valve automation and data management systems for the marine and offshore industries.

"We are pleased to have been involved with this first installation of an OIML certified system in North America," said Warren Garner, Senior Outside Sales Representative for W&O. "Progressive Barge Line has the vision to see the benefits that the early adoption of the system brings to their operations and their bottom line. We look forward to bringing this advanced solution and its many benefits to more vessel owners and operators throughout the industry."

Westwego에 위치한 Progressive Barge Line, 남미 최초로 MID-인증 해양 벙커 측정 솔루션 활용

W&O와 에머슨 프로세스 매니지먼트는 Micro Motion® MID-인증 (Measurement Instrument Directive) 마린 벙커 측정 솔루션이 La, Port of New Orleans에서 Progressive Barge Line이

운영하는 바지선(barge)에 설치되었다고 발표했다. 이는 남미에서 최초로 진행된 것으로 27,000톤급 Progressive사의 바지선 PBL2402에 적용됐다.

Progressive Barge Line(PBL)는 New Orleans 항구의 벙커 공급과 터미널간 화물수송을 전문으로 하고 있다. PBL은 각 탱크 주변에 폐쇄 레일

(containment rails)을 지닌 11,000~30,000 배럴 범위의 이중 선체(double-skinned) 바지선 11척과, 1570~2400마력의 밀배(push boats) 5척을 소유 및 운영하고 있다.

PBL은 New Orleans 항구의 모든 벙커 수송의 약 25%를 처리하고 있다. PBL에 따르면, 에머슨의 벙커링 솔루션을 바지선에 설치하게 된 배경

은 보다 정확하고 인증된 방식의 연료 수송을 원하는 고객들의 요구 때문이다. 이 시스템에는 Micro Motion® ELITE® Coriolis 유량계, 해양 bunker 전송 패키지(Marine Bunker Transfer Package)를 갖춘 Series 3000 트랜스미터, 영수증을 출력할 수 있는 bunker 수송 티켓 프린터가 포함된다.

Progressive사 바지선의 시스템은 W&O의 Warren Garner 및 Tony Calamia에 의해 턴키식(turnkey) 설치가 이루어졌고, 에머슨이 시운전과 인증을 진행했다. W&O는 해양 및 연안 산업을 위한 밸브, 파이프, 부속품, 공학적 제품, 밸브 자동화 및 데이터 관리 시스템을 공급하고 있다. W&O의 관계자는 "우리는 남미에 OIML 인증 시

스템을 최초로 설치하는 작업에 참여하게 된 것을 기쁘게 생각한다."며, "PBL은 시스템의 초기 도입이 운용 및 최종 가격에 미칠 긍정적인 영향을 기대하고 있다. 이러한 고급 솔루션 및 그에 따른 이점을 업계의 더 많은 선박 소유자들과 작업자들에게 공급할 수 있게 되기를 희망한다."고 말했다.

STX Group at the forefront of diplomatic effort for natural resources during APEC Summit

STX Group Chairman Gang Deok-soo held successive meetings with Mechel Chairman Igor Zyuzin, Russia's former Deputy Prime Minister and Rosneft Chairman Igor Sechin, USC President Andrei Dyachkov, EN + Group Chairman Artem Volynets, etc., in the natural resource-rich Russia during the APEC CEO SUMMIT 2012, actively engaging himself in people-to-people diplomatic activities in the energy, shipbuilding and shipping sectors.

STX signed a MOU (Memorandum of Understanding) with Mechel enterprise for strategic cooperation on September 8 during the APEC CEO SUMMIT 2012 held in Russkiy island of Vladivostok. The signing ceremony was attended by STX Group Chairman Gang Deok-soo, Mechel Chairman Igor Zyuzin, and other related officials.

This MOU includes the cooperation on the supply of steel for shipbuilding, equipment for ports thermal coal, development of ports in Russia, and the long-term cooperation on the maritime transportation in the shipping sector. Having signed this MOU, STX will work in partnership with a key player in the power generation sector and is expected to be better positioned to expand its shipping and port business in Russia and Europe.

Mechel, one of the Russia's largest resource developers, has carried on the business in the fields of coal, steel and power generation, and is a global energy company which registered USD 12.5 billion in sales in 2011. STX Group Chairman Gang Deok-soo met with Russia's former Deputy Prime Minister and

Rosneft Chairman Igor Sechin and had an in-depth discussion on the cooperation for off-shore project, etc.

Rosneft Chairman Igor Sechin remarked in his meeting with STX Group Chairman Gang Deok-soo, "We have a plan for equipment production and STX will have ample opportunities to be involved in off-shore programs if it is

looking for a Russian partner who can produce 70% of all equipments in Russia."

Rosneft is actively proceeding with the oil and resource exploitation projects in the North Sea, Sakhalin and Kamchatka in the Far East, along with Exxon Mobil, Statoil, ENI, etc., and plans to place orders for offshore plants in the period ahead. Particularly, STX and Rosneft are moving to expand cooperation to the off-shore plant and crude oil product trading sectors. Mover, STX Group Chairman Gang Deok-soo held successive meetings with the chief executives of EN+, Russia's leading mining, metals and energy group, and United Shipbuilding Corporation, Russia's state-owned shipbuilding Group, and discussed on technical cooperation in the resources exploitation, energy transport, and offshore plant sectors.

STX is the only domestic company that received the ultra large-scale LNG carrier order

from Russia this year, and STX Offshore & Shipbuilding (STXOS) have won orders from Russian ship owners for the construction of 10 LNG carriers, including the optional vessels since 2011.

STX will strengthen its cooperation with the Russia's leading companies such as Rosneft, USC, etc., to win larger slice of the share in the Russia's LNG carrier market and advance into Russia's offshore-related markets.

An official from STX said, "We are delighted to sign a deal during the APEC event period to strengthen cooperative relationship with the leading companies of Russia, a country rich in natural resources. STX, the major Korean company that made headway into Russian market, will expand partnership in various fields including the coal, natural gas, natural resources, shipbuilding and shipping infrastructures."



STX and Mechel signed an MOU for strategic cooperation. The photo shows STX Group Chairman Gang Deok-soo and Mechel Chairman Igor Zyuzin from the left.

STX그룹, APEC서 자원 외교 적극 나서다

'APEC CEO SUMMIT 2012'에 참가한 강덕수 STX그룹 회장은 자원부국 러시아에서 이고르 쥬진(Igor Zyuzin) 메첼(Mechel) 회장, 러시아 전 부총리이자 로스네프트 회장인 이고르 세친(Igor Sechin), 안드레이 디아초코프(Andrei Dyachkov) USC 사장, 아르템 볼리네츠(Artem Volynets) EN+그룹 회장 등과 잇따라 회동하며 에너지·조선·해운 분야에서 민간 외교활동을 활발히 펼쳤다.

STX는 지난 9월 8일 러시아 블라디보스토크 루스키섬에서 열린 'APEC CEO SUMMIT 2012'에서 강덕수 STX그룹 회장, 이고르 쥬진(Igor Zyuzin) 메첼(Mechel) 회장 등 사업 관계자들이 참석한 가운데 STX-메첼 간 전략적 협력에 관한 양해각서(MOU)를 체결했다.

이번 MOU는 발전소용 연료탄 공급, 해운사업 분야 장기운송 협력, 선박용 강재 조달, 러시아 항만개발 및 항만기자재 공급 협력에 대한 내용을 포함하고 있다. STX는 이번 MOU를 통해 발전사업 분야에서 건설한 협력자를 확보하게 되었으며 러시아, 유럽 지역에서의 해운항만사업 확대에도

긍정적인 효과를 얻을 수 있을 것으로 전망하고 있다.

메첼(Mechel)은 러시아 최대의 자원개발기업 중 하나로서 석탄, 철강, 발전 분야의 사업을 영위하고 있으며 2011년 매출액이 125억불에 달하는 글로벌 에너지 기업이다. 한편 강덕수 STX그룹 회장은 러시아 전 부총리이자 로스네프트 회장인 이고르 세친(Igor Sechin)을 만나 해양프로젝트 협력 등에 대해 심도 있게 논의했다.

이고르 세친(Igor Sechin) 회장은 강덕수 회장과 만난 자리에서 "해양장비 건설에 대한 계획을 가지고 있으며, STX가 장비의 70%를 러시아에서 생산할 수 있는 러시아 파트너를 찾는다면 로스네프트의 해양 프로그램 참여에 많은 기회가 있을 것"이라는 입장을 밝혔다.

로스네프트는 엑손모빌(Exxon Mobil), 스타토일(Statoil), ENI 등과 함께 극동 지역의 사할린 및 캄차카, 북해 지역에서 석유 및 자원개발 사업을 활발히 진행하고 있으며, 향후 해양플랜트 발주를 계획하고 있다. 특히 STX와 로스네프트는 해양플랜트 사업 및 원유·석유제품 트레이딩 분야의 협력을 확대해 나갈 계획이다.

이밖에도 강덕수 회장은 러시아를 대표하는 광물 자원개발기업 이엔플러스(EN+)와, 러시아 국영 조선그룹 USC(United Shipbuilding Corporation)의 최고경영진과도 잇단 회동의 시간을 가지며 향후 자원개발, 에너지 운송, 해양플랜트 기술협력 등에 대한 협력관계 구축에 대해 논의했다.

STX는 올해 국내업계에서는 유일하게 러시아로부터 초대형 LNG를 수주했으며, STX조선해양은 2011년 이후 러시아 선주로부터 옵션 포함 총 10척의 LNG선을 수주하는 성과를 거뒀다. STX는 로스네프트와 USC 등 러시아 대표 기업들과의 협력 강화를 통해 러시아 LNG선 시장을 선점하는데 이어 해양 분야의 진출도 확대해 나갈 수 있을 것으로 기대하고 있다.

STX 관계자는 "APEC 기간 동안 자원 강국 러시아를 대표하는 기업들과 협력 관계를 강화하는 성과를 거둬 만족한다"면서 "앞으로 러시아에 진출한 대표적인 한국 기업으로서 석탄과 천연가스를 비롯한 자원, 조선해운 인프라 등 다양한 분야에서 파트너십을 확대할 것"이라고 밝혔다.

**Korea MS and DSME signed an MOU for collaboration on developing the smart ship**

Korea MS and Daewoo Shipbuilding & Marine Engineering (DSME) joined forces to build the world's best cutting-edge integrated platform for the shipbuilding industry, converging the world-leading information technology. Both companies signed a MOU(Memorandum of Understanding) at the headquarters of Korea MS located in Daechi-dong on August 27 to collaborate on developing the smart ship platform, the core part of shipbuilding-IT convergence, and agreed to jointly develop the architecture, service scenario/roadmap, platform and application.

As a result, Korea MS and DSME will build on-board performance monitoring/early warning system, on-board IP-based integrated messaging system, and global integrated remote control center that controls the ship-board equipment and remotely controls the

operations. Both companies will work closely together for such systems built on the global cloud infrastructure.

Korea MS will build the real-time communication and collaboration platform to create the smart ship platform, such as the link and share point, including the real-time performance monitoring solution and dash board platform. At the same time, both companies will integrate the Windows Azure which is the public cloud to support the transmission of the data related to the equipment diagnosis and operation of ships that call at ports or are in service worldwide.

DSME has independently forged ahead with the research into the smart ship platform for several years to make inroads into the market for high value-added vessels and construct the cutting-edge vessels based on the convergence of the shipbuilding technology and

IT. DSME plans to provide the application services to the existing ship owners and ship operation companies, including the real-time monitoring of shipboard equipment, control of ship operations, and global ship maintenance/repair services.

An official from DSME said, "Korea has cemented its status as the world's leading shipbuilding country, carving out over 35% share in the global shipbuilding market, since 2000. However, domestic shipyards have been closely trailed by Chinese rivals which have the advantage of price competitiveness based on cheap labor costs and enjoy the support of the Chinese government that aims to help Chinese shipbuilders overtake Korea to become the world's top shipbuilding country. Having signed this MOU for the collaboration on developing the smart ship platform, DSME will fully leverage this unique conver-

gence of state-of-art information technology to solidify the nation's leading position in the global shipbuilding market.”

An official from Korea MS said, “I am delighted that the latest communication solutions and cloud platform of MS will play a key part in helping shipbuilding industry evolve to the cutting-edge level. We will exert our best effort

to ensure effective convergence of MS's leading technology with various industries to help sharpen the global competitiveness.”

한국MS-DSME, 스마트 ship 개발협력을 위한 양해각서 체결

한국MS와 대우조선해양(DSME)이 글로벌 IT 선도 기술을 통한 세계 최고 수준의 첨단 조선산업 플랫폼 구축을 위해 힘을 모았다. 지난 8월 27일 양사는 대치동 한국MS 본사에서 조선-IT 융합의 핵심인 '스마트 ship(Smart Ship)' 플랫폼 개발 협력을 위한 양해각서를 체결하고 해당 기술에 대한 아키텍처 및 서비스 시나리오/로드맵, 플랫폼 및 어플리케이션을 공동 개발하기로 했다.

한국MS-DSME는 이에 따라 선박 내 성능감시 및 조기경보 시스템, 선박내 IP 기반 통합 메시징 시스템 구축, 선박 설비 및 운항 원격 관제를 제공하는 글로벌 통합 원격 관제센터를 구축하고 이를 글로벌 클라우드 인프라를 통해 구현하도록 실질적인 협력을 추진할 예정이다.

한국MS는 스마트 ship 플랫폼 구축을 위해 링크, 세어포인트와 같은 실시간 커뮤니케이션 및 협업 플랫폼, 실시간 성능감시 및 모니터 솔루션과 대

시보드 플랫폼을 구축한다. 동시에 전 세계를 운항 혹은 기항 중인 선박의 운항/설비 진단 데이터 전송을 지원하는 퍼블릭클라우드 플랫폼인 윈도우 애저 등을 통합 제공한다.

DSME는 고부가가치 선박으로의 확장과 조선-IT 융합을 통한 첨단화를 위해 이미 수년 전부터 독자적인 스마트 ship 플랫폼에 대한 연구를 진행해 왔다. DSME는 이번 한국MS와의 협력에 힘입어 향후 기존 선주사, 선박 운용사를 대상으로 한 실시간 선박설비, 운항관제 원격 모니터링 부가 서비스 제공, 글로벌 선박 유지 보수 서비스 등의 응용 서비스를 제공할 예정이다.

DSME 관계자는 “우리나라는 2000년 이후 세계 조선시장의 35% 이상의 점유로 조선 선도국의 위상을 떨치고 있지만 중국이 2015년까지 조선산업 전반에서 한국을 추월한다는 목표를 세우고



The photo shows Min Seong-won, Managing Director of Korea MS, supervising the corporate customer division, and Lee Seong-geun, chief of the DSME's design division (fourth from the left).

값싼 노동력에 기반한 원가 경쟁력, 국적선 수주 지원 등으로 거세게 추격을 하고 있다”며 “이번 MS와의 개발 협력은 차별화된 첨단 IT 기술의 융합으로 글로벌 시장에서 국내 조선산업의 선도적인 입지를 굳힐 수 있는 계기가 될 것”이라고 말했다.

한국MS 관계자는 “MS의 최신 커뮤니케이션 솔루션 및 클라우드 플랫폼을 통해 첨단 조선 산업 구축에 이바지할 수 있어 기쁘다”며 “앞으로도 MS의 선도적인 IT기술이 다양한 산업 분야와 만나 글로벌 경쟁력을 갖출 수 있는 핵심 기호로 활용될 수 있도록 최선의 노력을 다할 것”이라고 말했다.

Hull design boosts fuel economy of ultra large container ships

A collaboration involving APL, Hyundai Heavy Industries and DNV has resulted in a hull design that will make APL's 10 new ultra large container ships some 20 per cent more fuel efficient per TEU compared with existing designs.

The design has been optimized for an operating profile along the Far East to Europe trade route involving nine speed and draught combinations. The installed propulsive power could be reduced by about 16 per cent compared to the initial hullform optimized for one draft & speed condition. The first of the new 13,800 TEU ships is under construction at Hyundai Heavy Industries (HHI) and will be

delivered next year. The resulting fuel savings will be worth about 3 million USD per ship per year to APL. “In the current challenging market environment it is extremely important for APL to introduce efficient and flexible container ships, which help us to reduce slot costs. These ships will be the most fuel-efficient ships ever built to the Asia-Europe container trade,” said Cedric Foo, Group Deputy President and CFO of APL's mother company NOL. “APL has decided to advance the delivery of the newbuildings, which have been ordered in 2011 using their superior fuel efficiency to make a contribution

to cutting emissions as soon as possible.” Traditionally container ships spend much of their time operating at ‘off-design’ conditions which increase hull resistance and reduce propeller and engine efficiency. In this case, the ships will operate at speeds typically ranging from 15 to 19.5 knots but with a maximum speed of about 23 knots. With the aid of sophisticated software and virtual sea trials, the three partners were able to analyse the proposed trading pattern of the ships and optimise accordingly. “This is a new way of cooperation between the partners in a newbuilding project,” said

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Gyung-Jin Ha, Executive Vice President of the Basic Design Office in the Shipbuilding Division of HHI. "Due to a concentrated and professional effort from all three parties within their respective roles we managed not only to keep the tight design schedule, but also to unlock an amazing potential for fuel savings,"

"For design optimization an innovative methodology has been deployed. Ideas and further innovation have been made more specific based on the DNV Quantum concept launched in 2010. We are pleased to see that this is utilized by HHI and APL for real designs now," said Tor Svensen, President DNV

Maritime and Oil & Gas. "This is the way of the future. Financial and environmental performance demands more sophistication, and DNV is ready with the technology, the people and the enthusiasm to ensure that shipowners get the best results possible."



Italy's Fincantieri confirms its decision to acquire a stake in STX OSV

Fincantieri, Italy's state-owned shipyard, will be the only company to acquire a majority stake in STX OSV, paying SGD 1.5 per share for the 51.75% stake owned by STX Group. The sale will go for approximately KRW 900 billion. Early this year, Italian shipyard Fincantieri and the U.S.-based Carlyle Consortium were selected as the preference negotiator of STX OSV.

STX Group and Fincantieri are expected to sign a MOU(Memorandum of Understanding) for the sale of STX OSV and enter into the SPA(Share Purchase Agreement) at the end of this month at the earliest or in September at the latest.

Meanwhile, STX OSV has achieved unrivalled performance in the market for the supply vessels and special purpose vessels such as

the offshore support vessels, platform supply vessels, and AHTS(anchor handling tug vessels) that transports and fixes the platform for oilfield development, etc., as the offshore energy exploitation activities gather momentum.

According to the related industry, the appraised equity value and market value of STX OSV are estimated at USD 800 million and USD 2 billion, respectively.



Nexans concludes its acquisition of the power cable business of Shandong Yanggu Cables Group in China

Nexans announced today its acquisition of a 75% stake in the Shandong Yanggu New Rihui joint-venture, alongside its historical shareholder.

This acquisition gives Nexans a strategic footprint in the rapidly growing Chinese Energy Infrastructure market. The transaction values the business (100% basis) at approximately

1,240 million RMB (approximately 156 million euros) on an Enterprise Value basis.

