KORSHIP Dec 2013 Vol.54

Korea monthly shipbuilding magazine

KORSHIP

Shipbuilding · Marine · Offshore · Offshore wind

2013. 12

Gastech 2014 Official Magazine

BETTER OFFSHORE AND SHIPBUILDING DESIGN

SmartMarine® 3D

ACCELERATE PROJECTS AND GAIN A COMPETITIVE EDGE

See why Intergraph® SmartMarine® 3D is the clear choice of offshore and shipbuilding industry leaders. Intergraph offers the world's most advanced offshore and shipbuilding design solution, featuring automated, rule-driven technology for the design, construction, and safe operation of your offshore facilities and ships. SmartMarine 3D, as part of our SmartMarine Enterprise solutions, provides a single, integrated environment for all disciplines involved in offshore and marine engineering and building.

Boost detail and manufacturing design productivity by an average of 30 percent and build safety into the design from the start. Streamline offshore and marine asset design processes for design-to-production accuracy and improve project delivery schedules. SmartMarine 3D is endorsed and used by leading offshore and shipbuilding companies globally, including the most productive shipyard, the top offshore owner operator, the top fabrication yard, and the top classification society in the world.

The future of engineering – today.

www.intergraph.com/go/smartmarine3d

INTERGRAPH KOREA OFFICE
16F & 18F Hongwoo Bldg. #1328, Seocho2-Dong Seocho-Gu
Seoul, Korea 137-858. Tel: (82) 02 3489 0300 Fax: (82) 02 3489 0388
www.intergraph.com

INTERGRAPH®

PART OF HEXAGON

Ready, Steady, Go!

Introducing Sensepoint XCD

XCD's unique tri-colour visual display allows the device's status to be seen at a glance - even from a distance! Using an instantly recognizable 'traffic light' system, the unit features three visual settings; steady green for normal operation, flashing yellow for a fault or warning and flashing red for an alarm.

Optimised for the detection of flammable, toxic and Oxygen hazards in potentially hazardous areas, XCD offers ease of operation and a low cost of ownership. Simple one man operation permits non intrusive configuration of the device, helping to reduce ongoing maintenance requirements.

Made in Korea!

MED approval
(MED-B-6360)

Honeywell Analytics - Experts in Gas Detection

Fixed Gas Detection

Our fixed range of gas detection products is suited to all types of applications and industries; from high functionality devices to low-cost systems ideal for the compliance market.

Toxic Gas Detection

Our toxic gas detection systems offer unrivalled sensitivity combined with flexible functionality to support a comprehensive array of gases including exotics.

Technical Services

From calibration work and maintenance to full end-to-end support, our technical services and additional support options provide expert assistance to ensure maximum up-time of your equipment.

Honeywell

Asia Pacific
Tel: +82 6909 0300
analytics.ap@honeywell.com

Europe, Middle east, India
Tel: +41 44 943 4300
gasdetection@honeywell.com

US, Canada, Latin America
Tel: +1 847 955 8200
detectgas@honeywell.com

www.honeywellanalytics.com

Customer-oriented & Technique-focused! Being proud to be your partner

Shiplift & Transfer

The SHIPLIFT SYSTEM is a modern marine elevator that safely lifts or lowers boats, ships or other marine vessels from or to the water. The TRANSFER SYSTEM can be arranged for any kind of ships or shipblocks on land, a shiplift platform or on a floating dock.

SSC (Ship Section Carrier)

Capacity : 50 ton ~ 1,000 ton
For combination of up to 10,000 ton

- High flexibility while operated with several steering programs
- High accuracy steering system (steering error at all positioning within 1°)
- Ring gear steering system (steering angle ±165°)

MTP (Module Transporter)

Capacity : 60 ton ~ 1,000 ton
For combination of up to 20,000 ton

- Ring gear steering system (steering angle ±165°)
- Flexible positioning under the load
- Center of Gravity Systems allows exact positioning under loads

RTP (Rail Transporter)

Capacity : 50 ton ~ 1,500 ton
For combination of up to 90,000 ton

- One operator controls the whole system via radio remote controller
- Hydraulic coupling for drive system and electric coupling cables not required.
- Reduce coupling time

Ra In Ho Co., Ltd. www.rainho.co.kr
19-89, Yulchonsandan 1-ro, Haeryong-myeon, Suncheon-si, Jeollanam-do, Republic of Korea
T +82 61 750 8800 / F +82 61 727 6696 / titan@rainho.co.kr

TITAN
ELEVATING TRANSPORTER

Germanischer Lloyd

Energy Efficiency by GL.

FutureShip´s maritime consultants and engineering experts supply energy-saving solutions for every ship in your fleet. For instance, the award-winning ECO-Assistant software for optimal ship trim.

www.futureship.de · www.efficiency-class.com · www.gl-group.com

Kukdong
a Nexans company

BECAUSE YOU NEED CABLE QUALIFIED FOR EXTREMELY LOW TEMPERATURES

WE CREATED **ICEFLEX®**, THE FIRST MARINE ENERGY CABLE TO RESIST ULTRA-COLD ARCTIC TEMPERATURES

Nexans
At the core of performance

For safe and secure arctic development, you need high performance cables. Nexans developed ICEFLEX®, the first marine energy cable qualified for extremely low temperatures. Even at –50°C, it remains highly flexible, resistant, while ensuring advanced fire performance. It was designed for all shipboard and offshore/onshore applications, making it easier to safely develop new oil and gas fields, shipping routes and refineries in the High Arctic. ICEFLEX®, the ultra cold cable which meets the arctic challenge... to help you achieve your goals.
www.nexans.co.kr

Save 25% pump power with a compact flowmeter?

Absolutely.

The new CoriolisMaster from ABB features one of the lowest pressure drops on the market today saving up to 25% on pump power. It is also one of the most compact coriolis mass flowmeters on the market. With no up or downstream piping requirements it can be installed in the tightest spaces, enabling applications not possible before. The new meter offers one of the widest measurement spans on the market. Other coriolis meters require two meter sizes to meet all applications, the new CoriolisMaster needs just one. Its smaller size and simplicity saves you precious time in installation, set up and maintenance. The new CoriolisMaster is simply the better alternative. Let us prove it.

Learn more.
www.abb.com/flow

ABB Korea
Tel. +82 2 528 3576
Fax. +82 2 528 3490
E-mail: chul-moon.kim@kr.abb.com

Power and productivity
for a better world™

ABB

www.kormarine.com

KORMARINE 2015

INTERNATIONAL MARINE, SHIPBUILDING &OFFSHORE EXHIBITION

OCT 20(TUE)-23(FRI)
BEXCO, BUSAN, KOREA

SECRETARIAT OF KORMARINE 2015 **K.Fairs Ltd.** | **E-mail.** jwlee@kfairs.com **Tel.** +82-2-555-7153 **Fax.** +82-2-556-9474

Organized by MOTIE · BUSAN METROPOLITAN CITY · KOSHIPA · Korea Marine Equipment Association · K.FAIRS LTD. · Reed Exhibition

Heavy Industries Happy Industries

Technology helps create the world that we dream of.
Hyundai Heavy Industries pursues the happiness of the global community with its advanced technology.

In the realm of heavy industries, our technology is everywhere, improving the quality of life and happiness of everyone.
We are building a world of shared dreams.

Shipbuilding | Offshore & Engineering | Engine & Machinery

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

Better ships, better performance

Safety is the foundation of our own and our clients' performance.

But we are about more than safety. Today our technical expertise is meeting the demand for ships that are designed and operated to perform better in every way, from the fuel they consume to the technologies and procedures they employ. And better performing ships means a better bottom line.

Talk to us today and see how we can help you.

Lloyd's Register – better ships, better performance

To find out more visit us on stand B02 at Sea Asia or go to www.lr.org/seaasia

Lloyd's Register

LIFE MATTERS

Parker KMSC
Korea Marine Service Center

Tech services | Kitting service | Breadman service

Engineering Advise

Design

Prefabrication

Delivery

Installation

Together, we can benefit from system solutions from a single supplier.

Parker offers you a new, integrated and innovative connector technology for hydraulic systems. From engineering advice on design and pre-assembly through to delivery and installation – everything is of the highest quality and reliability. KMSC provides hose assemblies, bending, pipe spool, Breadman services, Kitting, Tech Services, testing, flushing, On site Container and installation. Parker Piping Solutions stand for a very time- and cost-saving, as well as environmentally sound, manufacturing procedure.

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

ENGINEERING YOUR SUCCESS.

Parker

Parker Korea Marine Service Center
#1176-4, Jisa-dong, Gangseo-gu, Busan, Korea
Tel. 051 899 8500, Fax. 051 831 1410

Since 1968, JS Cable has been the leader in cable technology for marine and offshore applications

Where energy traverses the ocean, JS Cable is there.

A global company growing with its customers on the basis of trust and world-class technology. That is the future of JS Cable


Marine & Offshore Cables


Wind Turbines Cable


Nuclear Power Plant Cable


Crane Cable


Mining Cable


Electric Cable


Data Cable


Copper Rod

JS Cable
www.jscable.co.kr

Energy transfer solution provider

"Motor Business Since 1963
LG started it.
OTIS joined it.
HIGEN inspired it."

HIGEN MOTORS means Reliability and Quality for Shipbuilding Industry.

Explosion Proof Motors (Ex d)

71M ~ 250M

280M ~ 315M

355L

Fr. Size	Class	Poles and Rated Output			
		2P	4P	6P	8P
71M ~ 250M	IIB, IIC	0.4 ~ 90kW	0.2 ~ 90kW	0.4 ~ 75kW	0.4 ~ 45kW
280M ~ 315M	IIB	110 ~ 132kW	110 ~ 160kW	110 ~ 132kW	75 ~ 90kW
355L	IIB	–	260kW	220kW	–

*In all above frames, HIGEN is the only Korean manufacturer that acquired certificates such as ATEX.

High Voltage Motors

50 Years HIGEN MOTOR

HIGEN MOTOR
www.higenmotor.com

Seoul Office
2F, Korea Association of Machinery Industry Bldg,
13-6 Yeouido-Dong Seoul 150-729, Korea
Tel :+82-2-369-8216~8219, Fax :+82-2-369-8229

Busan Office
No. 413 4F, Bosaeng Bldg, 134-8 Gamjeon-Dong
Sasang-Gu, Busan, Korea
Tel :+82-51-710-5030~5033, Fax :+82-51-710-5034

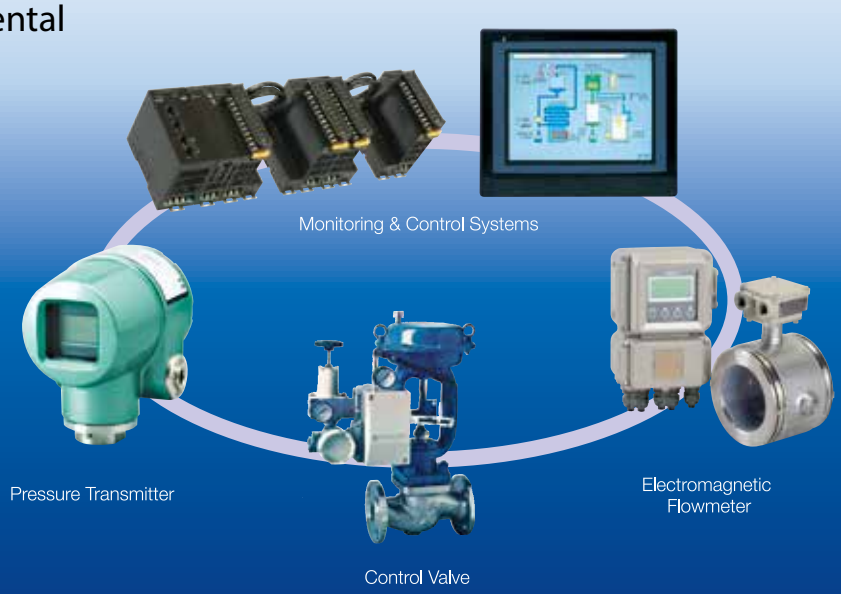
azbil

Yamatake Corporation changed its name to Azbil Corporation on April 1st, 2012

Environmental Protection

Products for Ballast Water Management System

The azbil Group, a major manufacturer of measurement and control system both on board and shore, provides strong supports in furtherance of your environmental protection efforts.



Azbil Korea

The Teachers Pension Fund Building 16F, 27-2
Yeouido-dong, Yeongdeungpo-gu, 150-742 Seoul

TEL 02) 2168 - 7800
URL http://kr.azbil.com

Oil & Gas, Power Plant Application
Severe Service Control Valve Manufacturer

BFS Incorporation.
34-5, Samjeong-dong, Ojeong-gu,
Bucheon-City, Gyeonggi-do, Korea
T. +82-32-329-9142 F.+82-32-329-9148
Web : www.bfsvalve.com
Master Mail : bfsvalve@bfsvalve.com

Gastech

Conference & Exhibition

Korea | KINTEX 1 | 24 – 27 March 2014

27TH EDITION

HOSTED BY

KOGAS
KOREA GAS CORPORATION

DIAMOND SPONSOR

SUPPORTED BY

KINTEX

Full Conference Programme Now Available

- Connect with the growing urgency for Gas and LNG demand in Asia
- Significant new commercial and technical papers
- A wealth of ground-breaking new project presentations

Commercial Sessions

- The Global Gas Market: Key Developments & Updates
- Unconventional Gas: Developing the Potential
- Contracting, Pricing & Trading in Gas & LNG
- Financing, Investing & Developing Gas & LNG Projects

Technical Sessions

- LNG & Gas Shipping & Shipbuilding
- LNG Terminals & Plants: Engineering & Project Progress
- **LNG as a Transport Fuel: with Bunkering & Infrastructure Development**
- Emerging & Ground-Breaking Gas Technologies
- Contracting & Fabrication: The Greatest Challenges

LNG as a Transport Fuel: with Bunkering & Infrastructure Development

Meeting Lower Marine Sulphur Emissions: How LNG as a Fuel Delivers Solutions
Bill Sember, Vice President Global Marketing, *ABS*

Main Engine Gas Injection (ME-GI): Successfully Converting Large 2-Stroke Diesels to Dual Fuel on Qatari Large LNG Carriers
Thomas Hale, Senior Cryogenic Engineer, *Qatargas Operating Company Ltd*

LNG Bunkering Feasibility Analysis for Korea's Coasts: Developing a National Infrastructure
Kim Kidong, Principal Research, *KOGAS*

Diversifying the Zeebrugge LNG Terminal into a Hub for Small-Scale LNG
Peter Verhaeghe, Director Technical Operations, *Fluxys*

For further information on delegate registration, please email marketing@gastech.co.uk

www.gastechkorea.com/Korship2

Gastech

Conference & Exhibition

Korea | KINTEX 1 | 24 – 27 March 2014

27TH EDITION

HOSTED BY KOGAS KOREA GAS CORPORATION

DIAMOND SPONSOR

SUPPORTED BY KINTEX

The Gastech Exhibition Comes to Korea

Dear Industry Colleague,

As the President & CEO of KOGAS it is my great pleasure to invite you to the Gastech Exhibition – a leading global gas event that we are bringing to Korea. The event, also supported by the government, takes place from 24-27 March 2014 at KINTEX 1, Seoul.

Encompassing all aspects of the international gas and LNG supply chain, Gastech Exhibition aims to help you forge and strengthen business relationships across the global gas industry. Attending the Gastech Exhibition will allow you to meet and do business with the major industry players, suppliers and contractors.

I look forward to welcoming you to Gastech Korea in March.

Yours Sincerely,

Mr. Jang Seok Hyo,
President and CEO, **KOGAS**
Chairman, **Korea Gas Union**

CONNECTING THE GLOBAL GAS SUPPLY CHAIN, FORGING NEW RELATIONSHIPS

- **4** days of networking, business and strategic partnership opportunities
- Offering over **60** free to attend gas technology seminars
- Over **350** international exhibitors
- Meet over **15,000** industry professionals
- Over **40 years** of serving the industry's most valuable buyers and decision makers.

Meet these Exhibitors and more

ADNOC & its Group of Companies · Technip · Shell · ExxonMobil · ConocoPhillips · bp · Chevron · CB&I · Foster Wheeler · Petrobras · Hyundai Heavy Industries Co., Ltd. · Woodside · Wood Group Mustang · Samsung Heavy Industries

Register for free online now at
www.gastechkorea.com/Korship3

The LNG market is booming, how about your bottom line?

Daniel 3818
8-Path LNG Ultrasonic Meter

Frequently, a liquefaction plant moves $4M/hr of LNG during loading and unloading. Measurement accuracy ties directly to exposure and risk on the financial transaction. A 0.2% reduction in measurement uncertainty would equate to a $12,000/hr reduction in financial risk.

Emerson's Daniel has been providing oil and gas custody transfer solutions for over 80 years. The Daniel 3818 LNG meter's proprietary design ensures the highest level of cryogenic measurement integrity available to the market. Improve your operation with higher accuracy, redundancy and integrated diagnostics.

Please call for more information or visit www.daniel.com.

DANIEL™

Emerson Process Management Korea Ltd.
www.emersonprocess.co.kr +82-2-3438-4600

EMERSON™
Process Management

EMERSON. CONSIDER IT SOLVED.™

MAKE WATER FROM SEA WATER TO FRESH WATER THROUGH REVERSE OSMOSIS (RO)

- Scandinavian quality
- Standard models ranging from 1,5 m^3/d to 200 m^3/d

Enwa Water Maker 50 m^3/day

NS - EN ISO 9001
CERTIFIED COMPANY

Achilles

KEEP YOUR SYSTEM CLEAN WITHOUT CHEMICALS

Approval from:

DNV · TÜVRheinland · WÄRTSILÄ

For engine cooling water
and your HVAC systems

EnwaMatic® Maritime

- Filtration to 5µ
- Fully automatic
- No scaling
- No corrosion
- No bacteria

ENWA
WATER TREATMENT

+82 32 851 0056 sales@ottomotor.kr +46 31 742 9250 info@enwa.se www.enwa.com

KORSHIP | Shipbuilding Design Manufacture Control and all kinds of devices

Contents

Correction

The 'Major Performance Galley' in November 2013 Issue incorrectly stated the title of the exhibition. The correct title is 'KORMARINE 2013'.

Advertisers Index

Mission Statement

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

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

Technology

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

Special Focus

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

Company & Comments

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

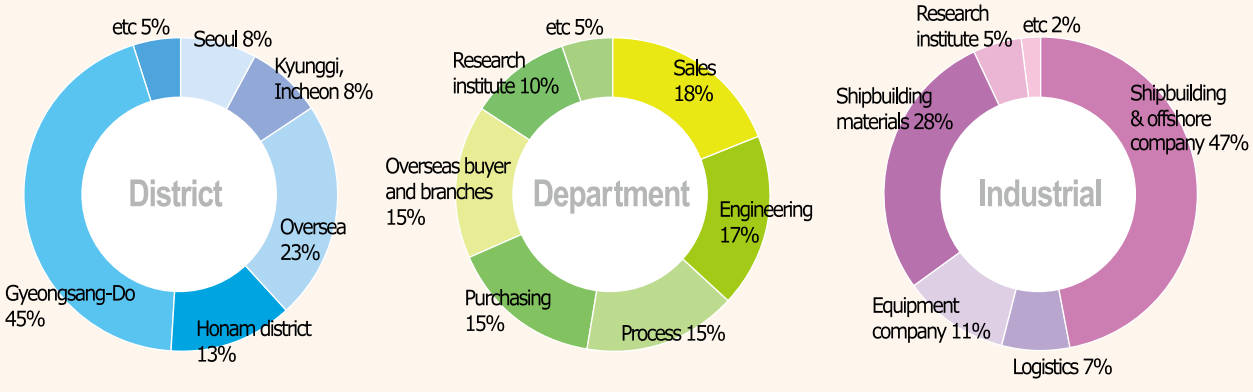
Product

New shipbuilding & offshore industry products overview

Business News

Issues and news articles from global shipbuilding & offshore companies and organizations

Detailed area breakdown



World's Leading Gas Industry Event hits Korea in 2014

The Korea Gas Corporation (KOGAS) will next year host Gastech 2014, the world's largest natural gas & liquefied natural gas (LNG) event, at the KINTEX international centre in Seoul, Korea between 24-27 March. The Korean Ministry of Foreign Affairs (MOFA) and Minister of Trade, Industry & Energy (MOTIE) have also confirmed their support of the event.

More than 15,000 visitors are expected to visit the 300 major international and Korean energy industry companies exhibiting - representing engineering and technology leaders from across the up, mid and downstream supply spectrum. The only international gas & LNG event to be supported by all six 'supermajor' international oil companies (Shell, ExxonMobil, Chevron, BP, Total and ConocoPhillips), Gastech also welcomes the leading international suppliers and consumers of gas & LNG, with major engineering contractors, services companies and technology innovators all present in support. Other global leaders supporting Gastech include: Qatargas, Rasgas, Gazprom, Rosneft, BG Group, GDF SUEZ, Bechtel, KBR, Chiyoda, GAIL India, PTT, Petrobras, Pertamina, ENI and many more.