넥상스, 중국 산둥 양구 케이블 그룹의 전력선 사업 인수 마무리

넥상스는 산둥 양구 뉴 리휘 합작 투자 회사의 75%의 지분 인수를 마무리 했다고 발표했다.

나머지 지분은 산둥 양구 전력 전선 회사의 원래 주주가 그대로 소유 하게 된다.

이번 인수로 빠르게 발전하고 있는 중국의 전력 인프라 시장에서 넥상스가 전략적인 발판을 마련

하게 된다. 인수 금액은 기업 가치를 기준으로 약 12억4000만 위안(약 1억 5600만 유로)이다.



Rockwell Automation Korea presents the oil & gas automation solution

Rockwell Automation Korea announced that it would hold the 'Rockwell Automation on Tour 2012' Oil & Gas Road Show at Ulsan Lotte Hotel on October 18 for the customers in the oil and gas industry.

This road show will revolve around the theme,

"Automation Solution for Oil & Gas Optimization" and showcase Rockwell Automation's comprehensive automation capabilities related to the oil and gas applications such as the petrochemical and offshore, etc.

Rockwell Automation plans to unveil the DCS solution for the optimization of overall process, motor control solution for low/high pressure inverter, soft starter, etc., and process safety solution that can satisfy TMR (Triple Modular Redundancy) and SIL3.

In addition, Rockwell Automation will present the software-based CEM(Continuous

Emissions Monitoring) system for measuring and monitoring the NOx , CO, CO₂, green-

house emissions and other gas emissions.

로크웰 오토메이션 코리아, 오일&가스 자동화 솔루션 제안

로크웰 오토메이션 코리아는 오는 10월 18일 울산 롯데호텔에서 오일&가스 산업 고객을 대상으로 'Rockwell Automation on Tour 2012' 오일 & 가스 로드쇼를 개최한다고 밝혔다. 특히 이번 로드쇼에서는 "오일 & 가스 최적화를 위한 자동

화 솔루션"을 주제로 석유화학, Offshore 등 오일 & 가스 어플리케이션에 대한 로크웰 오토메이션의 포괄적인 자동화 역량을 고객에게 소개한다. 로크웰 오토메이션은 공정 전반의 최적화를 위한 DCS 솔루션, 저압 및 고압 인버터, 소프트 스타터 등의 모터 제어 솔루션 및 SIL3와 TMR(Triple Modular Redundancy)을 만족하는 프로세스 세

이프티 솔루션을 선보일 예정이다. 아울러 NOx, CO, CO₂, 온실가스 및 기타 배출 가스 측정 및 모니터링을 위한 Software 기반의 CEM (Continuous Emissions Monitoring) 시스템도 소개한다.



KOMERI signed MOU with SMERI and JSTRA to promote cooperation on international standardization

Korea Marine Equipment Research Institute (KOMERI) signed a MOU(Memorandum of Understanding) with Japan Ship Technology Research Association (JSTRA) and Shanghai Marine Equipment Research Institute (SMERI) in Shanghai, China, on September 7 to promote cooperation among Korea, China, and Japan on the standardization.

The signing ceremony, held in Shanghai, China, was attended by the representatives from the concerned organizations of each country and related officials, who acknowledged the importance of the MOU and put forth the measures that could help promote cooperation on the international standards for shipbuilding and offshore industries.

In the general meeting of the ISO/TC8 (shipbuilding and offshore technology sector) held in Korea in 2010, KOMERI signed an agreement for the cooperation among the 3 countries with regard to the standardization. This

MOU came after a series of discussions among working-level officials.

These 3 organizations of Korea, China, and Japan agreed to work together in various fields, including the formation of consultative body related to international standards for shipbuilding and offshore industries, joint research for developing international standards, etc.

KOMERI has been seeking cooperation for the development and dissemination of international standards related to shipbuilding and offshore industries, and plans to ensure continued cooperation among the 3 countries for international standardization which is the cen-



An MOU was signed to promote cooperation among Korea, China, and Japan on international standardization for shipbuilding and offshore industries

terpiece of this MOU.

Kim Gi-jeong, President of KOMERI, said, "This MOU will lead to stronger technological competitiveness with respect to the international standardization and lays the cornerstone for making headway in foreign markets."

KOMERI-SMERI-JSTRA 국제표준화 협력 MOU 체결

한국조선해양기자재연구원(KOMERI)은 지난 7일 중국상해에서 일본선박연구조합(JSTRA), 중국상해조선기자재연구원(SMERI)과 표준화 협력활동을 위한 한·중·일 상호협력 양해각서를 체결했다.

중국 상해에서 열린 이날 협약식에는 각국 기관 대표를 포함한 관계자들이 참석하여 상호 협정체결의 중요성을 인식하고, 향후 조선해양분야 국제

표준화 협력 및 발전을 위한 방안을 제시했다. KOMERI는 지난 2010년 한국에서 개최된 ISO/TC8(조선해양기술분야) 총회에서 한·중·일 표준협력을 위한 상호협력 체결을 제안했으며, 이후 각국 실무자 논의 끝에 이번 MOU가 이루어 졌다고 전했다.

한·중·일 3개 기관은 이번 협약 체결을 통해 조선해양 관련 국제표준을 위한 협의체 구성, 정보교환, 국제표준 개발 공동 연구수행 등 다양한

분야에서 서로 협력해 나가기로 했다. 현재 한국조선해양기자재연구원은 조선해양관련 표준 보급 확산과 국제표준화를 위한 협력을 추진 중에 있으며, 이번 협약 체결을 계기로 향후 한·중·일 국제표준화 협력 창구로 활용하여 전략적 협력을 추진해 나갈 예정이다.

한국조선해양기자재연구원 김기정 원장은 "국제표준화 기술경쟁력 제고 및 해외진출 확대를 위한 교두보가 마련될 것으로 기대된다."라고 말했다.

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Current marine and offshore equipment industry of Korea

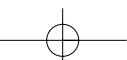
- Increased focus on offshore plant and LNG market



Domestic equipment manufacturers are facing increased difficulties amid the decline in new orders due to the low price competition from Chinese shipyards. To shake off these difficulties, domestic equipment manufacturers are expanding their business to the high value-added sectors such as the offshore plant, LNG carriers, etc.

However, domestic equipment manufacturers are often frustrated by high technological barrier of entry to these high value-added sectors which have been dominated by the global marine/offshore equipment manufacturers of Japan and Europe. Thus, it is urgent to increase the localization rate of marine/offshore equipment and add fuel to the growth of equipment manufacturing industry, thereby ramping up the competitiveness of domestic shipbuilding industry.

Fortunately, the 3 domestic shipbuilding heavyweights have seen a steady growth in new orders for offshore plant and high value-added vessels, and some domestic equipment manufacturers have made great strides in the offshore plant and LNG sectors.





By STX Offshore & Shipbuilding

Korea became the world's largest offshore plant building country in the previous year, registering USD 25.7 billion in new orders for offshore plants, on the back of rapid growth of the market for the offshore plants - which are used for the offshore oil and gas exploration, drilling, and production - in the wake of the rising demand for energy worldwide and sustained high oil prices. However, Korea has heavy reliance on foreign-made engineering and essential equipment and therefore over 50% of the revenue from the shipbuilding contracts is drained away to foreign countries.

Domestic marine/offshore equipment manufacturers (1,100 firms nationwide) are seeking to diversify their business portfolio in an attempt to tide over the difficulties arising from the downturn in the shipbuilding market due to the decline in the number of ordinary commercial vessels which mirrors the strong growth in new orders for offshore plants. Under those circumstances, the government needs to provide support at the policy level.

In the 121th Emergency Economic Measures Committee presided over by the President, the government proposed the measures to foster the offshore plant industry. Specifically, the government plans to increase investment outlay for the offshore plant industry, raise the ratio of domestic engineering, equipment production, etc., from current 40% to over 60% by 2020, and help increase new order intake by more than threefold to USD 80 billion.

Table 1. Major marine equipment manufacturers

Marine equipment	No. of manufacturers
Internal combustion engine	3
Auxiliary engine	48
Piping facility	21
Mooring system	11
Navigation device	9
Accommodation facility	16
Life saving and fire safety facility	6
Other fittings	17
Electric/electronic devices	29
Others	10
Total	170

(Source: Korea Marine Equipment Association)

According to the data published by Korea Marine Equipment Association (KOMEA), the number of major marine/offshore equipment manufacturers registered with the KOMEA stands at about 170 as of 2010, including the equipment manufacturers specializing in the pipe facilities, auxiliary engines, navigation apparatus, accommodation facilities, electric/electronic devices, etc. The combined sales revenue of those manufacturers in the shipbuilding sector is projected to be approximately KRW 14 trillion. Small and medium-sized equipment manufacturers - which supply the parts, equipment, materials, etc., to large shipyards - are advancing into the offshore plant sector,



Feature Story

a blue ocean which the shipbuilding industry is poised to unlock. The industry experts predict that the equipment manufacturers will speed up their entry to the offshore plant market.

High barrier for the entry to offshore plant market

Hundreds of Chinese shipyards, which have made large investment in shipbuilding sector over the last few years, are currently finding themselves in dire financial straits. Particularly, Chinese shipyards that have focused on the construction of commercial vessels are in even deeper financial troubles because new orders for all types of vessels, except for LNG carriers and offshore plant, plunged to less than half of the previous year's total.

Domestic shipyards are also affected. Wartsila Accommodation System Korea, a marine equipment manufacturer based in South Gyeongsang Province, recently went bankrupt, heightening the sense of crisis in domestic shipbuilding industry.

Domestic marine equipment manufacturers are making transition to the high value-added sectors such as the offshore plant, LNG carriers, etc. However, their entry to the market is hindered by high barrier although the 3 domestic shipbuilding heavyweights are almost sweeping the shipbuilding orders.

The technological barrier is very high as the safety is a very important issue for the offshore plants which are usually built in limited space unlike onshore plants. Thus, the offshore plant sector has been overwhelmingly dominated by the leading marine equipment manufacturers of Europe. In this situation, domestic marine equipment manufacturers are focusing on technology development and intensifying their marketing drive to successfully enter the offshore plant or LNG carrier market which has high barriers to entry.

Domestic marine equipment industry has achieved 90%

localization ratio for the equipment and materials used in the ordinary commercial vessels such as bulk carrier, tanker, containership, etc.

By contrast, the localization ratio of offshore plant equipment and materials has remained as low as 20%, except for the fittings which are supplied by most domestic equipment manufacturers due to the advantage in terms of the space.

Domestic marine equipment sector worth USD 4.4 billion

Last year, domestic shipyards received new orders for offshore plants worth a combined USD 25.7 billion. Offshore plants comprised 80% of new orders placed at the nation's 4 shipbuilding heavyweights in the first half of this year, which implies that the offshore plant sector has bright prospects for growth. Domestic shipyards are expected to win approximately USD 45 billion in new orders for offshore plants this year, a 30% increase compared to the previous year.

The offshore plant industry is considered a new growth engine that will supersede the traditional growth engine such as the shipbuilding industry currently mired in doldrums as the new orders in the existing ship sector are falling. However, it is widely acknowledged that the top priority is raising the localization ratio as the nation has heavy reliance on the essential equipment/materials and components manufactured abroad. The offshore plant industry estimates that the market for the equipment and materials is worth approximately 4.4 billion, except for the bulk materials (structural materials, pipes etc) Thus, large portion of the market has been captured by overseas equipment manufacturers thus far.

According to industrial sources, nearly all essential materials and manpower necessary for the construction of drillship, a high value-added vessel, are sourced from abroad. Ships are built at shipyards, but overseas manufacturers have the dominance in essential technologies and high value-added materials. Thus, the government needs to provide more supporting role in helping marine equipment manufacturers stand on their own feet.

LNG and offshore plant in spotlight this year

Manufacturers of essential equipment, such as Hankuk Carbon, etc., came into limelight amid the increasing domestic orderbook for offshore plant and LNG carrier. Hankuk Carbon, which manufactures the ultra low temperature insula-

Table 2. Korean shipyards' order intake of LNG carriers

Year	Status
2011	41 vessels out of 48 units
2010	4 vessels out of 5 units
2009	2 vessels out of 2 units
2008	4 vessels out of 5 units
2007	19 vessels out of 21 units

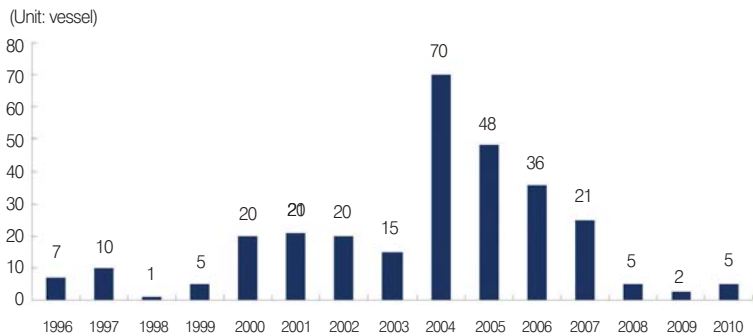


Figure 1. Annual trends of LNG carrier orders (Source: Clarksons)

tion panel for cargo containment system of LNG carrier, has established itself as unrivalled leader in this market. Particularly, LNG cargo tank is divided into MarK-III type and GT No.96 type, depending on the major raw materials. Among domestic shipyards, Samsung Heavy Industries (SHI) and Hyundai Heavy Industries (HHI) adopted the MarK-III type LNG cargo tank.

According to industry sources, Chinese shipyards have recently stepped up effort to win LNG carrier orders in an attempt to break through the serious slump in new orders for ordinary commercial vessels. However, Chinese shipyards are said to be unable to build a LNG carrier of MarK-III type with the insulation panels made from polyurethane. The most direct reason is that China has yet to build up the industrial infrastructure necessary for the production of MarK-III type. The domestic market for thermal insulation materials used in LNG carrier is projected to be worth approximately USD 420 billion this year.

An official from Hankuk Carbon implied that the global shipbuilding/offshore markets are unlikely to show sign of rebound in the short term. However, the market for LNG carriers and offshore plant is expected to show steady growth amid a boom in the oil and gas development. In particular, LNG carrier market is expected to witness rapid growth as the shale gas development in the United States gathers momentum.

Meanwhile, domestic shipyards built 70 LNG carriers out of the 80 units which have been ordered worldwide over the last 5 years. So far, domestic shipbuilding heavyweights have made a clean sweep of the LNG carrier orders placed around the globe as they have the leading technology and offer the custom design tailored to the needs of ship owners. This year, domestic shipbuilding heavyweights swept the

orders for 14 LNG carriers out of 16 units which were placed until July. To keep up with the swelling orderbook for offshore plant, the 3 major domestic shipyards are said to contract out specific quantity to manufacturers, as well as their current vendors. Some domestic medium-sized equipment manufacturers have already advanced into the offshore plant module sector and participate in large-scale offshore projects. Samkang M&T is one of such manufacturers. It has been involved in many projects, and in the process, has built up the experience and

secured related equipment technology.

Moreover, many equipment manufacturers equipped with excellent technology have seen their business thrive in some offshore equipment sectors, such as the fittings, flameproof lighting fixture, fire hydrant which are essential for offshore plants. The shipbuilding industry speculates that the manufacturers of essential marine equipment will show even stronger performance in the second half of this year or in the first half of the following year as the equipment orders are placed after shipyards complete the detailed design work.

Hankuk Carbon

- Ultra low temperature insulation panel for LNG carriers

Hankuk Carbon, a manufacturer of ultra low temperature insulation panel for LNG carrier cargo containment system, specializes in the manufacture and supply of the insulation panel for LNG carrier cargo tank.

Specifically, Hankuk Carbon directly manufacturers the



Figure 2. R-PUF(Reinforced Polyurethane Foam)



Feature Story

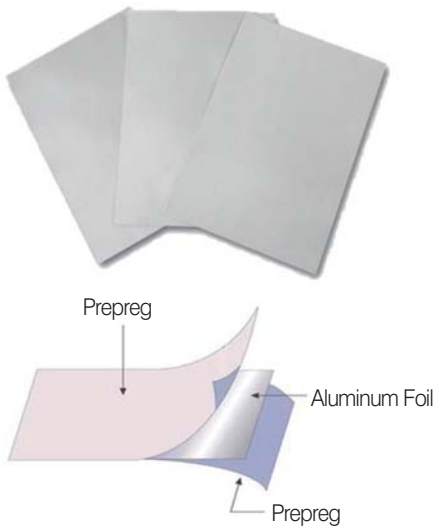


Figure 3. GTT MARK III TYPE, Rigid Secondary Barrier (RSB)

RPF(Reinforced Polyurethane Foam) which is the essential material for the insulation panel and 2 types of secondary barriers(Flexible Secondary Barrier & Rigid Secondary Barrier - LNG MARK III Type). The company has a track record of successfully supplying GTT LNG MarkIII type/CS-1 type IP materials, and IP materials for IHI onshore tank.

In addition, Hankuk Carbon is exporting the insulation materials for onshore storage tank, as well as the insulation materials for LNG carriers. The company is also exporting the insulation materials for TL-22 250K LNG storage tank currently being built in Japan's IHI. Moreover, Hankuk Carbon is supplying the mock-up to GST System currently under development by GTT.

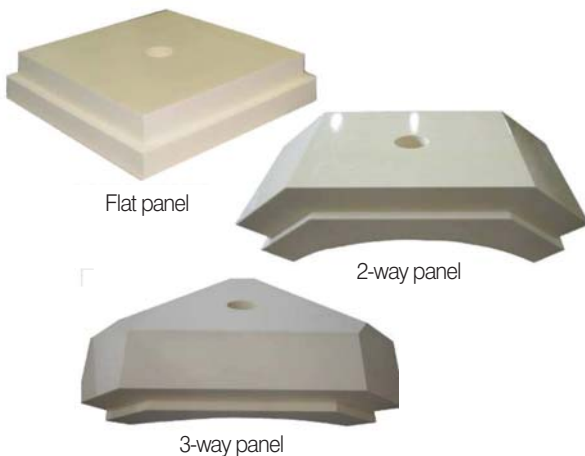
A leader in the market with advanced technology

R-PUF (Reinforced Polyurethane Foam), the key product of Hankuk Carbon, is the essential material for the insulation panel that maintains the temperatures of LNG at the extremely low level of -163°C . Hankuk Carbon is well recognized for the excellent quality and productivity as it directly manufactures CSM (Continuous Strand Mat), the essential material for glass fiber R-PUF.

The primary issue for LNG carrier is to develop the product that provides the highest insulation performance to reduce BOR (Boil Off Rate) of LNG. Hankuk Carbon became the first company that received the GTT (France) approval for the low BOR product. With relentless R&D efforts, Hankuk Carbon recently obtained the approval of its polyurethane foams



Figure 4. Independent tank type - SPB TYPE: MOCK-UP



made with different blowing agents.

The standard BOR for the existing LNG carrier was 0.15%/day (insulation panel thickness of 270mm), while the standard BOR for current LNG carriers is 0.1%/day (insulation panel thickness of 400mm). Hankuk Carbon increased the thickness of insulation material to enhance current BOR, but will use the blowing agent for low BOR to achieve more insulation performance with the same thickness.