There will be a major Korean presence in the exhibition with all of Korea's most prominent companies in the energy and shipping space represented at the highest levels. Leaders include Gastech 2014 hosts, KOGAS, plus Samsung Heavy Industries, Hyundai Heavy Industries, Daewoo Shipbuilding & Marine Engineering, Hanjin Heavy Industries, STX, SK Engineering, GS Energy, GS Power and more.

Also of major interest to international companies will be the 'Korean Pavillion', an innovative central space dedicated to showcasing the best Korean technology and manufacturing firms to the international visitors. 19 companies will be present to showcase the very best that Korea has to offer, with companies such as Gastron Co. Ltd, Wonil T&I Co. Ltd, Daeyang Electric Co. Ltd, Youngkook Electronics, Korea Unicom Valve and more. Additional small and midscale Korean companies such Korval, Hyunwoo, KangRim Insulation and Young Tech have also confirmed their attendance at the event.

Another special element to the Gastech Exhibition is the unique offering it provides visitors; over 60 free-to-attend seminar theatres that deliver presentations on the very latest international technology in the gas & LNG industry. The 'Centres of Technical Excellence' will welcome knowledge sharing from key companies involved in: Offshore & Subsea Technology, Pipeline Infrastructure, Health Safety Security & Environment, Natural Gas Vehicles, LNG & Gas Carrier Ship Technology, Power Generation, LNG Fuel Technology, Liquefaction and GTL/NGL Technology. Experts from global technology leaders that are presenting at the seminar theatres include KOGAS, Worley Parsons, Baker Hughes, Air Products, Woodside Energy, and Wartsila, among others.

Gastech's Event Director, Mr Paul Sinclair, remarks, "We are delighted with the overwhelming exhibitor response to Gastech 2014. This reflects the record that Gastech has established in its 42-year history of attracting executive visitors from around the world. The hosting of Gastech in Korea provides our international exhibitors with the platform to connect with leading buying and procurement teams from some of Korea's and Asia's leading energy companies, while providing an opportunity for Korean businesses to meet global gas industry players."

세계 가스 메이저 및 국내외 기업들 '가스텍 2014' 대거 참여

내년 3월 한국가스공사(KOGAS) 주최로 열리는 세계적인 가스 및 오일 업계 행사인 '가스텍 2014 컨퍼런스 및 전시회(Gastech Korea 2014 Conference & Exhibition)'에 전 세계 40여개 국, 3000여개 이상의 국내외 기업들이 참가한다. 30,000㎡에 이르는 전시장에는 업스트림, 미드스트림, 수요 부문 등 전 세계 가스 업계 및 관련 업계의 최신 기술이 한데 모여, 약 15,000여 명의 글로벌 방문객을 끌어 모을 것으로 보인다.

가스텍은 1972년 런던을 시작으로 매 18개월을 주기로 개최되는 전 세계적으로 가장 규모가 큰 가스 업계 컨퍼런스 및 전시회로서, 수퍼 메이저로 꼽히는 세계적인 에너지기업 6개사(쉘, 엑손모빌, 셰브론, BP, 토탈, 코노코필립스)가 후원한다. 이번 제27회 가스텍 컨퍼런스 및 전시회는 극동아시아 지역에서는 최초로 내년 3월 24일부터 27일까지 4일간 한국에서 개최되며, 전 세계 LNG 시장의 최대 구매자이자 글로벌 가스 업계를 선도하는 한국가스공사의 주최로 열린다.

이번 가스텍 2014 전시회에는 주최사인 한국가스공사와 더불어 삼성중공업, 현대중공업, 대우조선해양, STX, SK 에너지, GS 에너지, GS 파워 등 한국을 대표하는 에너지 기업들이 대거 전시 기업으로 등록해 그 어느 때보다 국내 기업들의 참여 열기가 높아졌다.

특히 가스텍 2014의 공식 후원 기업인 쉘(Shell), 라스가스(Rasgas), 셰브론(Chevron), 엑손모빌(Exxon Mobil), BG 그룹(BG Group), 플루어(Fluor), 우드사이드(Woodside), 사우디아람코(Saudi Aramco), 카타르가스(Qatargas), 오만 LNG(Oman LNG), 가스프롬

(Gazprom), 로즈네프트(Rosneft), GDF 수에즈(GDF SUEZ), 벡텔(Bechtel), KBR, 지요다(Chiyoda), 게일 인디아(GAIL India), PTT, 페트로브라스(Petrobras), 페르타미나(Pertamina), ENI 등 전세계 가스 및 LNG 시장을 선도하는 주요 글로벌 공급자와 수요자가 모두 참석한다.

또한 국내 중소기업들이 해외 고객들과 직접 만나 비즈니스를 모색할 기회가 될 '한국관(Korean Pavilion)'에는 가스트론, 원일티엔아이, 대양전기공업, 영국전자, 한국유니콤밸브 등 국내 유망 중소기업 20개 업체 이상이 참여를 신청해 해외 주요 기업 및 글로벌 방문객들의 관심이 집중 될 것으로 보인다. 뿐만 아니라 코밸, 현우, 영테크 등 중소기업 다수가 가스텍 2014에 참여한다.

한편 가스텍 전시회에서는 업계 최신 혁신 기술 동향을 알 수 있는 'CoTEs(Centres of Technical Excellence) 기술 정보 세미나'가 무료로 공개된다. CoTEs 기술 정보 세미나는 오프쇼어 및 해저기술, 파이프라인 기반시설, 보건 및 안전/환경, 천연가스차량(NGV), LNG 가스운송선 기술, LNG 연료 기술, 천연가스 공정 GTL/NGL 기술 등 60여 개 이상의 세션을 통해 각 분야 별 전문가들이 최신 동향을 발표한다. 여기에 한국가스공사(KOGAS), 월리파슨스(Worley Parsons), 베이커휴즈(Baker Hughes), 에어프로덕츠(Air Products), 우드사이드 에너지(Woodside Energy), 바르질라(Wartsila) 등 LNG 업계를 이끄는 세계적인 기업들이 연사로 나설 예정이다.

폴 싱클레어(Paul Sinclair) 가스텍 2014 이벤트 디렉터는 "가스텍 2014 전시회에 기업들의 압도적인 참여신청 받게 되어 매우 기쁘다. 이는 가스텍이 지난 42년간의 전 세계 고위급 참석자들을 불러 모은 성공적인 역사가 반영된 것으로 본다"고 소감을 밝혔다. 그는 "내년 한국에서 개최되는 가스텍 2014 전시회가 글로벌 전시기업들과 한국 및 아시아 기업들의 구매, 조달 팀을 연결하는 만남의 장이자, 한국기업들이 글로벌 가스업계 참여자들과 관계를 공고히 하는 기회가 될 것으로 기대한다"고 덧붙였다.

KR signed MOU with RS to promote mutual co-operation

Korean Register of Shipping (KR) entered into a Memorandum of Understanding (MOU) with the Russian Maritime Register of Shipping (RS) during the 6th Korea-Russia Business Dialogue held on November 13 to promote development of shipbuilding and offshore plant industries of both countries. The two countries will expand cooperation in various fields including the technical cooperation for icebreaker/ice-strengthened vessel, LNG development in Arctic Ocean and offshore area, expansion of technology exchange, and regular seminars.

Pavel Shikov, Chief Operating Officer (COO) of Russian Maritime Register of Shipping, said, "This agreement paved the way for acquiring the advance technology and laid the groundwork for the advancement of Russia's shipbuilding industry."

Chon Young-kee, Ph.D, Chairman & CEO of KR, said, "I am very pleased to see that our friendly relationship with Russian Maritime Register of Shipping has been taken to the next advanced level. I will do more to inject fresh momentum into the mutual technical and information exchange as part of effort to help spur development of shipbuilding industry and economic growth of both countries."

The Korea-Russia Business Dialogue was launched in 2008 to promote private-sector economic cooperation and expand the bilateral exchange. This year, Korean organizations, such as KR, KEPCO (Korea Electric Power Corporation), KRC(Korea Rural Community Corporation), POSCO, etc., signed the MOUs on economic cooperation with Russian companies and related organizations.

한국선급(KR)과 러시아선급(RS) 상호협력 MOU 체결

한국선급은 지난 11월 13일 개최된 '제 6차 한-러 비즈니스 다이얼로그'에서 러시아선급(Russian Maritime Register of Shipping, RS)과 양국 조선 및 해양플랜트 산업 발전을 위한 양해각서(MOU)를 체결했다. 이번 협력을 통해 양사는 쇄빙선·내빙구조선에 대한 기술협력과 개발, 북극해 LNG 및 Offshore 기술 협력, 정기 세미나 및 기술 교류 확대 등 상호협력을 추진할 계획이다.

이 날 행사에 참석한 파벨시코프(Pavel Shikov) 러시아선급 최고운영책임자(COO)는 "이번 협약을 통해 선진기술 습득과 더 나아가 러시아의 조선산업 발전의 계기가 마련됐다."고 소감을 밝혔다.

전영기 한국선급 회장(Chon Young-kee, Ph.D, Chairman & CEO of KR)은 "그 동안 우호적인 관계를 유지해온 러시아선급과 더욱 유익한 협력관계로 발전하게 되어 기쁘다."며 "앞으로 상호 기술 및 정보 교류를 활발히 하여 양국의 조선 산업의 발전 뿐만 아니라 더 나아가 국가 경제에도 이바지 할 수 있도록 하겠다."며 포부를 밝혔다.

한-러 비즈니스 다이얼로그는 양국의 민간 경제협력 활성화와 교류 증진을 위해 지난 2008년 창설됐으며, 올해는 한국선급을 비롯해 한국전력, 농어촌공사, 포스코 등이 러시아 기업 및 유관 단체와 경제협력을 위한 양해각서를 체결했다.

ABB appoints Claudio Facchin, ABB's head of North Asia, as Executive Committee Member responsible for Power Systems

ABB has appointed Claudio Facchin as Executive Committee member responsible for the Power Systems division, effective Dec 1, 2013. He succeeds Brice Koch, who will leave ABB on Jan. 15, 2014 after an orderly transition, as previously announced.

For the past four years, Claudio Facchin has led ABB's business activities in the major markets China, Japan and South Korea as Chairman and President, North Asia. During this time, he delivered solid profitable growth by penetrating existing and new customer segments, and developing products tailored to local market needs. He has been instrumental in successfully growing ABB's service business and leading collaboration across ABB's entire portfolio in this important growth region. A successor for his role in Asia will be announced in due course.

Prior to moving to China in 2010, Claudio Facchin led the global Substations systems business unit in the Power Systems division from 2004 to 2009, and the global service unit in the power business from 2002 to 2004. Claudio Facchin, an Italian national, joined ABB in 1995 in Italy, where he held management roles in sales, project management and service for the power business.

"Claudio is an experienced leader with an impressive global track record, and a true team player," said Chief Executive Officer Ulrich Spiesshofer. "In his roles in Asia and the global Substations systems business, he has demonstrated his ability to drive profitable growth building on collaboration and strong relationships with customers, while successfully executing many large-scale power projects. With these skills and his proven intercultural sensitivity, he is well placed to take over the Power Systems business."

Claudio Facchin graduated in industrial engineering from the Politecnico di Milano, Italy, in 1989. From 1990 to 1994, he worked in France for Trane Co. and then Valeo SA, holding various positions in operations as well as in marketing and sales.

ABB 북아시아지역 전력시스템 사업부 총괄 최고경영진으로 클라우디오 파친 임명

ABB는 올 12월 1일부로 클라우디오 파친(Claudio Facchin)을 한국 포함한 북아시아지역의 전력시스템 사업본부를 총괄하는 최고경영진으로 임명했다.

지난 4년간 클라우디오 파친은 중국, 일본, 한국 등 북아시아지역 총괄로 ABB 비즈니스를 이끌어 왔다. 기존 고객 유지는 물론 신규 고객으로의 진입확장과 현지시장의 요구에 맞춘 제품 개발을 통해, 견고하고 수익성 있는 성장을 이루어왔다. 아울러 ABB가 중점을 두고 있는 서비스 사업에 대해 성공적으로 성장을 주도했으며, ABB 포트폴리오에 걸쳐 지역적 협업을 독려하는데 중심적인 역할을 해왔다.

클라우디오 파친은 지난 2010년 중국으로 부임하기 전, 2004년부터 2009년까지 전력시스템 사업 내에서 글로벌 변전소 시스템 사업을 총괄했으며, 2002년부터 2003년에는 글로벌 서비스를 담당했다.

이탈리아 국적인 클라우디오는 1995년 ABB 이탈리아에 입사해서 전력 사업과 관련해 영업, 프로젝트 관리, 서비스에 걸쳐 다양한 매니져 업무를 맡아왔다. "클라우디오는 인상적인 글로벌 실적을 달성하여 왔다. 진정한 팀 플레이어이자 경험 많은 리더이다."라고 최고경영자인 울리히 스피스호퍼(Ulrich Spiesshofer)는 말했다. 덧붙여 "아시아 및 전세계 변전소 시스템 사업에서 대규모 전력 프로젝트를 성공적으로 수행했으며, 고객과 긴밀한 협력과 좋은 관계를 구축해 왔다. 이와 함께 수익성이 있는 사업을 성장시키는데 주도적인 능력을 보여왔다. 이러한 기량과 다른 문화를 이해하는 세심함으로 앞으로도 전력시스템 사업을 성공적으로 이끌어 나갈 것으로 기대된다."고 말했다.

클라우디오 파친은 1989년 이탈리아 국립 밀라노 공과대학교에서 산업공학과를 졸업했고, 1990년부터 1994년에는 프랑스 트레인(Trane)사 및 발레오(Valeo)사에서 근무했다.

Korea Trade Insurance Corporation provides the ship financing for 12 very large containerships

Korea Trade Insurance Corporation (K-sure) announced on November 13 that it would provide USD 510 million in loan to help finance the acquisition of 12 very large containerships to be built by domestic shipyards in the export transaction. Under the ship export contract, Hyundai Heavy Industries (HHI) and Hyundai Samho Heavy Industries (HSHI) will deliver 5 units of 18,000 TEU containerships and 7 units of 14,000 TEU containerships to UASC (United Arab Shipping Company) from

2014 to 2016 on a staggered basis. UASC headquartered in Kuwait is the united state-owned shipping company established in 1976 with the joint investment of 6 Middle Eastern countries holding abundant oil money, such as Qatar, Saudi Arabia, etc.
Korea Trade Insurance Corporation is the sole domestic policy financial institute providing the UASC with the ship financing of USD 510 million which represents 40% of total acquisition cost of USD 1.25 billion, thus playing a significant part in helping domestic shipyards win the large-scale contract.

The ship financing via the trade insurance is used to acquire the vessels built by domestic shipyards. Therefore, the ship financing provided by the policy financial institutes such as Korea Trade Insurance Corporation is vital for domestic shipyards to successfully win the shipbuilding orders amid the recent decline of private ship financing from Europe.
An official from Korea Trade Insurance Corporation said, "We will take all possible measures to ensure the provision of ship financing via the trade insurance in our endeavor to help improve the performance of domestic shipyards on the back of the increasing shipbuilding orders amid the rising expectation of global economic recovery. Particularly, we will induce the commercial banks to take part in the ship financing for large-scale ship projects, thereby strengthening the cooperation with domestic private financial sector, just as the domestic Foreign Exchange Bank participated in the provision of loan guaranteed by Korea Trade Insurance Corporation to help finance Scorpios Tanker's acquisition of vessel."

한국무역보험공사, 초대형 컨테이너선 12척에 대한 선박금융 제공

한국무역보험공사(K-sure)는 국내 조선소가 제작하는 16.4억 달러 규모의 초대형 컨테이너선 12척 수출거래에 대해 5.1억 달러의 선박금융을 제공한다고 지난 11월 13일 밝혔다. 이번 선박수출계약은 현대중공업과 현대삼호중공업이 중동 연합 국영해운선사인 UASC(United Arab Shipping Company)사에 18,000 TEU 컨테이너선 5척과 14,000 TEU 컨테이너선 7척을 수출하는 거래로, 해당선박들은 2014년부터 2016년까지 순차적으로 인도될 예정이다.
쿠웨이트에 본사를 둔 UASC사는 1976년 카타르, 사우디아라비아 등 풍부한 오일머니를 보유한 중동 6개국 정부가 공동출자해 설립한 중동지역을 대표하는 연합 국영선사이다.
한국무역보험공사는 UASC사가 선박구매에 필요한 12.5억 달러 중 40%에 해당하는 5.1억 달러의 선박금융을 국내정책금융기관으로는 유일하게 제공함으로써 대규모 선박수주를 성사시켰다.
무역보험을 통해 조달된 선박금융은 국내 조선소가 건조한 선박의 구매자금으로 사용되기 때문에, 최근 유럽계 민간선박금융이 위축된 상황에서 한국무역보험공사와 같은 정책금융기관의 선박금융제공은 국내 조선소의 성공적인 선박 수주를 위해 중요한 역할을 하고 있다.
한국무역보험공사의 관계자는 "세계경기 회복에 대한 기대감에 따른 선박발주 증가가 국내 조선산업 전반의 실적 개선으로 이어질 수 있도록 무역보험을 통한 선박금융 지원에 만전을 기하고 있다"면서 "최근 스콜피오 탱커선 선박금융에 국내 외환은행이 한국무역보험공사 보증부 대출에 참여한 것처럼 대형 선박 프로젝트에 시중은행의 선박금융 참여를 유도하여 국내 민간금융과의 공조체제를 강화할 계획"이라고 전했다.

Hyundai Heavy Launches New Frigate

Hyundai Heavy Industries (HHI) held a launch ceremony for its fifth frigate, ROKS Jeonbuk. On November 13, 2013, the launch ceremony was attended by the Chief of Naval Operations Admiral Hwang Ki-chul, governor of Northern Jeolla Province Kim Wan-ju, Hyundai Heavy's president & CEO, Lee Jai-seong and other government and military officials in Ulsan shipyard.
The Jeonbuk frigate has greatly improved capabilities with its weapon and sensors including new 3-D radar, antiaircraft & anti-ship missiles, and sonar & torpedo acoustic counter measures. In addition, the vessel uses stealth technology to minimize the exposure to electromagnetic waves. More than 90% of major equipment is locally developed and sourced.
The 2,300 tonne frigate, measuring 114 m long, 14 m wide, and 25 m deep, can sail at a maximum speed of 30 knots with a crew of 120. The frigate will be delivered to the Korean Navy in December 2014.

The Ulsan, South Korea-based shipbuilder delivered its third frigate ROKS Incheon in

January this year and is also currently building its fourth frigate ROKS Gyeonggi scheduled to be delivered in October 2014. Since constructing and delivering the first Korean-built frigate ROKS Ulsan in 1980, Hyundai Heavy has grown as a leading naval shipbuilder by delivering 63 naval ships including the first and the third Korean Aegis destroyers, 3 KDX-II destroyers, 5 frigates, 3 submarines, and 29 patrol·salvage ships.

현대중공업, 세 번째 차기호위함 진수

해군의 세 번째 차기호위함인 '전북함'이 현대중공업에서 진수됐다. 현대중공업은 지난 11월 13일 울산 본사에서 이재성 사장을 비롯해, 황기철 해군참모총장, 김완주 전북도지사 등 해군과 방위사업청, 공사 관계자들이 참석한 가운데 '전북함'의 진수식을 가졌다.

차기호위함은 현재 작전 운용 중인 호위함과 초계함의 대체 전력으로 2020년대 중반까지 20여척이 건조될 계획이다. 첫 번째 차기호위함인 '인천함'은 현대중공업이 건조해 올해 1월 해군에 인도됐고, 두 번째 차기호위함인 '경기함'은 지난 7월 현대중공업에서 진수됐다.

전북함은 신형 3차원 레이더, 대공·대함미사일, 소나(Sonar) 및 어뢰음향대항체계, 해상작전헬기 탑재 등 우수한 대함·대잠·대공전 능력을 보유하고 있어 대북 억지력 제고에 크게 기여할 것으로 기대된다. 특히, 선체에는 레이더 반사면적을 최소화하는 스텔스(Stealth) 건조공법이 적용되었으며, 전투체계, 레이더, 유도탄 등 주요 장비는 90% 이상 국내에서 자체 개발되었다.

전북함은 길이 114미터, 폭 14미터, 높이 25미터에 무게는 2300톤이며, 최대 속력은 30노트(55.5km)고 승조원은 120여명이다. 주요 임무는 책임 해역 방어, 해양통제권 확보, 해상 교통로 보호 등이다.