Hankuk Carbon is the only domestic company producing the RSB (Rigid Secondary Barrier), one of the materials for the secondary barrier of GTT MARK III type, and currently manufacturing and supplying the RSB to many countries worldwide. In addition, Hankuk Carbon is producing the FSB (Flexible Secondary Barrier), one of the materials for the secondary barrier of GTT MARK III type. This FSB received the approval and is being applied to real projects.



Figure 5. GTT MARK III TYPE, Flexible Secondary Barrier (FSB)

Evolving into a total supplier of LNG insulation materials

Hankuk Carbon is equipped with one-stop manufacturing system for the production ranging from raw materials to finished products. Particularly, the company's research center plays a key role in developing new products and improving the product performance.

As the current LNG insulation materials need to meet various requirements of customers, Hankuk Carbon is expected to target the market with its specialized products for each LNG project. This year, Hankuk Carbon plans to achieve a successful track record in supplying the thermal insulation materials for LNG pipes and evolve into the primary supplier of all products in the LNG insulation material sector. For that, Hankuk Carbon equipped itself with the facilities necessary to produce the materials for LNG pipes and is actively targeting the market.

An official from Hankuk Carbon said, "We currently supply the insulation materials for the GTT MARK III, and anticipate that we will be able to supply the insulation materials for the GTT

NO96 type that will be built by Hyundai Heavy Industries and STX. Unavoidably, R-PUF will be applied to the NO96 type to match the BOR performance of current MARK III type." He added, "Hankuk Carbon is the only domestic company that received the approval of HFC-245fa foam which will be applied to the NO96 type. We will obtain GT approval for various products as part of effort to maintain our leading position in the changing market."

Particularly, Hankuk Carbon is involved in the system development project of domestic shipyards with an aim to secure the essential technology for LNG carriers. Currently, the company is participating in the project related to the insulation material and secondary barrier of SCA, the independent model for Samsung Heavy Industries (SHI)'s membrane type LNG cargo tank which was unveiled in September, and the project related to the mock-up insulation material being development by Hyundai Heavy Industries (HHI). Thus, Hankuk Carbon is expected to secure competitiveness while supplying the insulation materials for LNG carriers built with domestic technology.

Moreover, Hankuk Carbon is proceeding with the test in relation to the supply of insulation materials used in onshore tanks that will be built by Japan's Kawasaki Heavy Industries, in addition to the GST (Ground Storage Tank) and NO96 New Type mock-up which is currently being built by France's GTT. Furthermore, Hankuk Carbon is moving ahead with additional development of Mark III Type FSB which the company is supplying solely in Korea. Hankuk Carbon plans to focus on R&D to develop the next-generation FSB with its own technology and become the exclusive supplier of the FSB in the global market.

Figure 6. GTT certification for the R-PU foam (based on blowing agent and thickness of product)

Type		HCFC-141B	100% Water	HFC-245fa	HFC-365mfc
110kg/m ³	180mm 5CSM	-	-	Progress	-
	160mm 5CSM	Completed	Completed	Completed	Completed
130kg/m ³	180mm 6CSM	Completed	Completed	Completed	Completed
	200mm 7CSM/6CSM	-	Completed	Completed	-
	290mm 9CSM/10CSM	Completed	Progress (October)	Progress (December)	-
170kg/m ³	130mm 5CSM	-	Progress	-	-
210kg/m ³	130mm 8CSM	-	Completed	-	-
	160mm 8CSM	-	-	Progress	-
250kg/m ³	130mm 9CSM	-	Progress	-	-



Samkang M&T

- Offshore plant module, a new growth driver

Samkang M&T has achieved steady growth in the offshore plant module sector, following its entry to the market for the ship block, since it launched the thick wall steel pipe business. In 2008, the company renamed itself to 'Samkang M&T' (Marine & Tubular), embarking on full-scale efforts to expand its marine and offshore business.

Samkang M&T expanded its factory in South Gyeongsang Province to bolster its business in the marine and offshore sector, and was registered as the supplier of offshore plant equipment and materials to the global companies such as Technip, Aker Solution, Saipem, after 2010, thus paving the way to achieve its goal to evolve into a supplier of the module for offshore plant.

Samkang M&T has the manufacturing plants in Goseong and Milyang. The Milyang manufacturing plant produces the thick wall steel pipe with a thickness of 8 to 100 mm and the

length of up to 18m, using the PRESS method. The Goseong manufacturing plant produces the ship block and thick wall steel pipe with the thickness of 8 to 150mm and length of up to 5m, using the Roll Bender method.

The key driver for Samkang M&T's fast growth in the offshore plant module sector is the company's experience in the production of thick wall steel pipe and ship block which Samkang M&T focused on in the incipient stage of its business. Samkang M&T currently focuses on the production of small module, the so-called 'skid package', among the marine equipment and materials. For that, Samkang M&T has worked closely with global companies such as GPS, PROSERNAT, Arker Process, etc., to sharpen its competitiveness and participated in multiple bidding for the supply of materials and equipment for offshore plants.



Project Name: OFON 2 T&I
 Client: Technip
 Project Description: Substructure & Grillage for Load out of OFON 2 Topside
 Construction Scope: Sub-structure & Grillage Modification, Refurbishment

Localization of offshore plant modules

The thick wall steel pipe is mainly used for the offshore plant module. Samkang M&T is considered to have strong competitiveness in the market as the company has secured both production and processing technologies by building up the experience in the assembly and production of ship block

The skid package which Samkang M&T focuses on is one of the essential materials that the 3 domestic shipbuilding heavyweights are using to build offshore plants. The industry sources indicate that problems are very likely to result from the huge transport costs, uncertainty over delivery, etc., if the skid packages are imported. They also pointed out that only





Figure 7. View of Samkang M&T's headquarters

a handful of domestic companies succeeded in the localization although they are considered to have stronger competitiveness compared to overseas companies.

In relation to the skin page, Samkang M&T is focusing on TEG Regeneration Package, Water Treatment Package,

Core Activities

Offshore Plant

- Oil & Gas Production Facilities
 - Jackets and Topsides for Platform
 - Deck Module sub-structure for FPSO & TLP
 - SKID Package
 - Bridge & Flare Boom Structures
 - PLEMS and Subsea Structures
- Wind Farm Foundation Structures
 - Jackets and Piles
 - Tripod Structures
 - Mono-piles and Transition Pieces

Shipbuilding

- Curved Block, T-BHD Block.
- Fore Hawse, Bulbous Block.
- Mega Block, E/Casing, Deck House
- Crane Barge, Accommodation Barge, Multi Purpose vessel.



Project Name: Jeju Offshore Wind Tower
 Client: KOSPO (Korea)
 Weight: 227 Ton
 Dimension: 17m(L)x17m(B)x37.6m(H)
 Delivery: 2012.06.27

Chemical Injection Package, etc. As part of such effort, Samkang M&T already reached an agreement with the suppliers - which were approved by the oil majors - for the technical cooperation and is proceeding with the joint bidding, etc. Samkang M&T has the ultimate goal of securing the independent technology for major products and achieving the competitiveness through differentiated capabilities both in Korea and abroad. ⚓

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Intergraph's engineering automation solution makes a clean sweep in the offshore plant market

Intergraph's SmartMarine & SmartPlant have gained widespread reputation in the offshore plant market. It is the key engineering SW solution of Intergraph which has amassed extensive experience in the plant sector. Intergraph is working in partnership with global offshore owners and offshore plant-related companies, as well as domestic shipbuilding heavyweights, to further expand its market.

'Intergraph 2012 Korea', organized by the PP&M (Process, Power & Marine) division of Intergraph, was held on September 4. This event drew the representatives of major domestic shipyards, offshore plant and construction industries such as Hyundai Heavy Industries (HHI), Doosan Heavy Industries & Construction (DHIC), SK Engineering & Construction (SK E&C), etc., and provided a platform for gaining insight into the latest trends of technology and exchanging the information.

Franz Kufner, Senior Vice President/Intergraph Asia-Pacific PP&M, who attended the Intergraph 2012 Korea, said, "Korea is the world's largest ship-

building country and has many excellent engineering companies. So, Korea is a very important market and we will make unsparing effort and provide full support to enable proven productivity gains, increasing the engineering efficiency and design productivity.

In April, Intergraph opened the Global Offshore Center in Busan. This Global Offshore Center provides technical support to major domestic shipyards and engineering companies, including Samsung Heavy Industries (SHI), and serves the role of R&D center that helps expand the technological capabilities related to the offshore plants.

Integrated engineering SW solution

SmartMarine Enterprise and SmartPlant Enterprise, the engineering software development tools of Intergraph, are the solutions indispensable for the design works in the shipbuilding and offshore sectors. This SW solution encompasses all solutions, including Engineering, Schematics, 3D modeling, and Analysis, which are necessary for the design of offshore plant such as FPSO, drillship, etc. Intergraph makes unrelenting efforts to secure technological competitiveness in the offshore plant market which has grabbed attention in the global energy market. Particularly, SmartPlant Foundation



Franz Kufner Senior Vice President, Intergraph Asia-Pacific PP&M

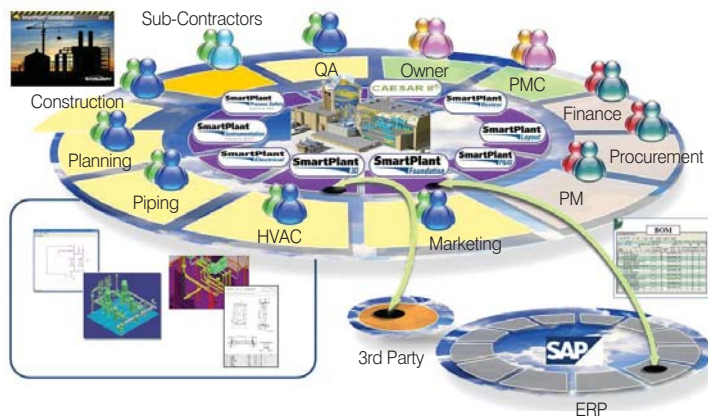


Figure 1. Intergraph's solution map in projects



Stephen Furze, Sr. Vice President, Intergraph Industry Solutions

enables the integrated management of engineering data to enhance the efficiency in each design phase and increase overall productivity.

Stephen Furze, Senior Vice President/Intergraph Industry Solutions, said, "We have successfully carried out various projects over the last several years. SmartMarine Enterprise and SmartPlant Enterprise, our key products, integrate various solutions for each development phase to increase the productivity and efficiency when the design works are carried out for the ships, offshore facilities and plants. They are comprehensive engineering development tools for the entire levels.

Wide-ranging marine & plant products

Intergraph's products can be largely divided into 5 categories. Smartplant Foundation and Smartplant Basic Integrator are the platform that integrates all those product categories. This engineering platform includes various engineering information, not merely providing the capability for SW design. Thus, it enables the simulation for the processes ranging from the real construction to the maintenance/repair, as well as design automation. Specifically, this engineering

platform enables more effective automation design compared to the rule-based system, and its automation design capability for the plant and steel structures can maximize productivity.

Stephen Furze, Senior Vice President/Intergraph Industry Solutions, explained, "Our engineering development tool consists of the single data stream from the design to the real manufacturing process.

This rule-based automation solution integrates the engineering data of each phase into the database and links such data to ERP to increase the productivity in the design process for the shipbuilding and offshore plants. Besides, this solution enables the design automation for all plants steel structures of FPSO topside, as well as relatively easy design of pipes, etc."

The tools for Engineering & Schematics include SmartPlant P&ID, SmartPlant Instrumentation, SmartPlant Electrical, SmartPlant Process Safety, SmartSketch®, SmartPlant Explorer, etc. Moreover, the tools for 3D Modeling & Visualization include SmartPlant 3D and SmartMarine 3D. Besides, there are PDS®, FrameWorks®Plus,

SmartPlant 3D Materials Handling Edition, SmartPlant Review, SmartPlant Layout, SmartPlant Isometrics, and CADWorx®.

Furthermore, there are analytical tools. Among those products are included CAESAR II®, PV Elite™, and TANK™ which analyze the pipe, heat exchanger, tank, etc., which are required for the design of offshore plants. Along with them, there are the Procurement/Fabrication & Construction product line for the production and the SmartPlant Alliance & Partners product line for the technical support and services.

Stephen Furze, Senior Vice President/Intergraph Industry Solutions, said, "We have extensive experience and expertise in the gas & oil plant sectors, and have achieved unrivalled competitiveness in the offshore market. Particularly, Samsung Heavy Industries have applied our engineering solutions to the drillship or offshore plant design for many years, as well as Hyundai Heavy Industries and STX and others." He added, "We will work closely with offshore owner operators, such as Petronas, ExxonMobil, and Shell, to further expand our share in the market." ⚓

SMART SOLUTIONS				
SmartMarine® Enterprise and SmartPlant® Enterprise				
Engineering & Schematics	3D Modeling & Visualization	Analysis	Procurement, Fabrication & Construction	SmartPlant Alliance & Partners
SmartPlant P&ID SmartPlant Instrumentation SmartPlant Electrical SmartPlant Process Safety SmartSketch® SmartPlant Explorer SIGGRAPH.CAE®	SmartPlant 3D SmartMarine 3D PDS®/FrameWorks®Plus SmartPlant 3D Materials Handling Edition SmartPlant Review SmartPlant Layout SmartPlant Isometrics CADWorx®	CAESAR II® PV Elite™ TANK™	SmartPlant Materials SmartPlant Reference Data Smartdard Database for SmartPlant Reference Data SmartPlant Spoolgen® SmartPlant Construction	Technology members Service members Content members Complementary Solutions
Integration and Information Management				
SmartPlant Foundation and SmartPlant Basic Integrator				
Automation and Implementation Services				

Figure 2. Intergraph's products



SSME successfully built an offshore facility on land

SSME successful launched an FSO built on land for the first time nationwide, laying the cornerstone to expand its share in the offshore market

Sungdong Shipbuilding & Marine Engineering (SSME) held a launching ceremony for a FSO (Floating Storage and Offloading) built on land. SSME became the first company nationwide to build the FSO on land. So far, offshore facilities, such as FSO, and large vessels were built mostly in a dry dock.

FSO has the barge-shape structure although it has the appearance of a vessel. FSO is an offshore facility with the lower part of hull connected by the pipe (submerged turret loading) to store the crude oil received from deepwater wells and transport it to the tanker.

SSME has built approximately 150 vessels on land, including 180,000-ton bulk carrier, 75,000-ton product carrier, 158,000-ton crude oil carrier, 6500teu containership, etc., since it built 92,000-ton bulk carrier in 2007.

This FSO, which measures 170m in length and 32.4m in width, can accommodate 50 persons and can store up to 350,000 barrels of crude oil. 350,000 barrels of oil are enough to fuel 850,000 medium-sized cars.

This FSO was ordered in May 2011 by PTSC (Petro-Vietnam Technical Services Company), the largest subsidiary of Vietnam National Oil and Gas Group (PetroVietnam), and will be delivered by the end of this year after the final outfitting works. Immediately upon delivery, this new-build FSO will be deployed in

the oil field in south-east of Vietnam, which is part of the Bien Dong 1 Project worth USD 800 million.

Thus, SSME became the fifth domestic shipyard to make inroads into the offshore market and paved the way for taking its business structure to the next advanced level and strengthening the new growth engines in the high value-added offshore sector.

Ta Duc Tien, Vice-Chairman of PTSC, attended the launching ceremony and said, "I was amazed at the technology of SSME once again. I hope that SSME will build the best vessel with the best technology."


An official from SSME said, "Our success in building this offshore facility on land for the first time nationwide is owed to our rigorous prior investigation and active cooperation to develop new construction method."



Ta Duc Tien, Vice-Chairman of PTSC, and Ha Seong-yong, President of SSME, are posing for photo at the bow of FSO (from the left in the middle).



Right before the load-out of FSO built by SSME

Meanwhile, the launching ceremony was attended by Ha Seong-yong, President of SSME, Ta Duc Tien, Vice-Chairman of Vietnam-based PTSC, Lim Chern Yuan, Managing Director of Malaysia-based Yinson Holdings, Tran Viet Dung, First Deputy Director General of Bien Dong POC which is the charterer, etc. 

ISA100 expands the market for industrial process automation

A seminar was held for industrial wireless communication technology on Sep 6. This 'ISA100 Wireless Technology Conference' was organized by GE, Honeywell, YOKOGAWA, and ISA100 WCI.

ISA100 Wireless Compliance Institute (WCI) is an industrial consortium under the ISA100, the ISA ANSI accredited standard committee, formed by ISA to establish the ISA100 wireless technology standards, promote the benefits of wireless technology and provide users with the information.

As ISA100 WCI's members consist of the producers as Honeywell, Yokogawa, GE, etc, user groups such as Exxon Mobil, Chevron, as well as research institutes, it embraces the input related to various fields such as the development and promotion of ISA100 WCI technology standards. ISA100 WCI is working hard for the certification, compatibility test, technical support and education to save the time and cost and reduce the risk arising from the development and distribution of industrial wireless devices and systems which are based on the standards.

ISA100 plays a key part in the device certification and conformity test. ISA100 validates the compatibility through the certification of various industrial devices, thereby forming the single standard framework. ISA100 supports the existing wired method and various applications, and furthermore allows the wireless technology to be applied even to important control loop.

ISA100 Standard

ISA100 provides the following specific

capabilities. Regarding the security which is the most important feature of wireless communication, the hop-by-hop authentication is provided in the Layer 2(Data link Layer) which forms the communication network structure of SA100.11a. Then, the end-to-end authentication follows in the Layer 5(Session Layer). This two-step security authentication is due to the encoding key based on the AES-128bit international encryption algorithm for each data packet which is transmitted hop-by-hop.

If there are many equipments using 2.4GHz band range in the same space, the resultant data packet collision may cause the packet error rate to increase. ISA100.11a applies the frequency hopping method to reduce the number of lost packets, and the black listing function helps avoid the collision with the data packet of equipments that use the 2.4GHz band range.

The wireless transmitter, which is based on ISA100.11a protocol, reports the estimated battery life and the residual battery capacity to the system manager, and the battery status of the wireless transmitter can be checked in the control



ISA100 Wireless Technology Conference

room. In addition, at the current level of industrial wireless technology, the wired transmitters, such as HART, Profibus, FF - which adopt the tunneling technology and have been in wide use - are fitted with ISA100.11a adapter for the conversion into ISA100.11a protocol to receive the data from the gateway, allowing the status of device to be managed. Moreover, it is applicable to the control loop, as well as the monitoring loop.

ISA100 plans to offer wireless solution for the whole factory, in addition to the wireless system for the automation of industrial process. Besides, ISA100 is currently developing the wireless standards for the whole factory, such as wireless Backhaul Backbone network ISA100.15, Trustworthy wireless ISA100.14, People and Asset tracking and identification ISA100.21, etc., including ISA100.11a, the wireless standard for the process application. ⚓

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Shipbuilding industry will reduce 14,896 tons of VOC emissions over the next 5 years

The shipbuilding industry agreed to reduce VOC emissions as part of effort to prevent the air pollution caused by the manufacturing, and is expected to proceed ahead carefully in light of the production facilities and costs.

6 companies that operate large shipyards, such as Samsung Heavy Industries (SHI), are taking the lead in reducing the air pollutant emissions to protect the natural environment. The Ministry of Environment entered into the Environmental Agreement with 6 major shipyards at the headquarters of SHI in Geoje City, South Gyeongsang Province, on September 21, along with Ulsan Metropolitan Government, South Jeolla Provincial Government, and South Gyeongsang Provincial Government, to reduce the volatile organic compound (VOC) emissions.

This second Environmental Agreement comes after the first Environmental Agreement that went into force between 2007 and 2011, and includes the control of the air pollution-emitting facilities in relation to the pollution reduction in the paint and coating which were excluded from the first Environmental Agreement. Moreover, this second Environmental Agreement is consistent with the global trends of environmental regulations that aim to reduce VOC emissions.

The companies that signed the second Environmental Agreement plan to reduce 14,896 tons of VOC emissions after considering the feasibility of cutting the VOC emissions additionally in each place of



business based on the outcome of the evaluation of the first Environmental Agreement. 14,896 tons of VOCs are equivalent to the amount of VOCs from the manufacture of 21.6 million cars.

The first Environmental Agreement involved 9 companies and led to the reduction of 70,454 tons of VOCs through dramatic improvement of facilities (with the injection of funds worth KRW 647 bil-

lion) such as the installation of VOC emission prevention facilities. The second Environmental Agreement involved 6 companies and is expected to reduce VOC emissions through the improvement of operation processes, etc, rather than the installation of the facilities that can sharply reduce VOC emissions.

The companies who signed this second Environment Agreement are expected to

explore various ways to reduce VOC emissions, like building new paint and coating factories, improving the system that controls the quantity of the paint being used, installing the VOC emission reduction facilities, using the low VOC paint, and providing on-site education, etc.

A total of KRW 231.1 billion will be earmarked for VOC emission reduction efforts during the period of the second Environmental Agreement. To speed up VOC emission reduction, relevant organizations, such as Ulsan Metropolitan Government, South Jeolla Provincial Government, and South Gyeongsang Provincial Government, National Institute of Environmental Research, etc., plan to provide full support to aforesaid major shipyards that signed the second Environmental Agreement that covers

the shipbuilding industry.

3 of the 9 companies which partook in the first Environmental Agreement did not sign the second voluntary Environmental Agreement for reason of labor strike, economic downturn, etc. The Ministry of Environment will induce those 3 companies and shipbuilding-related businesses(75 firms) to make voluntary effort, and will offer increased guidance to help the shipbuilding industry constantly cut VOC emissions.

In the congratulatory address, Yoon Jong Soo, Vice-Minister Ministry of Environment, who attended the signing ceremony, praised the determination of the companies to voluntarily reduce the emissions of air pollutants despite the unprecedented downturn in the shipbuilding market

He commented, "Environment-friendly business management is the key driver for the stronger competitiveness of shipbuilding industry in the global market, and will play a key part in the protection of health for workers and local residents, conservation of local natural environment, and prevention of global warming."

Meanwhile, Yoon Jong Soo, Vice-Minister Ministry of Environment, awarded the commendation of the Minister of Environment to the Korea Shipbuilders' Association(KOSHIPA) in recognition of the Association's hard work for the successful management of the previous first Environmental Agreement, and urged the Association to keep making effort to help ensure successful results of the second Environmental Agreement. 

Lloyd's Register, New service to help ship-owners, builders and designers to optimise the performance of their ships

Lloyd's Register has created a performance-optimisation service that will support ship-owners, builders and designers who are looking to develop solutions that offer more efficient performances for new and existing designs, and retrofits for ships in service. "We are looking at the whole ship and its operational requirements," said Luis Benito, Lloyd's Register's Singapore-based Marketing Manager. "Of course, right now, it's all about reducing fuel-oil consumption. The market needs to know what's feasible for existing ships as well as for new designs. We think that independent technical analysis and verification of performance is essential to making progress."

Using computational fluid dynamics (CFD) as the central technological capability, Lloyd's Register is offering performance analysis that reaches well beyond the boundaries of traditional classification. The CFD team is led by Dr Dejan Radosavljevic, who has nearly 30 years' experience in the field.

"Our track record of combining CFD with in-service measurements and observations to deal with issues related to propulsion hydrodynamics puts us in a great position to apply this problem-solving knowledge to finding and verifying new ways to improve operational efficiency," said Dr Radosavljevic. "The large body of work and in-service data we've built up over the years has helped us to fine tune our processes and validate our full-scale CFD analyses, so we can always seek solutions from computerised models of full-scale ships operating in real conditions."

Benito said joining up the different areas of expertise within Lloyd's Register is the key to providing an unrivalled service. "When looking at new ideas and innovation either for retrofit or newbuilds, we can marry sophisticated CFD tools with other skills that we have in Lloyd's Register," he said. "Working with the technical insight of our energy-management experts, we can help to generate and analyse the solutions needed to create more efficient ships."



DSME proves its unmatched technology in the construction of offshore plants

DSME proved its unmatched offshore technology once again. French Total, one of the top 5 energy and chemical companies worldwide, sent an email praising the excellent construction capability of DSME and early delivery, which further solidifies the cooperative relationship between both companies.

'Pazflor', the world's largest FPSO (Floating Production Storage & Offloading Unit), arrived offshore Angola on April 12, wrapping up the 84-day voyage after it sailed out from DSME's Okpo shipyard following the naming ceremony in January.

Amazingly, Pazflor started its first oil production in about 4 months after the installation and preparation at the rough sea. DSME brought forward the scheduled first oil production by about a month, and the French energy giant Total provided an early delivery incentive worth approximately KRW 60 billion, the largest single amount in the history of shipbuilding history, to DSME to express its appreciation.

Total is said to have recently sent an email to DSME President Goh Jae-ho and the executives of DSME's offshore sales division to praise DSME's excellent construction capability and express its gratitude.

Total sent this email to thank DSME for the excellent performance of this FPSO, which is 1 year after the oil from Pazflor began to flow. It is unprecedented that the ship owner sent an email to express gratitude 1 year after the delivery.

DSME President Goh Jae-ho said, "This email is an example showing the unmatched prowess of DSME in the



Pazflor, the world's largest FPSO built by DSME, is sailing out of the port.

construction of FPSO. DSME will exert its best effort for the current and future projects to solidify the nation's leadership in the global shipbuilding industry."

Pazflor is the world's largest FPSO to date both in terms of the contract amount and size. This 120,000 dead-weight-ton facility is 325m long, 61m wide, and 32m high.

Pazflor can produce up to 220,000 barrels of crude oil and 4.4 million cubic meters (m³) of natural gas per day. It is

designed to store up to 1.9 million barrels (approximately 260,000 tons) equal to the daily consumption of oil in Korea. Meanwhile, DSME is currently building CLOV FPSO, another project of Total. ⚓



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Company & Comment



A leading manufacturer of the equipment for shipbuilding & off-shore industries

Since 1978, DHP, which specializes in the manufacture of equipment for shipbuilding and offshore industries, has made the history sticking to its way nobody wants. DHP are proud of the history we have made to meet what is needed by the time period as the time period is created.

DHP do not scare at the new future to create when all other people say it is not, when they say they should just pass by and when they say this is enough. Sticking to the best being proud of ourselves as top, we will create the better picture along with the present and future progress not satisfied from the past history to make the higher dream come true based on the challenge and success history.

DHP Engineering Ltd.

DHP was established in 1978 when the industrialization gathered speed in Korea. At first, DHP focused on the supply of sterilization equipment for food industry and the repair of existing equipment. In 1986, DHP set up a manufacturing plant in Busan, making headway into the industrial heat exchanger market. In 1996, DHP relocated its manufacturing plant to Gimhae, a city in South Gyeongsang Province, and

started expanding its business to the shipbuilding/offshore and power generation sectors.

Particularly, DHP grabbed the attention of the industry in 2005 when it successfully localized the plate heat exchanger for the first time nationwide. Later, DHP began to supply the oil cooler for the engine - which Hyundai Heavy Industries(HHI) developed with indigenous technology - and the central fresh

water cooler for Taiwan's CSBC corporation, thus successfully making inroads into the shipbuilding and offshore sectors which are the largest markets for the plate heat exchanger. Major customers of DHP include domestic shipbuilding giants such as Hyundai Heavy Industries, Daewoo Shipbuilding & Marine Engineering, Samsung Heavy Industries, STX Shipbuilding, etc., and overseas companies such as Construction Holdings, SPP Shipbuilding, China Ship Building Corporation (CSBC), Cosco Shipyard, Mawei Shipbuilding, etc.

World's leader in the plate exchanger market

DHP is the first and the best Plate Heat Exchanger company

in Korea since its establishment in 1978. But now, it rises as world best plate heat exchanger company in the world. Korea is excellent ship building country throughout the history and now it is world famous and moreover it will still be the best because DHP is standing in the heart of ship building.

We can cool down lubrication oil temperature and fresh water temperature with sea water or fresh water. And we return the heat for ship again to get fresh water and heating. We do the same service for power plant, chemical plant, fresh water generator plant and industrial area. We do not consume heat at all in the plant instead we change the heat direction for users wish. Heat exchanging without any energy consump-

- 1978 Established DAEWON HEAT PLATE Ind. Co.in Busan
- 1982 Awarded 'Exellency Prize' by 'Ministry of Commerce and Industry'
- 1986 Installed 5,000 ton Hydraulic Press
- 1999 Installed 30,000 ton Hydraulic Press for ultra size plate pressing
- 2000 Awarded Prize by Ministry of Commerce, Industry and Energy
- 2003 Qualified BS EN ISO 9001:2000 by LR
- 2004 Applied Patent Right of 'Non-welding Disk Type Heat Exchanger'
- 2006 Registered international Patent Right of 'Double Seal Gasket System' for 28 countries Qualified ISO 14001
- 2008 Designated as 'leading Company' by Busan Metropolitan City
- 2009 Awarded prize by Ministry of SMBA(Small and Medium Business Administration) Qualified "KEPIC-MN" nuclear quality certificate.





Company & Comment

tion is our mission. If there is heat exchange problem that is charged with DHP. We can service the best solution.

Aggressive entry into the offshore market

The first half of 2012 has seen the market conditions aggravating compared to 2011 due to the adverse external factors. However, the market is expected to show signs of life in the second half of this year.

Currently, major domestic shipyards focus on offshore plants and wind power sectors, and DHP has made intensive investment in R&D as part of effort to make inroads into those sectors. Through relentless R&D, DHP has developed the products that can satisfy the requirements of all industrial sites where the heat exchange is required, such as the plate coil for various applications, spiral type heat exchanger, disc type heat exchanger, besides the plat heat exchanger.

Taking the customer satisfaction and quality control as top priority over the last 3 decades based on the craftsmanship, DHP has strived to increase customer satisfaction and create new value through various products. Specifically, DHP is offering differentiated services that set itself apart from competitors based on excellent technological competitiveness and production of high quality products. Particularly, DHP has gained reputation in the industry for its double sealing technology. DHP's customers include Daewoo Shipbuilding & Marine Engineering (DSME), Korea Hydro & Nuclear Power (KHNP), and major shipyards, etc. DHP plans to expand its business into the offshore sectors such as semi-rig, rig, drill-ship, FPSO, etc.

Plate Heat Exchanger

DHP's plate heat exchanger has high heat transfer capability, and has several thin and corrugated superimposed heat transfer plates with the gasket mounted between one fixed frame and mobile frame and can be compressed and assembled using the tightening bolt.

In particular, the arrangement of two liquids is that the cold liquid goes upward and hot liquid goes downward in order to increase heat transfer efficiency. There is an advantage to use plate type heat exchangers over Shell & Tube type heat



DHP Engineering, Young Ho Song (Ph.D.) President

exchangers, that is to say, the corrugations in the plates increase the liquid turbulence to a low Reynolds number and the liquids flow is counter flow so that the heat transfer efficiency is always 3~5 times higher than Shell & Tube type heat exchangers.

Application

- Shipbuilding: Central cooling, lub oil, Jacket, piston water, heavy oil, transmission oil cooling Diesel Oil, Heating Oil pre-heating
- Plant: Ice thermal system, local heating plant, nuclear power plants, swimming pool

Special Feature

- Cost Savings
- High Heat Transfer Coefficients
- Adhesive-Free Gasket
- Flexibility
- Low Product Content
- Compact Design
- Reliable Gasket Structure

Disk & Shell Type Heat Exchanger

DHP's new development 'Disk & Shell Heat Exchanger' is a heat exchanger which is composed of the good points of shell & tube heat exchanger and plate heat exchanger. This heat exchanger is welded plate pack in high pressure vessel. The maximum pressure is up to 100bar and the temperature



DHP has set up high quality production system based on the challenge and creative mind with passions to lead the industry with the cutting edge technology.

is up to 400°C. The main application is condenser, evaporator and the units require high pressure and high temperature but small size.

Technical Specification

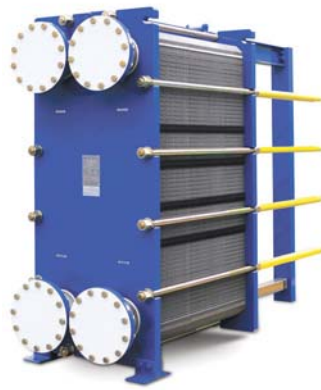
- Capacity: Max. 100MW/Unit
- Design Temp: -196°C~400°C
- Design Pressure : Max. 100bar
- Material : Shell (SS 400, SUS 304, SUS 316, Titanium, Nickel, etc.), Plate (SUS 316, 254 SMO, Titanium, Nickel, etc.)

Spiral Type Heat Exchanger

Generally, the spiral type heat exchanger is called 'vortex type' or 'spiral type heat exchanger. The spiral type heat exchanger consists of covers, plain plates, pins, etc., and is suited for the liquid with relatively high viscosity, the fluid with high rate scale formation and the heat exchange process with high thermal length. Thus, this type of heat exchanger is used for the condenser for ammonia solution, alkacide lyes, benzene washing fluid, ammonium sulfide, etc., in the gas



Heat Exchangers (Marine)



Heat Exchangers (Plant)



Company & Comment



Performance comparison of Heat Exchangers

and coal industry.

Special Feature

- Compact size and high efficiency guaranteed (Heating area 580m²: 2m(D)x2.5m(H))
- Heat transmission enabled at little temperature difference by means of complete counter flow.
- Mixing proof between fluids owing to the perfect welding between both side fluid channels.
- Fully developed spiral flows in both channels make self clean-



Spiral Type Heat Exchanger by DHP

- ing effect and this leads very little fouling inside of channels.
- Easy for chemical cleaning or mechanical cleaning by opening the cover
- Guaranteed efficiency for maximized heat transmission by highly developed turbulent flow
- Nearly no maintenance cost required thanks to the minimized fouling and non-use of gasket
- Heat exchange of fluid containing slurry

Water Mist Fire Fighting System for Cruise Liner

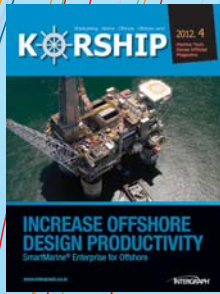
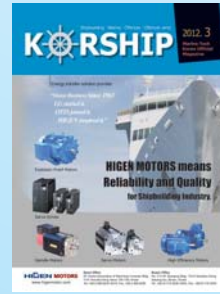
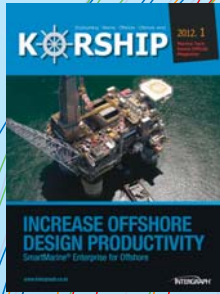
Total VOC Reduction System VOC reduction rate 77.8%

Non-Lethal Anti-Piracy Solution

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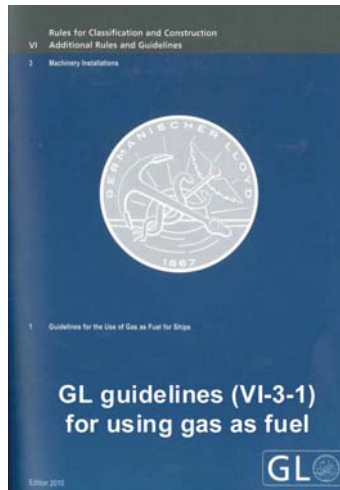
Why the focus is on LNG as fuel?

LNG as ship fuel is seen as one promising technology to achieve significant emission reductions. Regulatory and commercial conditions for using gas as ship fuel can be met. GL expects more LNG-fuelled vessels in international trade once strict fuel quality regulations are in force.

GL Academy

Kil-su Yun Manager / Coordinator

The IMO agreed to reduce SOx-emissions by controlling the Sulphur content in marine fuels (world wide Sulphur limitation). It means the regions within Sulphur Emission Control Areas (SECA's) sulphur content is limited to 0.1% weight from 2015 onward. An immediate consideration requires in switching to cleaner fuels like MGO, LNG and to install Sulphur Scrubbers. The regions within Emission Control Areas (ECA) 80% lower NOx limits are mandatory from 2016 onward need to use NOx catalysts and/or Exhaust Gas Recirculation (EGR).



GL Head of Research and Rules Development Dr. Pierre C. Sames informs; "The use of liquefied natural gas has a number of benefits such as the reduction by 90% to 95% of sulphur-oxide (SOx) emissions which are created using fuel with a high sulphur content. This reduction level will be mandated within the so called Emission Control Areas (ECAs) from 2015 on. A similar reduction will be enforced for worldwide shipping from 2020 on, pending a review at IMO which may shift the introduction to 2025".

"In addition, reduction of Nitrogen-oxide (NOx) emissions down to IMO Tier III limits, applicable in ECAs from 2016, is possible for pure gas engines and four-stroke dual fuel engines which are typically used onboard ships engaged in short sea and coastal shipping".

"Due to the lower carbon content of LNG compared to traditional ship fuels, a 20% to 25% reduction of Carbon-dioxide (CO₂) emissions is possible. The actual reduction depends on engine type and possible measures to reduce the unwanted slip of unused Methane".

Additionally, the LNG fuel price may be offered at a price comparable to Heavy Fuel Oil (HFO) and commercially attractive option compared to the low-sulphur marine gas oil (MGO) in measure against SOx emission.

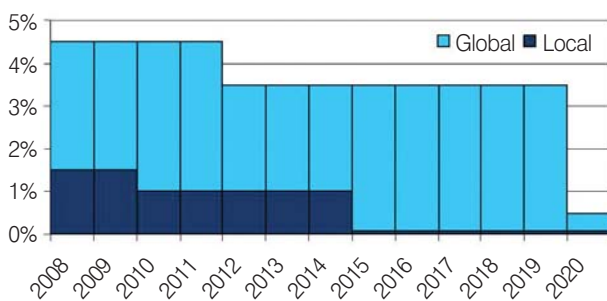


Figure 1. Sulphur content limits bunker fuels

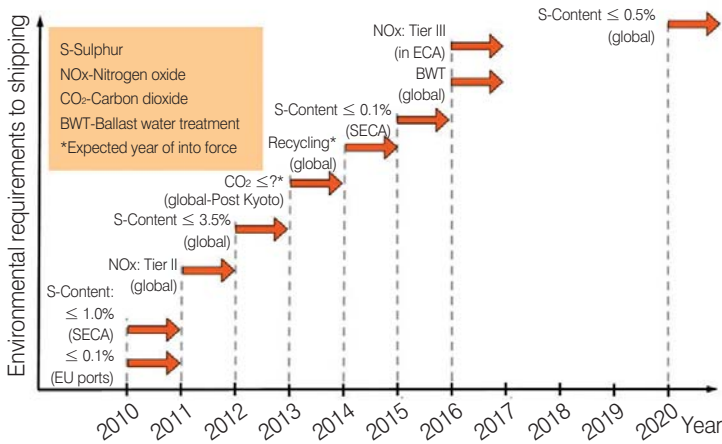
LNG as fuel for ship

- A Clean and Cost Efficient alternative

Environmentally and economically attractive option to use LNG as a fuel for ship is emerging to be a serious consideration during the coming decade.