해군 전투함 중 전북함의 함명은 이번이 두 번째이다. 이전 전북함은 미국에서 도입되어 1970~1990년대 대한민국 해군의 주력 전투함으로 활약했던 3400톤급 구축함이었다. 지난 1999년 퇴역해 현재는 강릉시 통일공원에 전시되어 있다. 전북함은 진수 후 해군의 인수 평가와 국방기술품질원의 품질보증 활동을 거쳐 2014년 12월 해군에 인도될 예정이다.

STX Heavy Industries received the national type approval for its Smart Ballast®

STX Heavy Industries announced that it recently received the national type approval from the Ministry of Oceans and Fisheries for its Smart Ballast®, the ballast water management system (BWMS) that it developed independently.

STX Heavy Industries embarked upon the development of BWMS in April, 2010. This national type approval for Smart Ballast® - which is preceded by the certification from IMO in November last year - was obtained through the performance, environment and conformity test.

BWMS is the essential element for the next-generation eco-friendly vessels. Winning this type approval, STX Heavy Industries is on track to produce and supply the BWMS in full scale. BWMS will become mandatory by 2021 for approximately 68,000 vessels operating worldwide if the Ballast Water Management Convention comes into force on the date of the general meeting of IMO at the end of this year.

An official from STX Heavy Industries said, "We will do our best to carve out larger slice of the market that has just begun to be formed based on the operational cost-effectiveness, the greatest strength of Smart Ballast®. We will enter the market in a short period of time and achieve tangible results, and furthermore, maximize the synergy effects created by the combination with the core marine equipment such as conventional diesel engine, cargo pump, LNG marine insulation, and others.

STX중공업, 선박평형수 처리장치 국가 형식 승인

STX중공업은 독자 개발한 선박 평형수 처리장치(BWMS)인 스마트발라스트(Smart Ballast®)가 최근 해양수산부로부터 국가 형식 승인을 획득했다고 밝혔다. 지난 2010년 4월 BWMS 개발에 들어간 STX중공업은 지난해 11월 IMO로부터 인증을 획득함으로써 국가 형식 승인을 위한 자격을 갖추게 됐다. 이후 성능, 환경 및 적합성 테스트 등을 거쳐 이번에 국가 인증 획득에 성공했다.

BWMS는 차세대 친환경 선박의 필수요건으로, STX중공업 측은 이번 승인으로 BWMS를 본격적으로 생산 및 공급할 예정이다. 올 연말 IMO 총회에서 선박 평형수 관리 협약이 발효되면, 전 세계 운항 중인 약 6만 8000여척의 선박은 오는 2021년까지 BWMS를 의무적으로 장착해야 한다.

STX중공업 관계자는 "스마트발라스트의 최대 강점인 운용상의 경제성을 바탕으로 막 형성되기 시작한 시장 선점을 위해 최선을 다하겠다"면서 "단기간 내에 시장에 진입해 가시적인 성과를 도출하는 것은 물론 기존의 디젤엔진, 카고 펌프, LNG선용 단열재 등 핵심 조선 기자재 사업과 결합해 시너지 효과를 극대화해 나갈 것"이라고 말했다.

SPP Shipbuilding's third-generation MR demonstrated the best-in-class fuel efficiency

SP Shipbuilding announced on November 12 that its third-generation MR ship (40,000 to 50,000-ton Product Chemical Tanker) recorded the best-in-class fuel efficiency in the commissioning speed test. These 2 third-generation model vessels, the 50.3K product carriers (PC) developed independently by SPP Shipbuilding, successfully completed the commissioning and were delivered to Jako and Lima, respectively.

SPP Shipbuilding has spurred the development of new eco-ship model to maintain technical advantage of MR vessel. It has constantly upgraded the ship model three times from 50K to 52K, and again to 50.3K over the last 3 years, pouring its energy into developing the ship model optimized to reduce fuel consumption.

As a result, the speed increased from 14.5 knots at the model test to 14.7 knots on sea trial, and the fuel consumption recorded 22.0 tons/day which is a decrease of about 26% compared to the initial 50K model. SPP shipbuilding expects that its third-generation MR improved the fuel efficiency and speed, thus reducing the fuel costs by an average of USD 4,600 per day.

An official from SPP Shipbuilding said, "Meaningfully, the eco-ship developed by SPP Shipbuilding successfully completed the test and demonstrated its performance beyond expectations. I anticipate many new orders for eco-ship from customers in the period ahead."

SPP조선, 3세대 MR 동급 최고수준 연비 입증

SPP조선은 자체 개발한 3세대 MR선박(4만~5만톤급 석유화학제품 운반선)이 시운전 스피드 테스트에서 동급 최고 수준의 연비를 기록했다고 지난 11월 12일 밝혔다. 이번에 성공적 시운전을 마치고 인도된 선박은 자코(Jako)사와 리마(Lima)사의 50.3K PC선 2척으로 두 선박 모두 SPP조선이 개발한 3세대 모델이다.

SPP조선은 MR선박의 기술적 우위를 지속적으로 유지하기 위해 에코쉽 신 선형개발에 끊임없이 박차를 가해왔다. 지난 3년 간 50K에서 52K로, 또 다시 50.3K로 선형을 세 번씩 바꿔가며 연료절감에 최적화 된 선형 개발에 힘썼다.

그 결과 모델 테스트 당시 14.5노트였던 스피드가 해상 시운전에서 14.7노트까지 높아졌으며, 연료소모는 초기 50K 모델 대비 26% 가량 줄어 든 22.0톤/day를 기록했다. SPP조선은 연비 개선과 스피드 향상이 이뤄지면서 SPP의 3세대 MR은 하루 평균 4600달러가량의 연료비를 절감 할 수 있을 것이라고 전망했다.

SPP조선 관계자는 "이번 테스트로 인해 SPP조선이 개발한 에코쉽의 성능이 기대 이상의 결과로 입증되었다는 점에서 큰 의미가 있다. 앞으로 많은 고객들이 에코쉽 발주 대열에 동참할 것으로 기대하고 있다"고 말했다

Offshore Plant Industry Support Center to open in Geoje, South Gyeongsang Province

The Offshore Plant Industry Support Center will be established in Geoje, South Gyeongsang Province, which will play a supporting role for offshore plant industry and stand at the forefront of effort to develop the technologies covering the entire offshore plant industry that provides new breakthrough for domestic shipbuilding industry.

The Ministry of Oceans and Fisheries (MOF) signed a Memorandum of Understanding (MOU) with South Gyeongsang Provincial Government, Geoje City, and Korea Institute of Ocean Science & Technology (KIOST) to establish the Offshore Plant Industry Support Center on November 11.

With the construction slated to commence in May 2014 and be completed in 2015, the Offshore Plant Industry Support Center will be built on the land covering an area of approximately 170,000m^2. For the construction, KRW 25.2 billion will be injected from the central government coffers while the land will be provided by South Gyeongsang Province and Geoje City.

The global offshore plant market is expected to grow at an annual rate of 6.7% by 2030, spurred by the development of deep-sea oil fields amid the surge in the demand for energy among the emerging economies. However, the 3 domestic shipbuilding heavyweights are making huge overseas royalty payments when they build offshore facilities such as FPSO, etc. Therefore, acquisition of fundamental technology is urgent in this sector.

The Offshore Plant Industry Support Center is expected to play a pivotal role in developing indigenous technologies. Particularly, the Offshore Plant Industry Support Center supports the development of international standards, verification experiment of water basin test equipment, and quality certifica-

tion of materials/equipment essential for domestic shipyards to achieve the localization of offshore plants. Meanwhile, MOF expects that the localization of offshore plant technology will bring the import substitution effect worth USD 80.5 billion by 2015 to USD 175 billion by 2030.

An official from MOF said, "The establishment of Offshore Plant Industry Support Center is meaningful in that the infrastructure required by the industry can be provided. This Center will provide support by underpinning the effort for developing indigenous design, engineering, facility certification, equipment, etc., which are the sectors where domestic shipyards showed weakness."

경남 거제시 해양플랜트산업지원센터 설립

국내 조선산업의 새로운 돌파구로 여겨지는 해양플랜트 산업의 전체 분야에 걸친 기술을 개발하고 관련 업계를 지원할 해양플랜트산업지원센터가 경남 거제에 설립된다.

해양수산부는 지난 11월 8일 경상남도 및 거제시, 한국해양과학기술원과 해양플랜트산업지원센터 건설을 위한 양해각서를 체결했다. 2014년 5월 착공해 2015년까지 거제시 장목면 일대 약 17만㎡에 들어서는 지원센터 건립에는 정부가 252억원을 투입하고 경남도와 거제시와 부지를 제공한다.

전 세계 해양플랜트 시장은 신흥국 에너지 수요급증에 따른 심해유전 개발로 인해 2030년까지 연평균 6.7% 성장할 것으로 전망되고 있다. 하지만 국내 조선 3사의 경우 FPSO 등의 해양설비 건조시 막대한 로열티를 해외에 지불하는 실정이다. 따라서 이 분야의 원천기술 확보가 시급하다.

해양플랜트산업지원센터는 이러한 기술들을 국산화하는데 있어 구심점 역할을 할 것으로 기대되고 있다. 특히 국내 조선업계의 해양플랜트 국산화를 위해 필수적인 기자재의 품질인증, 국제표준개발, 수조시험장비 실증실험 등을 지원한다. 한편 해양수산부는 해양플랜트 기술 국산화를 통해 2015년 805억 달러에서 2030년 1750억 달러의 수입대체 효과를 거둘 것으로 예상하고 있다.

해양수산부 관계자는 "해양플랜트산업지원센터 설립은 산업계가 실질적으로 필요로 하는 인프라를 제공할 수 있게 된다는 데 의의가 있다"며 "국내 조선산업에 있어 그 동안 취약했던 설계 및 엔지니어링, 설비인증, 기자재 등의 국산화에 크게 기여할 것"이라고 전했다.

DSME was honored with the Prize of Excellence in Korea Republic's Excellent Technology Award

Deepwater construction vessel built by Daewoo Shipbuilding & Marine Engineering (DSME) was selected as finalist for Korea Republic's Excellent Technology Award 2013. DSME announced on November 13 that its deepwater construction vessel was recognized with the Prize of Excellence in 'Korea Republic's Excellent Technology Award 2013' organized by Ministry of Trade, Industry and Energy and sponsored by Korea Institute for Advancement of Technology.

The Korea Republic's Excellent Technology Award recognizes the excellence of technologies, particularly the technologies that have proven exceptional performance and have significant impact on domestic industry among the products developed and commercialized nationwide.

Deepwater construction vessel carries out the installation and dismantling of crude oil extraction facilities, such as subsea pipes or offshore plants which are used in deep sea.