Regulations, Status, Trends and Developments today

IGF Code is being finalized - The IMO subcommittee



code will be published within next SOLAS revision in 2014 and this will supersede IGL Code.

Exploring the key aspects of LNG as Ship Fuel - In the early phases, various aspects of LNG as Ship Fuel has been considered such as;

Supply Chain - includes LNG Feeder, Local LNG, LNG bunker vessel and LNG end-user.

The practical safety and operational challenges - The Rules & Regulations, Safety Principles such as; Storage Systems, Gas handling, Engine Room Concepts, Control & Safety and Risk Management.

Bulk and Liquid Gases (BLG) is working on IGF Code which is planned to be finalized before Jan. 2013.

This will address issues such as Safety, other fuels with low flashpoints (methanol, ethanol, butane, hydrogen and propane); cover the energy conversion systems (low and high pressure ICE, gas turbines, boilers, fuel cells). The IGF -

Components of a gas fuelled propulsion system - GL's conversion of "Bit Viking" to Gas as Ship Fuel Included a complete due diligence and adherence to safety principles of MSC.285.(86) and IGF-Code involving LNG Containment

	2009		2010		2011		2012		2013		2014	
Regulatory Track	BLG-13		BLG-14		BLG-15		BLG-16		BLG-17		BLG-18	
	MSC-86		MSC-87		MSC-88		MSC-89		MSC-90		MSC-91	
	SOLAS 2010			SOLAS 2014								
	IGF-Interim-Guideline (IMO) BMVBS											
	GL-IGF Guideline											
	GL IGF- Rule Notes											
IGF-Code (IMO) BMVBS										finalise before BLG-17		

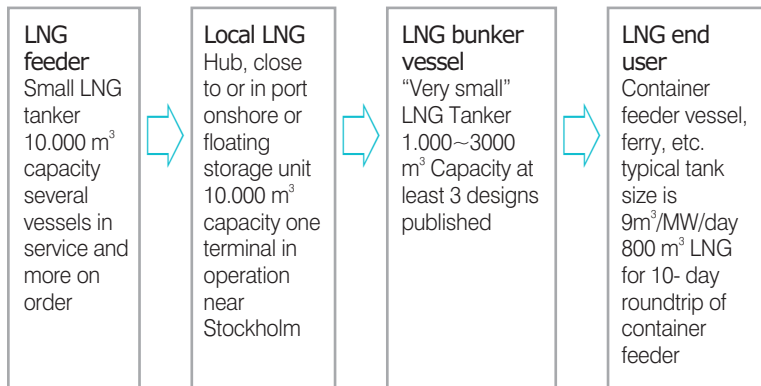
* MSC-86 (May 2009): IGF Interim Guideline: MSC Resolution MSC-285-86 Covers only LNG and Internal combustion Engines

Scope of IGF-Code Includes;

- IGF-Code should provide safety measures for ships using gases as fuel including liquefied gas tankers.
- IGF-Code is intended to address natural gas fuel and also other gas fuel types, such as butane, hydrogen, propane.
- IGF-Code will cover the energy conversion systems of relevance (low and high pressure ICE, gas turbines, boilers, fuel cells) and only address issues not already covered by SOLAS and serve as an addition to SOLAS.
- IGF-Code supersedes the interim guidelines and Chapter 16 of the IGC Code.
- IGF-Code should be set into force with in the schedule of SOLAS 2014
- IGF-Code will address requirements for bunker station



Technology



System, Safety Valves, Gas Handling Room, Ex zones /Ventilation and Engines.

Risk evaluation by Failure Mode and Effects Analysis (FMEA)

The aim of Risk Evaluation is to detect hidden failures, evaluate its consequences and recommend to reduce failure probability. Risk Evaluation is also to find Boundary Conditions such as focus on LNG / NG leakages, single point failures, system in good working order (proper execution of checks regularly) and Vessel operated by experienced crew. Keeping in mind to Restrictions such as external influences will not be considered and the system will be operated within the design limits.



Cost Studies for Gas Fuelled Vessels - Will also be a key component in project management. The scope of cost study includes design, classification, flag state, supervision, financing, shipbuilding and welding, Equipment, LNG tanks and equipment room, Machinery, Navigation, watch keeping, edv., Electricity, cabling, switchboards, lightning, Accommodation / furnish, Conservation / coating, inventory etc.

Other trend and developments are in process

- Bunkering a key issue

Bunkering of existing gas fuelled vessel is a LNG transfer from shore to ship and transfer rates are below or equal to 90m³/h, boundary conditions similar to gas terminals (safety distances, ex-protection, public access) and this transfer rates of today known LNG fuelling systems are generally too small for the future planned maritime applications.

Bunkering of gas is not yet regulated but, the Oil Companies International Marine Forum (OCIMF) and Society of International Gas Tankers and Terminal Operators (SIGTTO)



provide regulations for safe and reliable operations.

LNG bunkering must be competitive respectively comparable to normal fuel oil bunkering and major challenge of a bunker system is the economical and safe LNG transfer within normal port limits and during normal harbour operation of the vessel to be bunkered. The main safety related aspect is to avoid the release of any LNG during this transfer. ⚓

※ There will be an ongoing discussions and continuous introduction of rules & regulations in this regards.

Parker Fluid Connectors Group Marine Products Offering

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Parflange F37



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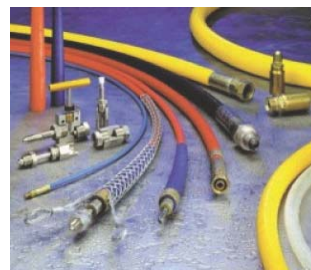
Hydraulic Hose



Industrial Hose



High Pressure Hose



Multitube



Marine Hose



Mooring Line



Umbilical & Cable



Quick Coupling



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ENGINEERING YOUR SUCCESS.



Marine Fuel Management

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.

Emerson Process Management Korea

By Joel Weinstein and David Ashley Hayes

Introduction

Marine fuel costs represent a major portion (60.70%) of a ship's operating cost. With increasing oil prices and conservation efforts, careful fuel management and increased engine efficiency have become vital for environmental and financial reasons. Fuel flow measurement with Coriolis technology provides the foundation for increased fuel efficiency and accurate accounting of fuel purchases. Even a medium-sized 30,000 DWT vessel can consume 20 tons of fuel oil per day, which at today's prices is greater than USD6,000 per day. This white paper describes how Micro Motion Coriolis meters can decrease the cost and waste associated with the fuel supply chain, from on-shore blending and barge loading to ship bunkering and fuel efficiency optimization.

Coriolis Measurement of Fuel Oil

The adoption of Coriolis flow meters is increasing in the marine industry because Coriolis meters offer solutions to many of the challenges faced in fuel metering applications. Coriolis meters are non-intrusive, meaning that there are no

moving parts or obstructions in contact with the fluid being measured. Coriolis meters provide continuous on-line measurement of mass flow rate, volume flow rate, density, temperature, and batch totals-all from a single device.

Coriolis meters have no complex moving parts and require no maintenance, and they require no flow conditioning or straight pipe runs. Unlike volume measurement, mass measurement is independent of operating pressure and temperature, which negates the need for error-prone density conversions. Coriolis meters also provide extremely accurate flow and density measurements.

For high-viscosity fluids, especially fluids with entrained gas, direct mass flow measurement is superior to competing technologies such as volumetric meters and tank gauges. Consider the measurement of bunker fuel with 5% entrained gas. A volumetric meter or a tank gauge will give liquid oil batch errors of +5% compared to true batch totals, even if the meters are functioning perfectly. The reason for this is that each meter simply measures the volume of what is going through it, i.e., a mixture of gas and bunker fuel. The operator

sees this measurement as liquid volume flow. The low-density entrained gas takes up a lot of space (i.e., volume), which the operator misinterprets as a large volume of oil. The mass of the entrained gas, however, is so small that it does not contribute significantly to the total mass of the mixture. A Coriolis meter, which measures mass flow



Figure 1. Micro Motion Coriolis Flow and Density Meters

directly, will therefore measure precisely the quantity needed.

Marine Fuel Blending

Blending is defined as the combination of raw material in exact proportion to meet specific requirements. The typical blending operation requested by the marine industry involves the combination of heavy fuel oil (HFO) or Bunker C, and an intermediate fuel oil (IFO), which is available in a range of viscosities and sulphur contents. The International Standard Organization (ISO) has specifications for marine fuels supplied worldwide for use on board ships. There are nineteen categories of residual fuels available. Out of those nineteen, five categories or grades are most frequently supplied and used by ships: IFO180, IFO380, IFO500, MDO, and MGO.

Precision blending of these fuels at the supply hub is very important due to increases in fuel prices, engine wear from different fuel grade burn temperatures, and the limitations associated with shipboard storage. Pre-load blending guarantees that a vessel receives fuel with optimal properties for the intended use of specific on board engines, leading to reductions in NOx and SOx emissions.

The pre-bunkering blending of fuels has also been increasingly popular in the marine industry due to regulations that discourage the mixing of fuels inside a particular tank on board. On-board mixing has been at the center of a growing number of bunker dispute claims, machinery failures, and failures to meet environmental standards.

Improved quality control of marine fuels by continuous blending measurements can address all of these concerns, as well as help improve fleet-wide fuel efficiency. Micro Motion Coriolis meters have been used for many years in a variety of blending applications, including hydrocarbons. Figure 2 shows a blending solution provided to a large fuel supplier using two Micro Motion Coriolis meters for the blending of HFO and diesel fuel. A control system uses the mass flow outputs of the two Coriolis meters to determine the exact set-points of the two downstream valves to control the desired fuel quality.

Marine Fuel Bunkering

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

volumetric tank measurements and a reference density (typically obtained by laboratory sample). Look-up tables, the reference density, and the “dip” are used to calculate the total mass of the bunker fuel delivered. Measurement accuracy depends on many factors including temperature, pressure, presence of entrained gas, dip tape, tank volume uncertainty, accuracy of conversion tables, human error, and how well the density sample represents the average batch density (HFO tends to stratify in tanks).

These systems have typical mass total accuracies on the order of 1.3%, and in some cases as poor as 5%. Additional inaccuracies can occur due to dead volumes in tanks or aeration of oil, both of which increase the apparent volume of oil delivered. Although some HFO suppliers have advanced laser level gauges, multiple sample points, and highly accurate look-up tables, a direct Coriolis mass measurement completely avoids the problems inherent in volumetric tank measurement. Coriolis meters deliver the mass total without all the instrumentation and measurement conversions. In addition, because the mass of air is negligible, ship owners do not pay for air that has intentionally or unintentionally found its way into the fuel. Coriolis mass flow technology is well-suited to HFO applications, particularly bunkering, where customer billing is based on mass.

However, metering HFO is not an easy application for flow measurement technologies, even those with direct mass capability. Flow meters must be able to handle the thick, viscous bunker grades used, along with any impurities that have not been filtered out, and varying amounts of entrained gas in the oil. This makes for a very challenging application, not to mention other environmental influences such as vibration,



Figure 2. Marine Fuels Blending Solution



Application

product solidification, and the need for low pressure drop. Several successful customer trials by Maersk, Exxon, Victrol, and others show that Micro Motion Coriolis meters can perform under harsh marine conditions.

Engine Fuel Measurement

A tiny increase in engine fuel efficiency can lead to dramatic fleet-wide savings. Accurate measurement and control of fuel oil supplied to marine engines allows operators to optimize engine use and save fuel wherever possible. While marine engines vary by vessel, an example of a 10-cylinder marine engine is shown in Figure 3. Meters can be mounted in the fuel supply and return lines of each cylinder to measure differential mass consumption.

Viscosity Control

The measurement and control of HFO viscosity is a known requirement within the marine and diesel engine industries. The blending of marine heavy fuel oils in terminals and on-board fueling barges often leaves the buyer and/or supplier without a clear picture of the fuel quality. Continuous viscosity measurement aboard each barge or vessel can provide dynamic, real-time validation of fuel quality, thereby reducing the number of bunker disputes.

Micro Motion viscosity meters, developed in close cooperation with leading engine manufacturers, can measure both dynamic and kinematic viscosity. This is critical for applications involving fluids with varying densities such as light and heavy oils. These meters measure not only kinematic viscosity at injection temperature but also provide a range of other

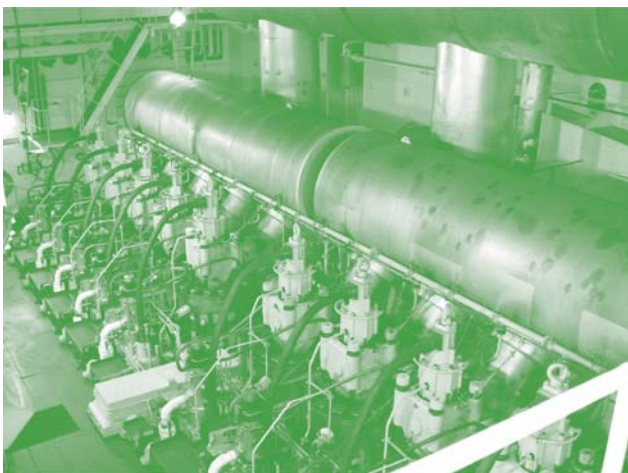


Figure 3. Engine Fuel Efficiency

quality factors including density at injection temperature and at the centrifuge temperature. The viscosities measured can be used to calculate both versions of the ignition index and fuel grade viscosity requested by engine manufacturers.

Summary


Micro Motion direct mass flow and viscosity measurement offers many benefits to marine fuel management operations. Inherent advantages, such as multi-variable measurement and no moving parts are shared among all Coriolis meters. However, the challenges for fuel bunker measurement are clear and the ability to maintain ongoing measurement performance and reliability in the presence of entrained gas or two-phase flow is not characteristic of all Coriolis meters. It is critical, therefore, to ensure any measurement technology is able to deliver accurate measurement in the presence of highly variable process conditions. Micro Motion Coriolis offers unmatched technical performance in harsh conditions and field-proven operation of Coriolis measurement in a range of fuel bunkering applications.

Coriolis Operation Principle

Coriolis meters operate by vibrating one or more flow tubes at the resonant frequency. Density is measured directly from this natural frequency, and mass flow is found from asymmetric tube displacements caused by the Coriolis force. (A simple, interactive tool for learning how a Coriolis meter works can be found at: <http://www.emersonprocess.com/micromotion/tutor/index.html>)

About the Authors

Joel Weinstein is a research and applications engineer for Micro Motion, a division of Emerson Process Management, which developed and manufactures the Coriolis flow meter. Dr. Weinstein has recently completed a five-year joint research project with the University of Colorado focused on improving Coriolis measurement with entrained gas for difficult industrial applications such as fuel bunkering.

Ashley Hayes is a Marine Business Development Manager for Micro Motion. Ashley has held positions in the process control and automation industry for over 20 years. Ashley's experience has focused on the proper application of process instrumentation in all industries, to provide specific improvements in asset management, reliability, efficiency and costs reductions. 

Hammelmann High pressure systems in the plant industry

Process pumps - High pressure pumps – Cleaning systems

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

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

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LDPE
Wet oxidation
CO₂ extraction
Mill scale removal
Non woven fabrics
Boiler feed pumps
Re-injecting reservoir water

Typical fluids

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



High pressure pumps

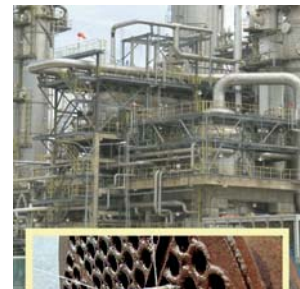
Hammelmann pumps produce maximum performance from a minimal footprint which is the result of combining a compact integral speed reduction gear end with the concept of a vertical configuration.

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Energy efficiency, application leadership and integrated solutions

Alfa Laval's customer and press seminar included a presentation entitled "Saving energy and reducing CO₂ emissions". Niclas Dahl, Alfa Laval Marine & Diesel Equipment, discussed the shipping industry's future fuel options with a focus on keeping operating costs at a viable level while complying with environmental regulations. Rene Fich Jespersen, Alfa Laval Aalborg, presented the latest Aalborg waste heat recovery products and showed the impressive fuel savings and reductions in CO₂ emissions they offer when installed onboard a typical container ship.

Alfa Laval

Onboard ships throughout the world, Alfa Laval products installed in engine rooms save energy, reduce CO₂ emissions and prolong engine lifetimes. The fuel treatment line, from the settling tank to the engine is one of Alfa Laval's key focus areas and the company continuously monitors developments in the marine fuels market.

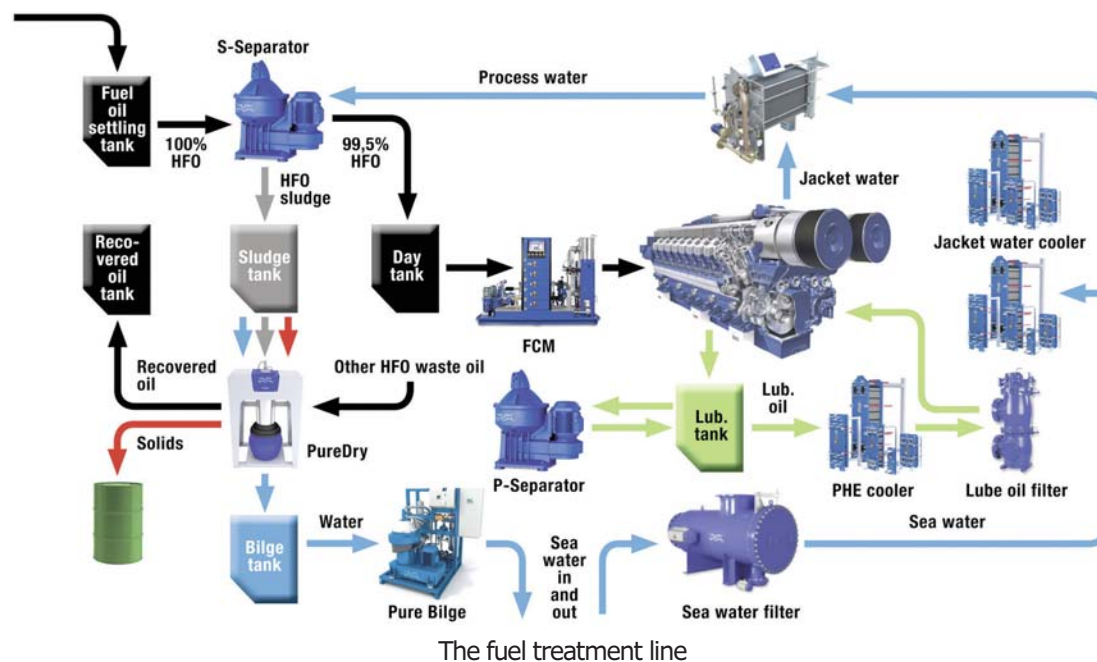
Fuel trend drivers

With increasingly stringent local and global environmental regulations, ship owners and operators are currently reviewing their future options in terms of fuel compliance strategies

and new fuels are being discussed. The result is likely to be the use of lower and more variable fuel quality, with more cat fines. Thus, there will be an even sharper focus on fuel handling and cleaning efficiency, and advanced fuel treatment equipment will become even more important.

A main driver is, of course, the need to reduce ship operation costs in order to remain profitable and competitive. Here the focus is on fuel efficiency, fuel flexibility, equipment life-cycle costs and cost of ownership.

Equally important is to find solutions that will comply with new legislation. The focus in this case is on preparing fuel systems





Exhaust gas heat recovery

Steam production

for handling multiple fuel types onboard. Other factors are fuel availability, deteriorating fuel quality, reliability and safety.

Future options

Of the main future options for ship owners and operators, Alfa Laval believes that the three most likely to dominate in the short term are: continue with HFO and add exhaust gas cleaning equipment (scrubbers); continue with HFO and complement with distillates (dual fuel); or blending fuel in order to meet environmental legislation.

Another option is to switch to LNG. However, for many industry players this is not a feasible option for the near future due to its prohibitive investment cost, lack of availability in terms of distribution infrastructure and the uncertainty of the future price of LNG bunkers.

Handling the short-term options

With the technologies, products and application know-how to handle the new fuel situation, Alfa Laval is currently focusing on multiple fuel management, blending fuels, and exhaust gas scrubbing - the company recently launched the PureSOx system for the latter application. These options, along with increased demands on logging, to provide proof of compliance when switching over, all contribute to making the Alfa Laval fuel treatment line more fit for the future.

A lot in the pipeline

In line with this thinking, the company is focusing its efforts on

optimizing the complete fuel treatment line from an installation and operation point of view, while continuing to develop products that reduce emissions and oil losses, offer lower energy consumption and generate less waste.

A typical example of Alfa Laval's innovative thinking is the new PureDry centrifugal separator, which has the capability to recover re-usable fuel oil from waste oil. Also in the pipeline are booster systems with fuel blending capabilities, advanced logging systems, and much more.

Alfa Laval, with its application knowledge based on integrated, user-friendly solutions, is well positioned to play a key role in ensuring a reliable, energy efficient fuel treatment line in the future, regardless of the fuel strategy chosen by the customer.

Waste heat recovery - a unique opportunity

Today's modern ship propulsion systems are considerably more efficient than their predecessors. Yet half of the energy they produce still goes to heat rather than propulsion. By recapturing this energy and putting it to use, Alfa Laval reduces both fuel consumption and emissions. The recovery of waste heat is a unique opportunity that benefits operating economy as much as the environment.

Developed in cooperation with main engine suppliers and turbine manufacturers, Alfa Laval Aalborg waste heat recovery systems take the excess energy from the main engine exhaust gas and convert it into electric power by means of a steam turbine and a generator. Alfa Laval's latest waste heat recovery boiler, the Aalborg XW-TG, is a critical component in the process. The waste heat is recovered in the boiler by producing the maximum amount of steam from the energy in the exhaust gas.

Annual savings of MUSD 2.4 for a container ship

The wasted energy in the exhaust gas from the propulsion systems on the average container vessel amounts to approximately 50% of the energy from the burned fuel oil. With the waste heat recovery system it is possible to improve the efficiency by 10~12%. Recovering a percentage of the wasted energy reduces the vessel's fuel consumption and emissions and allows greater flexibility in terms of engine configuration.

On a typical container vessel a waste heat recovery system can produce up to 3 MW of electric power. This corresponds to annual savings of 4,000 tonnes of fuel and about 12,000



Application



Alfa Laval PureSOx



Alfa Laval PureDry



Waste heat recovery

tonnes of CO₂, with a cost reduction for the operator of USD 2.4 million. Since the capital investment is approximately USD 4.2 million, payback time is fairly short and will decrease as fuel oil costs rise.

Waste heat recovery after the auxiliary engines

On container vessels, the traditional boiler installation comprises an oil-fired boiler, an exhaust gas economizer producing steam when the vessel is at sea, and auxiliary engines generating electricity for the reefer containers, and other purposes onboard the vessel.

In the past, it has not been considered worthwhile to recover the energy in the exhaust gas from these engines. However, the rising cost of fuel oil has opened ship operators' eyes to smaller savings.

Steam for in-port requirements

Alfa Laval has now introduced a new waste heat boiler, the Aalborg XS-TC7A economizer, which is specially designed for installation after the auxiliary engine. Compact and easy to install and retrofit, it delivers sufficient steam for in-port requirements and in some cases at sea. The unit benefits the ship owner and the atmosphere by reducing the need to burn fuel oil in the oil-fired boiler when in harbour.

A waste heat recovery system on a container vessel with 3 MW gensets installed will provide annual fuel oil savings of approximately 100 tonnes, a reduction in CO₂ emissions of

about 300 tonnes, and annual cost savings for the operator when operating on HFO of about USD 60,000.


The numbers are smaller but with thousands of vessels trading and around 1,500 new vessels being delivered each year, even small savings will make a difference.

Identifying overlooked heat sources

Alfa Laval is now focusing on overall system efficiency and will continue to identify other sources of wasted heat. Using overlooked heat sources to superheat steam, for example, not only helps vessels accommodate their power generation needs, but also helps prepare them for forthcoming emission regulations. Since they cut fuel consumption and thereby costs, they also limit their production of CO₂, NO_x, SO_x and other emissions.

TCi boiler range

Alfa Laval has a market share in excess of 30% with its energy product portfolio and, in addition to developing new products, it continuously improves its existing, oil-fired Aalborg boiler range. Aalborg TCi (Turbo Clean, intelligent) technology offers improved efficiency and self cleaning effects without water washing.

TCi boilers offer highest quality and reliability with lowest life-cycle costs. They also have a higher output-to-weight ratio than competing products and are therefore lighter and occupy less space, thus increasing the ship's cargo carrying capacity. 

Ships are not still



So why are bilge water treatment systems static?

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

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

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

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



PureBilge – a dynamic force
in bilge water treatment



www.alfalaval.com



The Challenge of Total Marine Service Solution

Hanil-Fuji (Korea) Co., Ltd.

Hanil-Fuji (Korea) launched the ship store business in October 1974 under the name of Hanil Ship Store Co.,Ltd and was renamed to its current name in 2000 after forming a joint business with FUJI TRADING CO., LTD, the Japan's international trading company specializing in the equipment for ships. Since then, Hanil-Fuji (Korea) has achieved a 20-fold growth over the last decade.

Particularly, Hanil-Fuji (Korea) participated in the Fuji Global Logistics (a joint venture formed between Hanil-Fuji (Korea) and Fuji Trading Japan) and won the top place when the public offering was made for tenant companies in 4th phase of hinter logistics complex of Busan New Port North Container Terminal supervised by Busan Port Authority in 2010. Hanil-Fuji (Korea) began the construction in May 2011 and completed the warehouse and office sections in April 2012, establishing the global logistics center.

BUSINESS OVERVIEW

Transit Cargo

Warehousing

- CFS
- Special Cargo Handling
- Bonded Warehousing
- High end Security Capabilities
- Packing, Assembly, Sorting

Air Freight

- Consolidation Service
- Door to Door Delivery
- Local Trucking
- Customs Clearance & Documentation
- Online Tracking Service

Ocean Freight

- FCL, LCL Consolidation Service
- Bulk Cargo & Project Cargo

Depot

- Specialized handling of heavy cargo



WHY FUJI GLOBAL LOGISTICS?

Fuji Global Logistics (FGL) is located at BUSAN New Port, KOREA as Northeast Asian Business Hub Free Trade Zone. The New Port is well connected by Highways to key industrial areas, making it fast and reliable for cargo delivery. Also superb inland transportation infrastructure is directly connected deep into the major cities by rail and expressway.

DO YOU HAVE SPARE PARTS CARGOES FROM KOREA?

FGL delivers ship's stores, provisions and spares to vessels at any port in the world. Furthermore, Fuji Global Logistics keeps the transit cargo with minimum expenses such as warehouse fees and delivers the transit cargo to all Korean Ports and dispatches other relative countries as instructed by customers

LOOKING FOR THE MOST RELIABLE BUSINESS PARTNER?

THAT'S "FUJI GLOBAL LOGISTICS".

Stock Management System

Hanil-Fuji (Korea) put the stock management system in place to store high quality products imported from abroad at cheaper prices and has been focusing on the supply of stock items over the last several years, as well as purchase and supply the products to the shipping companies. The company has secured over 500 items as of 2012 since 2005, and has steadily expanded the number of items to offer lower prices and improved price competitiveness. The advantage of using Hanil-Fuji (Korea)'s stock items is presented below.

**•COST SAVE**

Shipping companies can save 10% of the costs when they purchase the ship's stores and provisions if the quotations are based on the stock management system.

•Advanced Stock Management System

Hanil-Fuji (Korea)'s stock management system is constantly

managed through the collection and sharing of various information. Many items are being kept in storage and the monthly and yearly consumption of each item is measured to create the database. As the system is linked with ERP system, the person in charge of sales can easily figure out the stock items when the quotations are produced.

•Storage for the management of stock item

To use many different stock items, a space is necessary to hold the items in storage for a long time. Any lack of the storage will act as a constraint in using the stock items. Hanil-Fuji (Korea) has broad storage area in the free bonded area and can supply the stock items anytime according to the requirements of ship owners.

•Coexistence with overseas vendors

Hanil-Fuji (Korea) has secured various overseas vendors as the company regularly contacts them and places the orders. Furthermore, Hanil-Fuji (Korea) is focusing on identifying new overseas vendors to provide higher quality items at more affordable prices to the ship owners. Hanil-Fuji (Korea) has seen its orderbook for ship's stores swelling even amid fierce competition, and the key driver for the company's increased order intake is the stock management system with affordable prices, systematic stock item management through constant database integration, exclusive warehouse for the stock items, and reliable and excellent overseas vendors.

New Provision Services

Hanil-Fuji (Korea) is the leading company of marine service provider. For the better service, Hanil-Fuji (Korea) is pleased to inform that the new service of provisions is started. Hanil-



Special Focus

Fuji (Korea) is so sure that its quality of provisions is quite better than any other suppliers in the world. Fuji Global Logistics has owned provision import department from worldwide which they purchase original European brand in order to meet customers' taste.



Also the company deeply pays attention to quality matter and does not supply lower quality provisions to ship's owners. The company is supplying its provisions to lots of new building vessels in Korea, and all captains are satisfied with the company's food quality and best service. Moreover, Hanil-Fuji (Korea) made 2 Big Cold Store in the Fuji Global Logistics's new warehouse, and it can keep the provisions as fresh as possible. And Hanil-Fuji (Korea) started to import provisions by itself, including Beefs. With its warehouse and imported provision items, Hanil-Fuji (Korea) can give customers the best condition of provision supply.

Also Hanil-Fuji (Korea) wants to explain advantages for using Hanil-Fuji (Korea). Hanil-Fuji (Korea) guarantees the quality of each item as high marine standard. If there is found any inferior item under correct usage during the voyage, Hanil-Fuji (Korea) is able to exchange them by free of charge within one year after delivery through our Fuji World Wide Network (Singapore, Rotterdam, USA, Dubai, Japan, Korea, China etc.) at customers' convenient port.

Hanil-Fuji (Korea) has awarded ISO 14001 and achieve continual improvement of its environmental performance through developing the source for garbage bag & galley soap etc as "Eco-Friendly items" and expanding the number of items continuously. Thus, Hanil-Fuji (Korea) would appreciate if its customers keep above its advantages in mind.

Ship's spare parts services

Hanil-Fuji (Korea) is an authorized spare parts sales agent of STX MAN engine and many auxiliary machine manufacturers in Korea (Donghwa Entec, Donghwa Pneutec, Sam Gong, Hi-Air Korea, Jung-A Marine, OPCO, etc).

It is widely-known that the use of imitation parts can cause problems with vessel systems/machines, and result in exorbitant, unplanned for expenses. Because at Hanil-Fuji (Korea) only uses genuine parts, the quality can be guaranteed, reducing customers' financial risk and giving them peace of mind.

Keeping costs low is in the best interest of any successful business. When faced with the decision between purchasing imitation parts and genuine parts, it is tempting to purchase imitation parts as their costs are lower... initially. But in the long run, the cost of purchasing imitation is a lot pricier. Using genuine parts is the cost effective choice as the lifetime is longer with safe running and quality is guaranteed.



Technical Services

Hanil-Fuji (Korea) has been provided a wide range of repair & reconditioning services for diesel engines & related equipments and also annual inspection of all safety & nautical equipments of the vessels. The company's customers see Hanil-Fuji (Korea) as a technical solution partner in avoiding revenue loss when the unexpected occurs.

As for annual & 5-years inspection service for lifeboat & boat davit, Hanil-Fuji (Korea) has authorized service engineers who have been trained by Korean & Japanese manufacturer's training program and they are providing qualified services.



(Source: Daewoo Shipbuilding & Marine Engineering)

tion. Hanil-Fuji (Korea) works closely with leading equipment manufacturers in Korea and Hanil-Fuji (Korea) has shared valued information with them.

Marine and offshore lubricant solutions

Hanil-Fuji (Korea) is an authorized lub-oil distributor of the SHELL and Hanil-Fuji (Korea) is one of the biggest suppliers in marine & offshore field. Hanil-Fuji (Korea) has been supplied a balanced range of lubricants in this field and have various local & world-wide networks so customers will be satisfied with its time effective management service. Hanil-Fuji (Korea) is firmly

Quick responding to critical situations with services of high quality has earned the company a strong position with technical managers who focus on the value of uninterrupted opera-

convinced that it will become the leader of total lubricant oil service in the world. ⚓

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HHI clinched an order worth USD 620 million from Rowan for a drillship

Hyundai Heavy Industries (HHI) added a drillship to its orderbook in the second half of this year.

HHI announced on September 13 that it won an order worth USD 620 million from the Houston-based drilling firm Rowan for the construction of a drillship. This contract includes an optional vessel, raising the expectation for additional order in the period ahead.

Rowan placed its first drillship order in June 2011 with HHI in recognition of the shipbuilder's excellent technology. Rowan, which is currently expanding its business into the deepwater drilling sector, has ordered all four of its drillships to HHI.

This drillship will measure 229m in length and 36m in width with a drilling depth of up to 12km from the surface of sea. HHI will begin the design process from this month and deliver the new-build drillship to the ship owner by the first quarter of 2015. Particularly, this drillship will adopt the drillship-specific design to optimize the size, reduce the maintenance costs and enhance the fuel efficiency. In addition, this drillship is fitted with the thruster, the core equipment, which can be repaired on board and thus dramatically reducing the maintenance and repair costs.

Besides, this drillship is equipped with the state-of-art systems, including the computer propulsion system, positioning control systems that allows the vessel to maintain a fixed position in severe weather conditions with high waves, and also equipped with the 7 BOPs (blowout preventers), instead of 6 BOPs, to increase the stability.

This year, HHI secured orders for 2 drillships and 2 semi-submersible rigs in the drillship sector, and also won orders for 6 units of LNG carriers and 1 unit of LNG FSRU, the high value-added vessels, thereby overcoming the sluggishness in the ordinary commercial vessel market.

현대중공업, 로완(Rowan)사로부터 드릴십 1척 6.2억 달러 수주

현대중공업이 올해 하반기 들어 드릴십 1척을 추가했다. 현대중공업은 미국 휴스턴의 시추전문회사 로완(Rowan)사로부터 총 6.2억불 규모의 드릴십 프로젝트를 수주했다고 지난 9월 13일 발표했다. 이 계약에는 옵션 1척도 포함되어 있어 향후 추가 수주가 기대된다.

로완사는 지난 2011년 6월 첫 드릴십을 발주하며, 뛰어난 성능과 기술력을 지닌 현대중공업을 선택한 바 있다. 이후 심해 시추로 사업영역을 확장하고 있는 로완사는 드릴십 4척을 모두 현대중공업에 발주했다.

이번에 수주한 드릴십은 길이 229m, 폭 36m 크기로 해수면으로부터 최대



The drillship which HHI delivered to Deepsea Metro in November 2011.

12km까지 시추가 가능하다. 현대중공업은 이달부터 설계에 들어가 오는 2015년 1분기 선주사에 인도할 예정이다. 특히 이 드릴십은 전용 설계로 선박의 크기를 최적화해 유지비를 줄이는 대신 연료의 효율을 높인 것이 특징이다. 여기에 핵심설비인 스러스터(Thruster)의 선상 수리가 가능하도록 해 유지, 보수에 따른 비용을 크게 줄일 수 있다.

이밖에 파도가 심한 해상에서도 위치를 스스로 제어할 수 있는 위치제어시스템과 컴퓨터 추진시스템 등 각종 최첨단 장치를 적용했으며, 기존 6중 폭발방지장치(BOP)도 7중으로 확대 적용해 안전성을 높였다.

현대중공업은 올해 시추선 부문에서 드릴십 2척과 반잠수식 시추선 2척을 수주했으며, LNG 6척, LNG FSRU 1척을 수주하는 등 일반상선 시장의 불황을 연이은 고부가가치선 수주로 타개하고 있다.

STXOS signed a KRW 500 billion contract to build a ultra large FSO

STX Offshore & Shipbuilding (STXOS) announced on September 4 that it was awarded a turnkey contract worth KRW 500 billion to build a FSO (Floating Storage Offloading) for a North African oil company. This ultra large FSO has the storage capacity of 1.5 million barrels of crude oil which is equal to approximately 70% of Korea's daily consumption of oil. This FSO measures 324m in length and 51m in width, which is about 3.5 times larger than a soccer field.

Under this contract, STXOS will undertake the design, production, installation, commissioning and sea trials, including the production of submarine pipeline system, as well as the construction of the FSO that will be deployed in the North African sea.

STX successfully delivered a FSO with a storage capacity of 2.2 million barrels, which was ordered from a Middle East-based oil company in 2008, in the beginning of this year. This time, STX won the bid for the construction of a FSO that has a storage capacity of 1.5 million barrels, thus cementing its leadership in the market for large FSO and making headway into the offshore plant sector.

An official from STX said, "STX has gained reputation for its world's best expertise and technology in the construction of drillship since it built the pipe-laying vessel, and is also highly recognized in the field of FSO. This contract is meaningful as it paves the way for STX to make full-fledged entry into the market for large offshore plants such as FLNG, FPSO and others."