This deepwater construction vessel, selected in Korea Republic's Excellent Technology Award, was ordered to DSME in 2012 by the Netherlands-based Heerema Offshore Services B.V., a company specializing in the transportation, installation and dismantling of offshore structures, and incorporates more advanced technologies compared to the existing models.

It is the world's first vessel that applies the Dynamic Positioning System (DPS) capable of precisely controlling the center of vessel within the desired range through 15 pumps. In addition, it has the tower for pipe-laying works and crane with a lifting capacity of over 4,000 tons, and therefore can carry out the load transport and subsea pipe installation simultaneously in water depths of up to 3,000m.

An official from DSME said, "I am delighted that our technological prowess was recognized in offshore sector which is our mainstay business focus. We will make our utmost effort to secure the best technology, standing firm in our belief that the competitiveness of the company and products is dictated by technology."

대우조선해양, 대한민국기술대상 우수상 수상

대우조선해양의 '심해구조물설치선(Deepwater construction vessel)'이 2013년 대한민국 우수 기술로 선정됐다. 대우조선해양은 자사의 '심해구조물설치선'이 산업통상자원부가 주최하고 한국산업기술진흥원이 주관하는 '2013 대한민국기술대상'에서 우

수상을 수상했다고 지난 11월 13일 밝혔다.
대한민국기술대상은 국내에서 개발돼 상용화에 성공한 개발품 가운데 기술적 성과가 뛰어나고, 국내 산업에 미치는 영향력이 큰 기술을 선정해 시상하는 상이다.
심해저구조물설치선은 해저 파이프나 해양플랜트와 같이, 심해에서 사용되는 원유채취설비의 설치 및 해체를 담당하는 선박이다. 대한민국기술대상에 선정된 이번 선박은 대우조선해양이 네덜란드 해양 구조물 운송·설치 및 해체 전문 업체인 히레마(Heerema Offshore Services B.V.)사로부터 지난 2012년 수주한 것으로, 기존 모델에 비해 진일보 한 기술이 적용됐다. 15대의 펌프를 통해 선박의 중심을 원하는 범위 내에서 정교하게 제어할 수 있는 자동위치제어 시스템(DPS; Dynamic Positioning System)이 세계 최초로 적용됐다. 또한 4,000톤 이상을 들 수 있는 크레인과 파이프 부설 작업이 가능한 타워가 설치되어, 최대 3,000미터 수심의 심해에서 중량물 운반 및 해저파이프 설치 작업을 동시에 수행할 수 있다.
대우조선해양 관계자는 "주력 사업인 해양부문 제품의 기술력을 인정받아 기쁘다"면서 "기술이 곧 제품과 회사의 경쟁력으로 직결된다는 마음가짐으로 최고의 기술력 확보를 위해 앞으로도 노력할 것"이라고 말했다.

Rockwell Automation to Acquire vMonitor, a Global Technology Leader for Wireless Solutions Connecting the Digital Oilfield

Rockwell Automation announced that it has agreed to purchase vMonitor, a global technology leader for wireless solutions in the oil and gas industry on Oct 29, 2013.
vMonitor is a pioneer in Digital Oilfield implementation and remote operations worldwide. vMonitor has the world's largest installed base of wireless wellhead monitoring systems for natural and artificially lifted wells with more than 6,000 well sites for major oil and gas companies around the world.
"Strategically, vMonitor's world class digital oilfield technology and services, combined with our comprehensive portfolio of solutions, strengthen our ability to deliver end-to-end projects for the oil and gas sector," said Terry Gebert, vice president and general manager, Rockwell Automation Global Solutions. Also, "Equally important, vMonitor's capabilities will accelerate our development of similar process solutions and remote monitoring services for water / wastewater, mining and other industries globally," said Gebert.
"Our customers will benefit from Rockwell Automation's global solutions capabilities and complementary product lines to ensure we can collectively provide a seamless integrated solution," said Rashed Saif Al Suwaidi, chairman of vMonitor.

vMonitor is a leader in creating the Digital Oilfield with thousands of wellheads currently under constant supervision at remote control centers similar to the one above.

The company's technologies include an all-wireless portfolio of wellhead sensors and transmitters, remote terminal units, gateways and modems, as well as turn-key monitoring and control systems and services. These offerings cover a broad range of applications from oil and gas wells, pipelines, pumping and lift stations, to refineries and tank farms.
The acquisition is expected to close within two months. vMonitor will then become part of Rockwell Automation's Control Products & Solutions operating segment.

로크웰 오토메이션, 디지털 유전을 연결하는 무선 솔루션의 리더 'vMonitor' 인수

로크웰 오토메이션은 오일 & 가스 산업 내 무선 솔루션의 글로벌 기술 선두업체인 vMonitor를 인수하기로 합의했다고 지난 10월 29일 발표했다.
vMonitor는 전세계 디지털 유전 적용과 원격 운영 분야의 선도기업이다. vMonitor는 전세계 오일 & 가스 기업을 대상으로 유전과 함께 천연 및 인공 유정을 위한 무선 웰헤드 모니터링 시스템에 대해 세계 최대 규모인 6000개 이상의 설치 베이스(installed base)를 보유하고 있다.
로크웰 오토메이션 글로벌 솔루션 팀의 부사장이자 경영 이사인 테리 게버트(Terry Gebert)는 "vMonitor의 세계적인 디지털 유전 기술 및 서비스는 로크웰 오토메이션의 광범위한 솔루션 포트폴리오와 전략적으로 결합하여 오일 & 가스 부문에서 엔드투엔드(end-to-end) 프로젝트를 수행할 수 있도록 우리의 역량을 강화할 것"이라고 말했다. 덧붙여 "vMonitor가 보유한 기술로 상하수, 광산, 기타 산업에 걸쳐 로크웰 오토메이션의 관련 프로세스 솔루션과 원격 모니터링 서비스의 개발을 촉진할 것"이라고 밝혔다.
라셰드 사이프 알 수와이디(Rashed Saif Al Suwaidi) vMonitor 회장은 "우리 고객들은 로크웰 오토메이션의 글로벌 솔루션 능력과 보완 제품라인으로 혜택을 누리게 되고, 양사는 완전한 통합 솔루션을 함께 제공하게 될 것"이라고 말했다.
vMonitor의 기술에는 턴키 모니터링, 제어 시스템 및 서비스뿐만 아니라 웰헤드 센서 및 송신기, 원격 터미널 장비, 게이트웨이, 모뎀 등을 아우르는 모든 무선 포트폴리오가 포함된다. 이러한 기술은 오일 & 가스 유정, 파이프라인, 펌핑, 리프트 스테이션(lift station)에서 정유, 탱크 팜(tank farms)에 이르는 광범위한 어플리케이션을 포함한다.
이 인수 작업은 두 달 내에 마무리 될 것으로 예상된다. 이후 vMonitor는 로크웰 오토메이션 제어 제품 및 솔루션 운영(Control Products & Solutions) 사업부로 편입될 예정이다.

The 13th edition of

Asia Pacific MARITIME

Shipbuilding & Marine
Workboat • Offshore

Asia Pacific Maritime 2014

19 – 21 March 2014
Sands Expo & Convention Center,
Level 1 and Basement 2
Marina Bay Sands, Singapore
www.apmaritime.com

This is the ONE

With the latest in shipbuilding & marine, workboat and offshore, there are now more reasons to participate in Asia Pacific Maritime 2014.

An unmissable proven platform in Asia expecting

- **20,000 sqm** of exhibition space
- **1,500** international participating companies from **53** countries
- **14** Official Pavilions
- **15,000** visitors from over **60** countries
- **45** prominent trade associations
- **74** international media titles
- High-powered conferences and seminars

Join us at the 13th edition of Asia Pacific Maritime.

T: +65 6780 4506 • **E**: apm@reedexpo.com.sg • **W**: www.apmaritime.com

Organised by Reed Exhibitions®

Endorsed by aif Approved International Fair

Supported by MPA Singapore, Singapore Exhibition & Convention Bureau

Official Logistics Partner Agility Fairs & Events

Held in YourSingapore

MAKE A SAFE INVESTMENT!

As a global provider of Unitor safety solutions, we have the experience and equipment to keep your vessels safe and compliant.

Through our network covering more than 2400 ports in 125 countries we supply, install, service and inspect a complete range of high quality safety solutions for both newbuilds and retrofits providing:

- Fire prevention and suppression systems
- Smoke detection systems
- Portable fire and safety equipment
- Life rafts
- Consumables and spares

www.wilhelmsen.com/safeinvestment

Wilhelmsen Technical Solutions | **Wilhelmsen Ships Service**

Shipbuilding market on track for a slow recovery

-Robust commercial vessel sector & sluggish offshore sector

The global newbuilding orders increased 74% year-on-year to 35.60 million CGT as of October this year. Amid the surge in new orders for ordinary commercial vessels such as containership, bulk carriers, etc., Korean shipbuilding industry has cemented its leading position in the newbuilding market.

Particularly, the 3 domestic shipbuilding heavyweights have raked in new orders for high value-added vessels, such as drillship, in the offshore plant sector with a focus on LNG carriers and eco-ship, already achieving more than 90% of annual new order targets. In addition, domestic medium-sized shipyards, such as Hanjin Heavy Industries & Construction (HHIC), Sungdong Shipbuilding & Marine Engineering (SSME), SPP Shipbuilding (SPPS), etc., also have seen their orderbook swelling, thus underpinning a slow but constant recovery of shipbuilding industry.

Recently, the global order placement has shown robust recovery. According to the data published by Clarkson, the global newbuilding orders stood at 3.2 million CGT as of October, which represents a 10.6% increase from the previous year and 94.6% increase compared to the corresponding period of the previous year. A close look at the cumulative newbuilding orders as of October this year shows that the shipbuilding market is showing clear signs of recovery. The cumulative orders stood at 35.60 million CGT which represents an 74% increase from 20.50 million CGT recorded in the same period of the previous year.

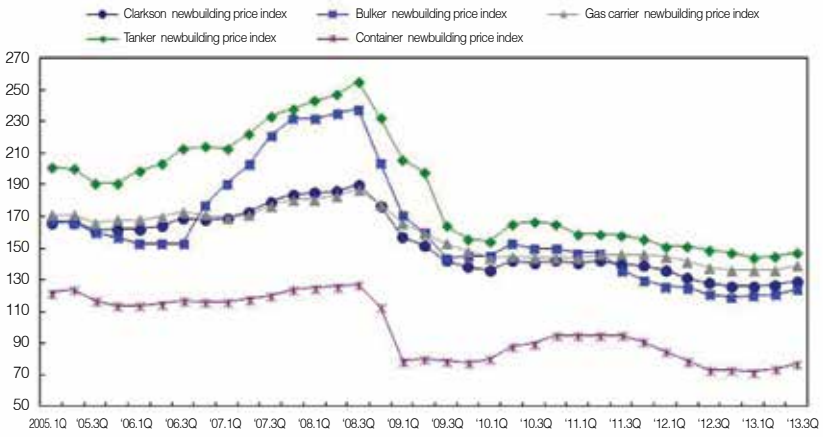


Figure 1. Trends of Clarkson newbuilding price index by ship type

Particularly, the Clarkson newbuilding price index has gained 1 point each month since June this year and hit 132 points in early November after it had been stuck in a 126 point range between November last year and May this year. Meanwhile, the newbuilding price index was hovering above 190 points during the boom period of 2008, but plummeted to 126 points, the all-time low level, in May after the financial crisis that started in the United States and the eurozone crisis.

Containership drives the price hikes of newbuild bulk carrier

The Clarkson newbuilding price index rose 1.6% compared to the level of previous quarter. Specifically, the Clarkson newbuilding price index for bulk carriers and tankers rose by 2.5% and 1.4%, respectively. Meanwhile, the Clarkson newbuilding price index for gas carriers and containerships increased by 2.2% and 4.1%, respectively. The increase in new order placement was driven primarily by the high value-added vessels such as tankers, larger containerships, etc. Based on ship type, the shipbuilding market has witnessed a drastic increase in new orders for tankers(62.6%), containerships(308.5%), bulk carriers(77.7%) and LNG carriers(31.5%) compared to the previous year.

Particularly, new orders for bulk carriers soared to 54.70 million DWT with 624 vessels, accounting for more than half of total new orders. In addition, new orders for bulk carriers increased by 41% based on DWT (dead weight tonnage) and 51% based on the quantity of vessels, compared to the corresponding period of the previous year (25.60 million DWT, 371 vessels). Last month, the shipbuilding market saw the placement of new orders for as many as 24 capesize vessels, signifying the strong performance of bulk carrier sector. Noticeably, there has been a surge in new orders for newcastle max-class vessel which is larger than the capsize-class vessel.

In ordinary commercial vessel market, USD 14.2 billion was invested in containership sector with USD 12 billion worth of new orders placed for the post-panamax containerships alone which have a capacity of over 8,000 TEU. That represents more than a three-fold increase compared to the annual investment (USD 4.1 billion) recorded last year. In addition, USD 8.8 billion has been invested in oil tanker market this year until last month, which is a USD 1 billion increase year-on-year. Particularly, the investment in product carriers accounted for 73% of the aggregate investment in oil tankers.

The volumes of vessels built worldwide until the third quarter of this year decreased 26.2% year-on-year to 28.72 million CGT. In particular, Korean shipyards overtook Chinese rivals in 4 years after 2009 and took the top spot in terms of the volumes of vessels built. By country, Korea ranked the first with 10.18 million CGT (35.4%), followed by China with 9.69 million CGT (33.7%) and Japan with 5.41 million CGT (18.8%).

The industry opines that the primary reason was the reduction of production at Chinese shipyards undergoing the retrenchment. The volumes of vessels built in China jumped 262% in the period between 2007 and 2012. With the robust growth in shipbuilding volume, Chinese shipyards have seen their share in the market climbing to 41% from 19%. However, the restructuring process has taken a toll on the Chinese shipyards, leading to a decline in shipbuilding volume by approximately 30%

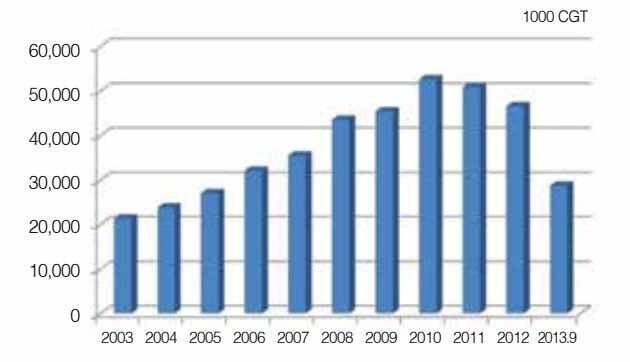


Figure 2. Trends in the volume of vessels built worldwide

compared to the previous year, which is a sharp contrast to the period between 2000 and 2012 when China never experienced a reduction in shipbuilding volume.

BDI(Baltic Dry Index) is a barometer of global maritime shipping activity, and higher BDI means strong shipping market. BDI hit 10,000 points during its peak. However, BDI has continued to remain flat since the financial collapse of Lehman Brothers in 2008. Over the last 5 years, BDI has been locked in downward spiral after recovering to 4,661 points in 2009. Even worse, BDI plummeted to 60 points last year. The shipping industry has recently shown a rebound, but admits that it may be premature to count on a fast turnaround. This BDI hit 2,000 points in September in 2 years.

Domestic shipyards won 36% of orders placed worldwide

Domestic shipyards swept more than a third of the shipbuilding orders placed worldwide this year.

According to the data published by the Ministry of Trade, Industry and Energy, new orders placed at domestic shipyards stood at 10.86 million CGT as of September, which accounts for 36% of the orders placed around the globe(30.22 million CGT). Meanwhile, domestic shipyards won new orders for 295 vessels worth approximately USD 30.36 billion which represents a 27% increase compared to the corresponding period of the previous year. In addition, domestic shipyards have seen a 70% increase in orders. The compensated gross tonnage (CGT), a measure of the ship's value-added, hit 10.86 million, which represents an increase by 88.9% from 5.75 million CGT recorded in the same period of the previous year.

Based on the ship type, domestic shipyards won new orders for 117 tankers out of 225 units ordered worldwide, and secured new orders for 50 large containerships out of 120 units ordered around the world. Moreover, domestic shipyards clinched new orders for 26 LNG carriers out of 32 units ordered around the globe. Meanwhile, the offshore plant market experienced the order drought which was more server than expected.

However, the 3 domestic shipbuilding heavyweights showed strong performance in the offshore plant market, winning orders for 8 drillships out of 10 units ordered in the world, along with 3 FPSOs, 1 LNG-FSRU, etc. Chinese shipyards won 38.7%(11.68 million CGT) of orders until September this year, overtaking the Korean shipyards in terms of the order quantity, but recorded only USD 20.95 billion in order value. Japanese shipyards clinched 4.26 million CGT, accounting for 14.1% of orders, and recorded USD 6.33 billion in order value.

Figure 3. Comparison of order quantity and order value among Korea, China, and Japan(from January to September, 2013)

Robust commercial vessel sector vs. sluggish offshore sector

The global shipbuilding market showed different trends in both commercial vessel sector and offshore sector compared to the previous year. According to the data published by Clarkson which is the U.K.-based shipbuilding and shipbuilding market researcher, 882 newbuild vessels were contracted in the containership, bulk carrier, and tanker sectors, which represents an increase by 32% compared to the previous year, among 1370 newbuild vessels that have been contracted until the third quarter of this year.

Those 3 commercial vessel sectors comprise 72% (based on CGT(compensated Gross Tonnage)) of whole contracts, and have seen a significant increase in sales from 53% recorded last year. Particularly, the newbuild bulk carrier contracts increased by 34% compare to the previous year. In addition, new orders for containership have shown a two-fold increase from the previous year, and product carrier has

Offshore supply vessels (OSV), built by SPP Shipbuilding

FPSO, built by Samsung Heavy Industries

been the primary contributor to the order intake growth in tanker sector.

Meanwhile, new orders for special purpose vessels decreased by 56% from the previous year. However, the experts predict that the gap would be narrowed during the remaining 2 months. Amid the widespread recognition that the ship prices hit the bottom, ship owners have often entered into option contracts which offer the vessels at lower prices (fixed prices) in the period ahead. With the significant growth in optional vessel volumes, the new order intake is expected to exceed the previous year's level by a wide margin.

This year, the 3 domestic shipbuilding heavyweights, such as Hyundai Heavy Industries (HHI), Samsung Heavy Industries (SHI), and Daewoo Shipbuilding & Marine Engineering (DSME), have achieved significant growth in new order intake from the commercial vessel sector, but showed slight sluggishness in offshore sector.

Hyundai Heavy Industries (HHI) set its annual new order target of USD 23.8 billion for the shipbuilding and offshore sectors, which includes the annual new order target of Hyundai Samho Heavy Industries (HSHI). HHI won the orders worth USD 19.6 billion, achieving about 82% of its annual new order target. That is a significant improvement from the figures registered last year when HHI's order intake was valued at only USD 14.8 billion, falling well short of its annual new order target of USD 23.6 billion. HHI won orders for 109 vessels worth KRW 10.1 billion from the commercial vessel sector, which represents a 37.6% increase compared to the same period of the previous year. HHI has seen more than three-fold increase in orders. Specifically, HHI secured orders for 8 vessels worth USD 6.9 billion from offshore sector and saw its order value increasing by 60% despite the fewer number of vessels contracted to it compared to the previous year when 9 vessels were added to its orderbook.

Samsung Heavy Industries (SHI) set an annual new order target of USD 13 billion and won orders worth USD 11.7 billion so far this year, achieving 90% of its annual new order target. That is considered as a successful result, given that the new orders placed at SHI last year amounted to only USD 9.6 billion. SHI clinched orders for 34 vessels worth USD 3.5 billion from commercial vessel sector, which represents a 22.6% increase from the previous year, and saw a nearly two-fold increase in the ordered quantity compared to the previous year. Meanwhile, new orders placed at SHI from offshore sector until the third quarter of this year stood at USD 8.2 billion which represents a 2.3% decrease from the previous year. The value of order declined, despite the increase in quantity to 3 units in 2013 from 2 units in 2012. SHI secured orders for 3 units this year, i.e., 2 large jack-up rigs and 1 semi-submersible drilling rig, compared to the previous year when it received orders for 2 units, i.e., 1 CPF (Central Processing Facility) and 1 platform.

DSEM set an annual new order target of USD 13 billion and has won new orders worth USD 11.9 billion so far this year, achieving 92% of its annual new order target. Specifically, DSME saw more than a three-fold increase in new orders for commercial vessels to 36 units, but experienced a decrease in new orders to 8 units from the offshore sector compared to the previous year. Particularly, DSME made a clean sweep of the orders for 5 units of natural gas-powered LNG carriers ordered worldwide, including the 2 LNG carriers ordered to it recently, thus solidifying its leading position in the market for eco-friendly high-efficiency LNG-powered vessels.