STX조선해양, 5,000억원 규모 초대형 FSO 수주

STX조선해양은 북아프리카의 석유회사로부터 한화 5,000억원 규모의 부유식원유저장설비(FSO, Floating Storage Offloading) 건조에 관한 턴키베이스 공사의 낙찰 통보를 받았다고 지난 9월 4일 밝혔다.

STX조선해양이 수주한 초대형 부유식원유저장설비는 150만 배럴의 원유를 저장 가능하다. 150만 배럴은 우리나라 1일 석유사용량의 약 70%에 해당하



FSO with a storage capacity of 2.2 million barrels, built by STX.

는 분량이다. 이 부유식원유저장설비는 원유 저장능력만 큼 크기도 엄청나다. 이 설비는 길이 324m, 너비 51m의 규모로서 축구장 약 3.5개에 해당하는 크기다.

이번 계약을 통해 STX조선해양은 북아프리카 해역에 투입될 부유식원유저장설비의 건조는 물론 해저 파이프라인 시스템을 포함한 심해 작업에 대한 설계, 제작, 설치 및 해상 시운전까지 담당하게 됐다.

STX는 2008년 중동의 석유회사로부터 수주한 220만 배럴 규모 부유식원유저장설비를 올해 초 성공적으로 인도했으며, 이번에 다시 150만 배럴 규모 부유식원유저장설비를 추가 수주하면서 대형 FSO 시장의 강자로 새롭게 자리매김함과 동시에 해양플랜트 사업에 본격적으로 진입하게 됐다는 평가다.

STX 관계자는 "해저 파이프 부설선을 시작으로 드릴십 건조에서 세계 최고라는 평가를 받은 데 이어 부유식원유 저장설비 분야에서도 업계의 확고한 인정을 받았다"면서 "이번 수주는 STX가 FLNG, FPSO 등 초대형 해양플랜트 사업에 본격 진입한다는 중요한 의미도 지니고 있다"고 밝혔다.

Nexans secures 10-year global frame agreement with BP to supply umbilicals and pipeline heating systems

Nexans has secured a 10-year global frame agreement with BP International Limited, UK to supply umbilicals, DEH (Direct Electrical Heating) systems, accessories and services for various oil and gas projects worldwide.

The agreement runs from 2012 to 2022. It covers the design, manufacture and supply of bespoke umbilicals that will carry fluid, power,

control and telecommunication services for new sub-sea oil and gas projects together with DEH systems that provide flow assurance in pipelines. Nexans has had two umbilical frame agreements with BP Exploration and Production Inc., one secured in 2003 and the other in 2009 for deep water umbilical pro-



New Orders

jects in the Gulf of Mexico.

"We are delighted to secure this major long-term umbilical/DEH frame agreement with BP. It further cements Nexans' place in the market as a key strategic supplier of subsea systems for demanding offshore oil and gas projects across the world," says Ragnvald Graff, Sales & Marketing Director, Hybrid Underwater Cable Division, Nexans. "The key factors in winning this latest agreement with BP included our proven technical and organizational capabilities, our well-established manufacturing capacity to meet the required production schedules for on-time delivery and our attention to quality and HSE performance."

넥상스, BP와 10년간 umbilical 케이블 및 파이프 라인 히팅 시스템 공급

넥상스는 영국의 BP 인터네셔널과 10년간 전세계의 다양한 오일 & 가스 프로젝트에 사용될 umbilical, DEH (Direct Electrical Heating) 시스템 및 서비스를 제공하는 계약을 체결했다.

이번에 체결한 계약은 2012년부터 2022년까지 유효하며, 파이프 라인의 원활

한 흐름을 보장하는 DEH 시스템과 함께 유체, 전력, 제어 및 통신 서비스를 제공하는 맞춤형 umbilical의 설계, 제조 및 공급을 모두 포함하고 있다. 이미 넥상스는 2003년과 2009년에 BP E&P(Exploration and Production)로 부터 멕시코만의 심해 umbilical 프로젝트를 수주한 바 있다.

넥상스의 하이브리드 해저 케이블 사업부문의 영업&마케팅 임원인 라그발드 그라프(Ragnvald Graff)는 "넥상스는 BP와 10년간 장기 umbilical/DEH 기본 계약을 체결하게 되어 매우 기쁘다. 이번 계약으로 넥상스는 전세계의 offshore 오일&가스 프로젝트에서 필요로 하는 해저 시스템의 전략적인 공급업체로서의 위상을 더욱 공고히 할 수 있게 되었다.

이번 BP와 장기계약을 체결하게 된 가장 큰 요인은 입증된 기술력과 탁월한 조직력, 납기 준수에 꼭 필요한 생산 계획을 차질 없이 진행할 수 있는 잘 갖춰진 설비 그리고 품질뿐 아니라 보건, 안전 및 환경에 대한 우리의 끊임 없는 노력 덕분이다."라고 말했다.

STX received an order worth KRW 150 billion for offshore patrol vessels

STX Offshore & Shipbuilding (STXOS) announced on September 3 that it signed a contract with Korea Coast Guard to build 2 units of 3,000-ton offshore patrol vessel and 1 unit of 1,000-ton offshore patrol vessel. The contract is valued at approximately KRW 150 billion.

The 3,000-ton offshore patrol vessel will be 115m long and 14.2m wide, while the 1,000-ton offshore patrol vessel will be 91m long and 11.8m wide.

These offshore patrol vessels can sail at a maximum speed of 30 knots and have their own helicopter pads. Moreover, these vessels will be armed with 40mm automatic cannons and 20mm vulcan automatic cannons and have the high speed boats with a speed of 40 knots, in addition to the fire extinguishing water cannon capable of spraying 20 tons of water per minute. Both will be built at Jinhae shipyard of STXOS from 2013 and delivered to the ship owner by December 2015.

Meanwhile, STXOS successfully built Zemin No. 12 and Zemin No. 13, the 1,500-ton offshore patrol vessels, and delivered them to Korea Coast Guard in December 2010 and February 2011, respectively.

STX조선해양, 1,500억원 규모 해경경비함 수주

STX조선해양은 해양경찰청으로부터 2척의 3,000톤급 해경경비함과 1척의 1,000톤급 해경경비함을 수주했으며, 총 수주금액은 1,500여억원에 달한다고 지난 9월 3일 밝혔다. 이번에 STX조선해양이 수주한 3,000톤급 해경경비함



1,500-ton high speed offshore patrol vessel built by STXOS.

은 길이 115m, 너비 14.2m이며, 1,000톤급 해경경비함은 길이 91m, 너비 11.8m의 대형 경비함이다.

이 해경경비함은 약 30노트의 속도로 운항 가능하며 헬기 탑재능력을 갖추고 있다. 또한 40mm 자동포와 20mm 발칸포 및 40노트급 고속 단정이 탑재되고 분당 20톤의 물분사가 가능한 소화포 설비도 장착될 예정이다. 2013년부터 STX조선해양 진해조선소에서 건조되며, 2015년 12월까지 인도될 계획이다.

한편 STX조선해양은 1,500톤급 해경경비함 '제민12호 및 제민13호'를 성공적으로 건조하여 2010년 12월과 2011년 2월 해양경찰청에 인도한 바 있다.

The Shipbuilding Marketshare



Korean shipyards recorded the lowest newbuilding orders in August this year. According to the data published by Clarkson, new orders placed at Korean shipyards last month remained at 150,000CGT with 6 vessels, which is the lowest monthly total over the last 3 years.

In August, the global newbuilding orders stood at 1.39 million CGT with 71 vessels. Chinese shipyards won new orders totaling 700,000CGT with 35 vessels, which account for 50% of the newbuilding orders placed worldwide. Particularly, Chinese shipyards' order-book contains a good balance of vessels such as bulkers, containerships, tankers, gas carriers, etc.

This year, the newbuilding orders which have been placed at Chinese shipyards from January to August stood at 4.26 million CGT with 260 vessels worth approximately USD 8.8 billion. Although the newbuilding orders at Korean shipyards for the same period stood at 4.79 million CGT with 154 vessels, the total value of the newbuilding orders placed at Korean shipyards amounted to approximately 16.4 billion which is more than twice the total value of newbuilding orders clinched by Chinese shipyards. This gap in total value is attributed to the fact that Korean shipyards won new orders for high-priced vessels, such as LNG/LPG carriers, drillships, etc., and offshore plants.

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

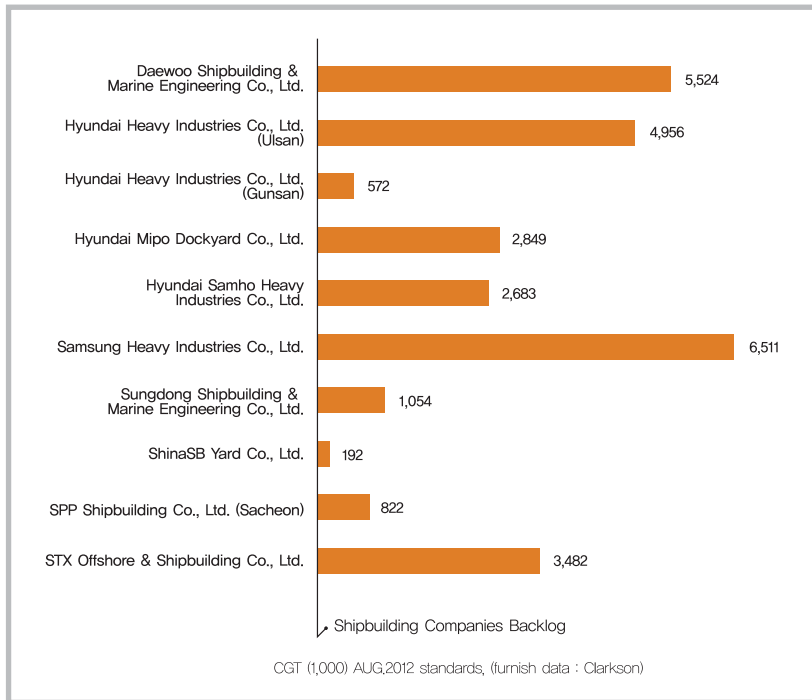


Photo : STX Offshore & Shipbuilding Co., Ltd.



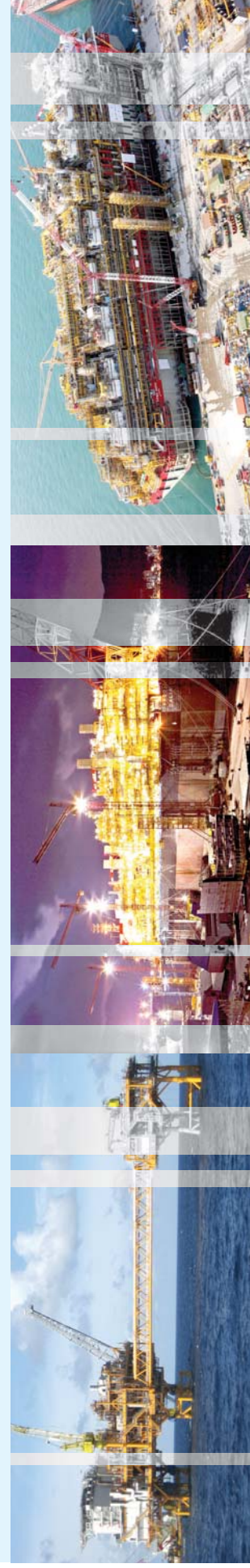
Offshore Plant Orders

Offshore plant orders awarded to domestic shipyards in 2011-2012

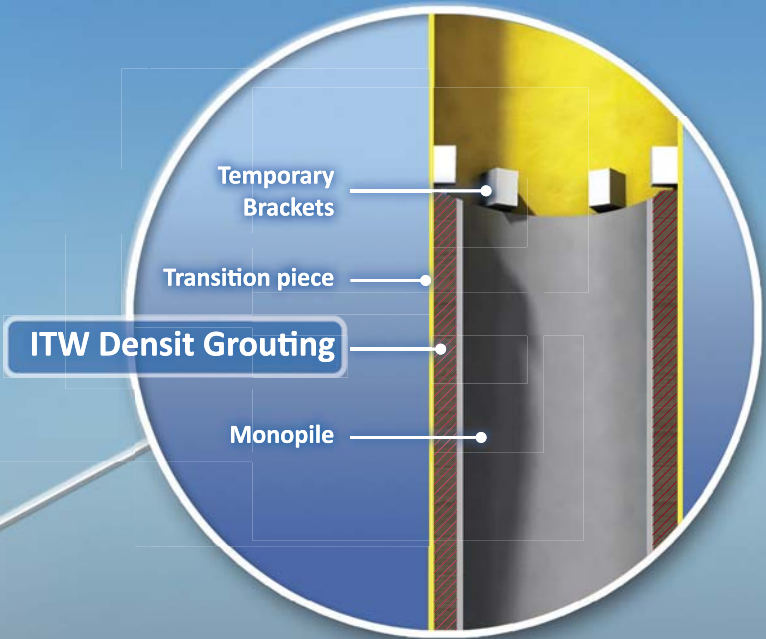
Date	Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard
January	Drillship	1 vessel (including 1 optional vessel)	KRW 590 billion	Diamond Offshore Drilling Limited, U.S.A	Mid 2013	Hyundai Heavy Industries
	Offshore Plant	-	USD 900 million	RasGas, Qatar	Late 2013	Hyundai Heavy Industries
	Drillship	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
February	Deepwater drillship	1 vessel	-	Atwood Oceanics, U.S.A	Second half of 2013	Daewoo Shipbuilding & Marine Engineering
	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
March	Fisheries Research Vessel	1 vessel	EUR 35 million	Ministry of Fisheries and Marine Resources, Republic of Namibia	Early 2012	STX Finland
	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	KRW 1.2 trillion	Aker Drilling, Norway	Second half of 2013	Daewoo Shipbuilding & Marine Engineering
April	Drillship	2 vessels	USD 1.1 billion	Ship owner, U.S.A	June 2012	Samsung Heavy Industries
	Platform Supply Vessel	1 vessel	-	Norsea Group AS, Norway	2012	STX OSV
	Platform Supply Vessel	1 vessel	-	-	2012	STX OSV
May	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
June	Shuttle Tanker	2 (including 2 optional vessels)	USD 200 million	European Navigation, Greece	2013	STX Offshore & Shipbuilding
	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
July	Offshore Platform (Top side of offshore platform)	-	USD 414 million	Statoll, 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
August	FPSO	1 unit	-	PTSC, Vietnam	Early 2013	Sungbong Shipbuilding & Marine Engineering
	LNG-FPSO	1 unit	USD 3,026 billion	Royal Dutch Shell, U.S.A	2016	Samsung Heavy Industries
	Platform Supply Vessel	2 vessels	Around KRW 150 billion	Island Offshore, Norway	First quarter, third quarter of 2013	STX OSV
September	LNG-FSRU	2 units	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
October	Drillship	2 vessels	USD 1,122.5 billion	Maersk, Denmark	July 2014	Samsung Heavy Industries
	LNG-FSRU (Floating Storage and Regasification Unit)	1 vessel	USD 280 million	Excellerate Energy, U.S.A	First quarter of 2014	Daewoo Shipbuilding & Marine Engineering

September	Semi-submersible Rig Well Intervention Vessel	2 units 2 vessels 1 unit (optional vessel awarded on January 19)	USD 1.1 billion USD 420 million	Songa Offshore, Norway Eide Marine Services AS, Norway	Second half of 2014 2013	Daewoo Shipbuilding & Marine Engineering STX Finland
October	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
	Fixed Offshore Platform	-	USD 1.4 billion	Chevron, U.S.A	Second half of 2014	Daewoo Shipbuilding & Marine Engineering
October	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
October	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
	CPF (Central Processing Facility)	-	KRW 2.6 trillion	Australia / INPEX	4th quarter of 2015	Samsung Heavy Industries
January	Semi-submersible rig	1 unit	USD 620 million	Norway / Ocifjel	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 AS	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	Enscoplc	Third quarter 2014	Samsung Heavy Industries
	Semi-submersible Drilling Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Mid 2015	Daewoo Shipbuilding & Marine Engineering
May	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 Bernhad, Malaysia	June 2015	Daewoo Shipbuilding & Marine Engineering
July	Drillship	1 vessel	USD 645 million	Enscoplc	-	Samsung Heavy Industries
	Gas Compression Platform	1 unit	USD 420 million	(Letter of Award)	Second half of 2015	Hyundai Heavy Industries
Aug	LNG-FSRU	8 vessels	-	Excelerate, U.S.A	Between early 2015~2017	Hyundai Heavy IndustriesDaewoo Shipbuilding and Marine Engineering
Sep	Drillship	1 vessel	USD 620 million	Rowan, U.S.A	First half of 2015	Hyundai Heavy Industries
	Drillship	1 vessel	USD 623 million	-	-	Samsung Heavy Industries

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



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The land where the ships are born and grow

- Panoramic view of domestic and overseas shipyards

A shipyard with a history of almost 300 years, the world's oldest, recently shut down. Stephenson Clarke shipping, a Britain's shipping firm established in 1734, opened when King George II was on the throne. This shipyard, which thrived during the Industrial Revolution and survived the two World Wars, recently went into liquidation due to the recent economic recession. The shutdown of this shipyard may suggest the graveness of the current crisis facing

the shipbuilding industry.

The data published by Clarkson show the monthly cumulative order intake of 166 shipyards. There may be more shipyards around the globe. China, the neighboring country, has hundreds of shipyards. Korea has about 20 shipyards, including small and medium-sized ones.

Shipyard literally means the site to build and repair ships. This 'Major Performance Galley' Section provides the panoramic view of domestic and overseas shipyards to meditate on the meaning of shipyard. ⚓



Samsung Heavy Industries (SHI) has successfully completed diverse projects with the aim of securing global leadership in various sectors including shipbuilding, offshore, engineering and construction, wind power, power and control systems. Most notably, it has achieved unbeatable leadership in the high-tech high-value shipbuilding sector by maintaining the world's No. 1 share in the drill ship, ultra-large container ship, LNG carrier and FPSO markets.





Hyundai Heavy Industries (HHI)'s Ulsan shipyard, which broke the ground in October 1971, began to obtain the orders and build ships since its construction of 2.6 million dw very large crude carrier(VLCC) in 1973, and played key role in catapulting Korea into the ranks of the world's top 10 shipbuilding countries. So far, HHI's Ulsan shipyard has delivered approximately 1740 vessels to 272 ship owners in 48 countries.

Keppel Offshore & Marine is involved in offshore rig design, construction and repair, ship repair and conversion and specialised shipbuilding. With 3 major division, each covering different sector of the Offshore and Marine Operations, consisting of Keppel Fels, Keppel Shipyard and Keppel Singmarine. (Source: Keppel)



Major Performance Gallery



Daewoo Shipbuilding & Marine Engineering (DSME) uses factory area of 351,000m² among total 4million m² yards, 4,988m of outfitting quay, 11.3m of quay water level, 0.2m of surrounding average wave height, 17.5°C of average temperature, where is 40 commercial ships, 100,000tons of land and marine plants, submarine, war ship and various special ships are built in the facility.



Zvezda-DSME shipyard is the joint venture formed between USC (United Shipbuilding Corp.) and DSME, located in Vladivostok, Russia.

Hantong Shipbuilding & Heavy Industry





Sungdong Shipbuilding & Marine Engineering



STX Offshore & Shipbuilding
STXOS is one of the best shipbuilder contributed the growth of Korea's shipbuilding industry constructing about 700 ships in their 40 years history. STX accomplish 'global triangle production belt' connecting JinHae, Busan and Dalian Shipyards by taking opportunity buy STX Europe (old name Aker Yards), World's best cruise ship maker, last year.

Major Performance Gallery



Hanjin Heavy Industries
(Yeongdo Shipyard)

Source: The Economic Times





Hyundai Samho Heavy Industries



SPP Shipbuilding (TongYong Shipyard, Gosung Shipyard, SaCheon Shipyard)

Wärtsilä's GenerationX Engines offer a shorter route to greater profits

Wärtsilä Korea

Wärtsilä, the marine industry's leading solutions provider, made a significant contribution to lowering marine engine fuel costs and improving environmental performance when, in May 2011, the company introduced its new generation of 2-stroke engines; the Generation X series of engines.

The Wärtsilä X35 and X40 engines cover the small-bore end of the market. The Wärtsilä X62 and X72 engines are designed specifically for medium sized, bulker, tanker and container Panamax and feeder vessels, and the most recent addition to the engine series is the Wärtsilä X92 engine, which is planned for delivery in 2014. The X92 is aimed for providing propulsion power for large and ultra large container vessels of 8000 TEU and above. All X-series engines have higher internal efficiencies and extended power/speed layout fields, and are notably more economical than other engines in their market segment.

Competitive operational performance

The technologies employed in the Wärtsilä Generation X Engines have been derived from proven existing 2- and 4-stroke engine designs. They include cylinder lubrication, common rail fuel injection, exhaust valve control, and the Wärtsilä UNIC™, (Unified Controls) system. Each of these technologies features highly competitive operational performance. The well proven, electronically controlled, common rail fuel injection system, together with the extra long stroke and low rpm, results in exceptional efficiencies.

For example, fuel consumption can be reduced by as much as 10 percent compared to current engine installations. Exhaust emissions are also considerably lowered, while lubricating oil consumption is also optimised. The improvement in emission levels of CO₂ naturally makes it easier for shipyards to achieve a better Energy Efficiency Design Index (EEDI).

The engine speeds and power ranges selected for the Wärtsilä Generation-X engines offer flexibility throughout a broad variety of operational applications. Additional flexibility is provided by the enlarged layout field. This enables the ability to select the most efficient propeller speed to attain the minimal daily fuel consumption, and the most economical propulsion solution for the propeller's diameter and shafting.

Easing environmental regulation compliance

The common rail fuel injection is time controlled, and the injection pressure is maintained at the optimum level irrespective of the engine speed. At very low speeds, individual fuel injectors are shut off and the exhaust valve timing is adjusted to help keep smoke emissions below the visible limit.

Another benefit is the lower fuel consumption at part loads than that achieved by conventional camshaft-type engines. Additionally, two alternative fuel consumption profiles are available as standard through Delta Tuning and Low-Load Tuning, to give even lower brake-specific fuel consumption in what is the main operating

range for many vessels.

The overall flexibility of the Wärtsilä Generation X Engines eases compliance with current and pending environmental regulations, with carbon dioxide (CO₂), sulphur oxide (SO_x), and nitrogen oxide (NO_x) emissions all reduced. The engines are already IMO Tier II compliant, and are prepared for the forthcoming Tier III requirements.

In line with current and future needs

The shipping industry needs to rapidly adjust to changing market conditions. Economies of scale, increasing fuel prices and operational costs are driving the search for greater efficiencies, and environmental legislation is a major challenge throughout the marine sector. The Wärtsilä Generation X series of engines was developed with all these needs in mind, and is exactly in line with the industry's current and future needs.

The X35 and X40 engines are intended for small bulk carriers, product tankers, general cargo vessels, reefers, feeder container ships, and small LPG carriers. The first of these electronically controlled, low speed engines was started in November 2011 and passed its factory test in February 2012. The X35 covers a power range of 3475 to 6960 kW at 142 to 167 rpm, while the X40 has a power range of 4550 to 9080 kW at 124 to 146 rpm. Both engines are available in 5 to 8 cylinder configurations.

The X62 and X72 are compact mid-sized engines for main power applications in merchant vessels, such as Capesize bulk carriers, Panamax bulk carriers, Aframax tankers, Suezmax tankers, and also Feeder and Panamax container ships (1600 to 4500 TEU). The X62 and X72 are the most compact engines in their class and feature a minimal physical width. This results in a slimmer aft vessel design for further propeller efficiency gains. The power range is from 6,00 to 21280 kW, while the X72 has a power output in the 8880 to 28880 kW range. Both engines are available in 4 to 8 cylinder configurations.

The X92 is the latest of the Wärtsilä Generation-X engines to be introduced. It is in direct response to the industry's move towards larger ships and more efficient propulsion systems, particularly in the container sector. The X92



engine covers the power range from 25860 to 70200 kW and is available in 6 to 12 cylinder configurations.

Multiple benefits

In addition to all the operational and cost benefits outlined above, reliability is central to everything. The technologies used in the development of the Wärtsilä Generation Engines are well known and validated, as exemplified by the time controlled fuel injection system that serves also to improve operating costs.

The overall reliability of these engines, together with the lower fuel costs and reduced maintenance expenditures that they offer, leads inevitably to a lower total cost of ownership. Extended intervals between overhauls and the possibility to re-manufacture key components are the key in being able to reduce maintenance costs. Plus, because the engines are easier to operate and service, highly trained crews are not required.

The route to profits for shipping industry owners and operators has been a difficult one during recent years. However, the Wärtsilä GenerationX Engines have been designed in close co-operation with customers to meet the many-fold challenges that they face, and to shorten the route to industry profits.

-TEL: +82-51-329-0674
-http://www.wartsila.com

New NI CompactRIO Expansion Chassis

National Instruments Corporation

National Instruments released the 8-slot NI 9154 MXI-Express RIO expansion chassis and the 4-slot NI 9146 Ethernet RIO expansion chassis. CompactRIO expansion chassis scale the breadth of the C Series platform to applications requiring hundreds or even thousands of I/O channels. Engineers can gain full control of the field-programmable gate array (FPGA) capabilities inside both chassis using the NI LabVIEW FPGA Module, which enables custom inline processing, closed-loop control, synchronization, and custom timing and triggering.

- CompactRIO expansion chassis now include two new options that offer connectivity to industrial sensors through NI C Series mixed-signal-conditioned I/O modules.
- The 8-slot NI 9154 MXI-Express RIO expansion chassis is designed for applications that require high channel counts, increased throughput, and custom signal processing and control, such as rapid control prototyping, hardware-in-the-loop test and complex research applications.
- The 4-slot NI 9146 Ethernet RIO expansion chassis helps engineers easily add C Series mixed-signal-conditioned I/O to any PC or Ethernet network and is ideal for cost- and time-sensitive distributed monitoring or control applications.

NI 9154 Features

- High-throughput MXI-Express x1 interface for 200 MB/s multichassis streaming



bandwidth

- Access to thousands of I/O channels from a single controller by daisy chaining multiple CompactRIO devices, NI PXI chassis, NI industrial controllers or PCs
- Support for up to eight C Series mixed-signal-conditioned I/O modules, enabling direct connectivity to any sensor on any bus

NI 9146 Features

- Simplified software experience, which helps engineers seamlessly add distributed monitoring and control to any Ethernet network
- Instant access to FPGA-enabled I/O using LabVIEW from any Windows PC or LabVIEW Real-Time controller
- Diagnostic and auto-configuration features that simplify installation, operation and maintenance
- Low power consumption, quick startup times and rugged industrial construction

-TEL: +82-3451-3400

-http://ni.com/korea

NX 8.5 delivers customer-driven enhancement to help reduce time to market

Siemens PLM Software

Siemens PLM Software announced the latest release of NX™ software, the company's fully integrated computer-aided design, manufacturing and engineering analysis (CAD/CAM/CAE) solution. The latest version, NX 8.5, includes extensive customer-driven enhancements and new capabilities that provide increased flexibility and productivity across product engineering and manufacturing to help reduce time to market. NX 8.5 builds on Siemens PLM Software's HD-PLM vision, which was established to help companies make smarter decisions more efficiently and with a higher level of confidence.

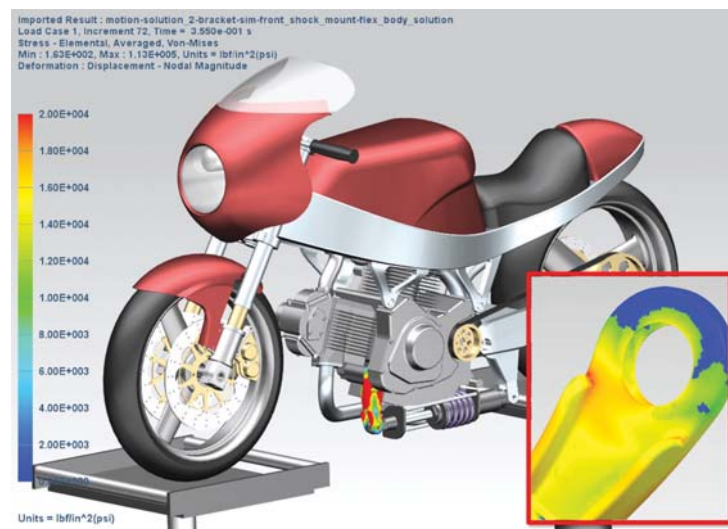
NX 8.5 for Design

NX 8.5 delivers a wide range of new and enhanced design functionality, to help improve efficiency and reduce design time. Streamlined workflows and an enhanced user experience help improve productivity, minimize input, and reduce the effort required to accomplish design tasks.

In addition, new design commands help shorten design cycle times by up to 30 percent. For example the new Emboss Body command requires fewer steps when combining a region of faces from another intersecting solid or sheet body. NX 8.5 also includes new capabilities for feature modeling, sheet metal design, freeform modeling, validation checking and drafting.

NX 8.5 for Simulation

NX 8.5 includes new simulation enhancements that help development teams more efficiently engineer products. For example, new optimization tools such as NX Shape Optimization, suggest specific, detailed improvements to



an existing design to reduce stress concentrations. NX 8.5 also includes improvements in simulation modeling, structural, thermal, flow, motion and multi-physics analyses to help prepare more accurate analysis models faster, and speed solution time by as much as 25 percent.

NX 8.5 for Manufacturing

NX 8.5 includes the full release of Volume Based 2.5D Milling. Customers working with the initial introduction of this solids-based approach to the programming of prismatic shaped parts have reported excellent ease of use and faster programming times. Also new are functions to support and automate multi-part and multi-stage machining. These new NX 8.5 CAM functions are particularly relevant to the type of parts commonly found in the machinery industry.

-TEL: +82-2-3016-2079
-http://www.siemens.com/plm

KOMEA (Korea Marine Equipment Association)

Member List

AMS CO., LTD.

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

BUMHAN INDUSTRIES CO., LTD.

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

BOYANG HARDWARE CO., LTD.

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

BY CONTROLS INC.

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

BC TAECHANG IND. CORP.

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

CHK CO., LTD.

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

CMR KOREA CO., LTD.

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

CAPE INDUSTRIES LTD.

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

Emerson Process Management Marine Solutions Korea Co., Ltd.

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

DAEYANG INSTRUMENT CO., LTD.

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

DAE JIN IND. CO., LTD.

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

DAE JIN DAMPHA CO., LTD.

head office : Ulju Ulsan.
homepage add :

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

DAECHUN INDUSTRIAL CO., LTD.

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

DAIHAN ANCHOR CHAIN MFG. CO., LTD.

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

DONG KANG M-TECH CO., LTD.

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

DONG WOO MACHINERY & ENGINEERING CO., LTD.

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

DONG-I INDUSTRIAL CO., LTD.

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

DONGHWA ENTEC

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

DOOSAN ENGINE CO., LTD.

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

DONGNAM MARINE CRANE CO., LTD.

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

DAEMMSTOFF INDUSTRIE KOREA LTD.

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

DAEYANG ELECTRIC CO., LTD.

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

DAE HEUNG COOLER CO., LTD.

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

DONG-A VALVE IND. CO.

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

DK TECH CORPORATION

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

DAE HEUNG MARINE CORP. LTD.

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

DONGJIN M.P. TECH CO., LTD.

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

DAECHANG METAL CO., LTD.

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

FINETEC CENTURY CORPORATION

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

GENERAL MARINE BUSINESS INC.

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

G.S HIGH TECHER CO., LTD.

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

GS-HYDRO KOREA LTD.

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

HY-LOK CORPORATION

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

HANKUK MIBOO CO., LTD.

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

HI AIR KOREA Co., Ltd.

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

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

HAN KOOK FLEXIBLE CO.

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

HANLA LEVEL CO., LTD.

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

HALLA INDUSTRIAL CO., LTD.

head office :
homepage add : www.hallaiq.co.kr
main products : Refrigeration Pumps (NH₃, R22, NHO₃, CO₂), Volute Pumps, Turbine Pumps
TEL : +82 51-264-2201/5

HANSHIN ELECTRONICS CO., LTD.

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

HAN JO CO., LTD.

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

HAEAN MACHINERY IND. CO., LTD.

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

HYUNDAI LIFEBOATS CO., LTD.

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

HYUNDAI MARINE MACHINERY CO., LTD.

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

HYUNDAI ELEVATOR CO., LTD.

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

HYUNDAI WELDING CO., LTD.

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

HYUN DAE FITTING CO., LTD.

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

HYUN JIN CO., LTD.

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

KANGRIM HEAVY INDUSTRIES CO., LTD.

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

KANGRIM INSULATION CO., LTD.

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

KUNSUL CHEMICAL IND. CO., LTD.

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

KYUNG EUN CERAMICS CO., LTD.

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

KUKDONG ELECTRIC WIRE CO., LTD.

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

KUMKANG PRECISION CO., LTD.

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

KUMOH MACH. & ELEC. CO., LTD.

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

KEYSUNG METAL CO., LTD.

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

K. C. LTD.

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

KSP CO., LTD.

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

KTE CO., LTD.

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

KOKACO CO., LTD.

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

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

MIN SUNG CO., LTD.

head office : Sasang Busan

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

M.H CONTROL VALVES CO., LTD.

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

MSL COMPRESSOR CO., LTD.

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

MYCOM KOREA CO., LTD.

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

MYCOM KOREA CO., LTD.

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

Myung Sung Engineering Co., Ltd.

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

Marine Radio Co., Ltd.

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

NK CO., LTD.

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

ORIENTAL PRECISION & ENGINEERING CO., LTD.

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

OSCG CO., LTD.

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

PANASIA CO., LTD.

head office : Gangseo Busan
 homepage add : www.pan-asia.co.kr
 main products : cargo monitoring sys. tank level gauge sys. high & 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.sjind.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, bollard
TEL : +82 55-346-0034

SUNG JIN GEOTEC CO., LTD.

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

STACO CO., LTD.

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

STX ENPACO CO., LTD.

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

SEOUL ELECTRIC CABLE CO., LTD.

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

SMECO

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

SURO PROPELLER & MACHINERY CO

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

SHIN-A ENTERPRISE CO., LTD.

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

TK CORPORATION

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

TAE YOUNG TRADING LTD.

head office : Junggu Seoul

homepage add : www.marine-material.com
main products : Receptacles & Wire Accessories, Floodlight, Deck Light, Reflected Lamps
TEL : +82 2-2272-1960

TANKTECH Co., Ltd.

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

TECHMARINE S/W CO., LTD.

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

FRIEND CO., LTD.

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

TMC CO., LTD.

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

WARTSILA ACCOMMODATION SYSTEMS KOREA, INC.

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

WOOCHANG IND. CO., LTD.

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

WHA YOUNG CO., LTD.

head office : Miryang Gyeongnam
homepage add : www.whayoung.co.kr
main products : Supply Unit Assy, Collector Block Assy, Fuel & Exh. Movement, Fuel Pump Assy
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.youjeonsteel.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/Aframax/Panamax Tankers, Shuttle/Chemical Tankers, Product Carriers, Containerships, Capesize/ Kamsarmax/ Supramax Bulk Carriers, Ore Carriers, VLCCs, Ro-Ro Ships, PCTCs, Passenger Car Ferries, FPSOs, FSOs, FPU, Drill Ships, Semi-Submersible Drilling Rigs, Fixed Platforms, Submarines, Submarine Rescue Vessels AUVs, Destroyers, Battle Ships

SAMSUNG HEAVY INDUSTRIES CO., LTD. (SHI)

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- Products : Arctic Shuttle Tankers, VLCCs, Crude Oil Tankers, Container Vessels, LNG/LPG Carriers, FPSO, FSO, Drillships, etc., LNG FPSO, Offshore Platforms, TLP, SEMI, Cruise Ships & Ferries, Steel Structures, Bridges & Building, Cargo & Material Handling Equipment

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- Products : Tankers, VLCCs, Product Carriers, Chemical Tankers, Containerships, LNG Carriers, LPG Carriers, Pure Car Carriers, Bulk Carriers, Other Vessels

STX OFFSHORE & SHIPBUILDING CO., LTD.

- Address : 100 Wonpo-dong, Jinhae, Gyeongnam, Korea • Tel : +82-55-548-1122 • Fax : +82-55-546-7928 • <http://www.stxship.co.kr>
- Products : Crude Oil Tankers, Product Oil Tankers, Chemical Tankers, Bulk Carriers, Container Ships, LNG/LPG Carriers, Pure Car & Truck Carriers, Ferries & Passenger Ships, Naval Ships, Special Purpose Ships, Offshore and offshore support vessel, Etc

HYUNDAI MIPO DOCKYARD CO., LTD. (HMD)

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- Products : Product/Chemical Tankers, Containerships, Self-Unloading Bulk Carriers, Multipurpose Cargo Carriers, Drillships, Cable Layers, Pipe Layers, FPSOs, Car Ferry & Passenger Ships, LPG Carriers, Pure Car / Truck Carriers, General Cargo Carriers, Ro-Ro Vessels

HANJIN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.

- Address : 29, 5-ga, Bongnae-dong, Yeongdo-gu, Busan, Korea • Tel : +82-51-410-3240 • Fax : +82-51-410-8477 • <http://www.hanjinsc.com>
- Products : Container Carriers, Product/Chemical/Crude Oil Tankers, LNG/LPG Carriers, Cable Ships, Supply Boats, Semi-Submersible Drilling Rigs, Dredgers, Naval Ships, Special Purpose Ships, Bulk Carriers

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- Address : 227, Danam-dong, Tongyeong, Gyeongnam, Korea • Tel : +82-55-640-3300/3302 • Fax : +82-55-649-2114 • <http://www.shinasb.co.kr>
- Products : 43,000DWT Stainless Steel Chemical Tanker, 44,000DWT Chemical Tanker, 45,000DWT Chemical Tanker, 51,000DWT Product/Chemical Tanker, 49,700DWT Product Tanker, 41,000DWT Product/Chemical Tanker, 40,000DWT Product/Chemical Tanker, 58,000DWT Supramax Bulk Carrier

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