Meanwhile, STX Offshore & Shipbuilding (STXOS) won orders for only 38 vessels worth USD 1.1 billion until the third

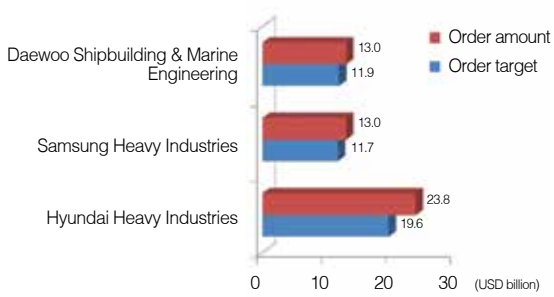


Figure 4. Order target and order amount of 3 major domestic shipyards for 2013 in shipbuilding and offshore sectors (from January to October)

quarter of this year amid the liquidity crisis, which is a sharp decline from 80 vessels worth USD 4.3 billion registered in the same period of the previous year.

Medium-sized shipyards see a robust growth in order intake

Medium-sized shipyard, such as Hyundai Mipo Dockyard (HMD), SPP Shipbuilding (SPP), Sungdong Shipbuilding & Marine Engineering (SSME), Hanjin Heavy Industries & Construction (HHIC), etc., have been sailing smoothly towards their annual new order targets, as well as major domestic shipyards such as Hyundai Heavy Industries (HHI), Samsung Heavy Industries (SHI), and Daewoo Shipbuilding & Marine Engineering (DSME). According to the shipbuilding industry, domestic medium-sized shipyards could rake in new orders in the wake of the restructuring of Chinese shipyards that caused the glut of vessels in global market.

Particularly, Hyundai Mipo Dockyard (HMD) has shown strong performance. HMD won new orders for 100 vessels worth USD 3.4 billion until September this year, including 71 medium-sized product carriers, 11 bulk carriers, 7 gas carriers, 7 containerships, 4 pure car and truck carriers, etc., already exceeding its annual new order target of USD 3.2 billion.

HMD successfully diversified its ship types of PSV(Platform Supply Vessel), Juice Carrier, etc., as well as ordinary commercial vessels, and saw its order intake increasing steeply from 40 units registered in the same period of the previous year.

SPP Shipbuilding, the leader in MR tanker market, has focused on product carriers and won orders for 36 vessels until last month, coming close to its annual order target of approximately 40 vessels. Particularly, SPP received the orders for only the medium-sized 50,000-ton tankers, increasing its cost and quality competitiveness. SPP Shipbuilding obtained the orders for 27 product carriers (PCs) out of 55 units ordered worldwide last year, carving out more than 50% share in this market segment.

In September, SPP Shipbuilding delivered its 200th vessel in 7 years after it launched the newbuilding business, reaffirming its status as the middle-standing shipyard, and has diversified the ship type to tap into new markets vigorously. Moreover, SPP Shipbuilding made inroads into the market for high value-added offshore supply vessels (OSVs) when it clinched an order worth USD 120 million from a European ship owner for 2 units of AHTS in May.

Purse seine fishing vessel, built by Sungdong Shipbuilding & Marine Engineering

Sungdong Shipbuilding & Marine Engineering(SSME) won the orders for 36 vessels worth USD 1.5 billion so far this year, including 14 bulk carriers, 8 tankers, 4 purse seines, 4 bituminous coal carriers, etc., poising to take another leap forward. Particularly, SSME signed a contract with the Denmark-based Maersk, the world's largest shipping company, to build 6 units of 50,000DWT MR tankers (including 2 optional vessels), and this marked the first shipbuilding contract that SSME entered into a with Maersk. Maersk, the world's largest shipping company, is known to set forth the demanding requirements when placing the shipbuilding orders.

Hanjin Heavy Industries & Construction (HHIC) has seen a fast growth in its order intake, led by the strong performance of the Subic Shipyard. Currently, HHIC has an order backlog of 42 vessels and achieved USD 2.2 billion in sales. Additionally, HHIC's Yeongdo Shipyard clinched an order from an overseas ship owner in 5 years and 2 months after winning its last order from a Germany-based ship owner for

180,000-ton bulk carrier in August, 2008. HHIC's Yeongdo Shipyard added 12 vessels (worth approximately USD 600 million) to its orderbook this year.

Domestic shipyards corner the market for large containerships and LNG carriers

Domestic shipyards won massive new orders for high value-added vessels, such as large containership, LNG carrier, etc., this year. Large domestic shipyards comprise absolutely large proportion of shipyards worldwide which are equipped with the validated technology such as the technology for large containership, particularly the 18,000TEU ultra-large containership which is currently the world's largest. Noticeably, domestic shipyards secured the orders for 36 units of 18,000TEU ultra-large containerships that have been ordered worldwide over the last 3 years. Among them, Daewoo Shipbuilding & Marine Engineering (DSME) and Hyundai Heavy Industries (HHI) secured the orders for 26 units and 10 units, respectively. In a word, the 2 domestic shipyards have taken the lion's share over the last 3 years. In addition, the medium-sized shipyards, such as SPP Shipbuilding (SPP) and Sungdong Shipbuilding & Marine Engineering (SSME), etc., have seen a rapid growth in new orders for large containerships, as well as large domestic shipyards.

According to Clarkson, global new orders for large containerships with a capacity over 8000TEU stand at about 230 vessels, and among them, domestic shipyards won orders for about 150 vessels which account for 60%.

- *(HHI) 5 units of 18,000TEU containerships and 5 units of 14,000 TEU containerships ordered by UASC (United Arab Shipping Company), a shipping company of UAE*
- *(HHI) 5 units of 18,400TEU containerships ordered by CSCL(China Shipping Container Lines), a Chinese shipping company*
- *(DSME) 3 units of 10,500TEU large post-panamax containerships ordered by Hamburg Sud, a Germany-based shipping company*
- *(DSME) 3 units of 18,400TEU containerships ordered by an Asian ship owner*

The LNG carrier market is actually dominated by domestic shipyards. Domestic shipyards, such as HHI, SHI, DSME, etc., won orders for as many as 41 LNG carriers out of 48 units ordered worldwide in 2011, and swept the the orders for 24 LNG carriers out of 30 units ordered in the world last year. This year, domestic shipyards won orders for 25 LNG carriers out of 31 units ordered around the globe, thus taking the lion's share in the global LNG carrier market.

There has been a surge in the newbuilding orders for LNG carriers amid the soaring global demand for the long-distance transportation due to the fact that the production of shale gas, which holds the key to the future of energy such as LNG, is limited to some regions such as North America and Russia. Shipyards are striving vigorously to win orders for LNG carrier, the high value-added vessel priced two to three times higher compared to ordinary containership.

- *(SHI) 2 units of 174,000m^2 LNG carriers ordered by FLEX LNG of Europe*
- *(SHI) 2 units of 174,000 m^2 LNG carriers ordered by Gaslog of Monaco*
- *(HHI) 4 units of 150,000 m^2 LNG carriers ordered by PETRONAS of Malaysia*
- *(HHI) 2 units of 174,000 m^2 LNG carriers ordered by Maran Gas of Greece*

13100TEU containership, built by Hyundai Heavy Industries


Drillship, built by Daewoo Shipbuilding & Marine Engineering

Jack-up rig, built by Daewoo Shipbuilding & Marine Engineering

- *(DSME) 1 unit of 170,000 m^2 LNG carrier ordered by a shipping company of Americas*
- *(DSME) 4 units of 173,400 m^2 LNG ordered by Angelicoussis Group, a shipping company of Greece*

3 domestic shipyards swept the new orders for offshore plants ordered worldwide

Hyundai Heavy Industries (HHI), Samsung Heavy Industries(SHI), and Daewoo Shipbuilding & Marine Engineering (DSME) took the lion's share of offshore facility orders placed around the globe this year. The offshore plants have brought domestic shipyards a respite from the order drought, despite the decline in new order volume this year. The recent upswing in new orders at domestic shipyards is buttressed by the world's best technological prowess of domestic shipyards and the surge in large-scale contracts awarded by the global energy companies.

The 3 domestic shipbuilding giants made a clean sweep of the new orders for 13 drillships ordered worldwide this year. In addition, DSME successfully clinched the order for the jack-up rig, the large offshore plant facility, in 30 years after it delivered the jack-up rig last time. SHI successfully diversified its offshore plant portfolio, securing an order worth approximately USD 1.3 billion from Statoil for 2 units of large jack-up rigs.

Domestic shipyards received the new orders worth a combined USD 26.4 billion for offshore plants so far this year. Among them, the orders placed at HHI amounted to USD 10.4 billion, the highest share. Meanwhile, the orders at SHI and DSME stood at USD 8.2 billion and USD 8 billion, respectively. According to the data published by Clarkson, new orders placed in the shipbuilding and offshore sectors stood at USD 81.2 billion as of October this year, and among them, the new order for offshore plants amounted to approximately USD 25 billion which accounts for 31%.

- *(HHI) 1 unit of Gas Production Platform ordered by Statoil of Norway*
- *(HHI) 1 unit of Floating Production Unit (FPU) ordered by Total of France*
- *(HHI) 1 unit of FPSO ordered by Chevron of U.S.A*
- *(SHI) 1 unit of LNG-FSRU ordered by BW Maritime of Singapore*
- *(SHI) 1 unit of Ultra-deepwater Drillship ordered by Ensco of United Kingdom*
- *(SHI) 1 unit of FPSO ordered by Nigeria*
- *(SHI) 2 units of Ultra-deepwater Drillship ordered by Seadrill of Norway*
- *(DSME) 1 unit of Ultra-deepwater Drillship ordered by Atwood Oceanics of U.S.A*
- *(DSME) 1 unit of drillship ordered by Atwood Transocean of U.S.A.*

The shipbuilding industry anticipates a continuous upswing in new orders for offshore plants for the next several years, given that the world's top 5 oil companies are increasing their investments by 3 to 5% each year and that the deep sea development gathers speed. Therefore, the new orders for offshore plants are expected to grow at an annual average of more than 15%, despite the difference in scale, depending on the year.

Full-scale recovery of commercial vessel market

According to the shipbuilding industry, the newbuilding price index which started to rebound in June exceeded 135 points, putting the shipbuilding industry on a path to recovery. The industry expects that the commercial vessel market will show the marked recovery bolstered by the strong demand for bulk carriers and tankers from the second half of this year.

Domestic shipbuilding industry is showing clear signs of recovery as the 3 domestic shipbuilding giants come very close to meeting their annual order targets. Equipped with the leading technology for high value-added state-of-art vessels, domestic shipyards are edging out Chinese rivals and solidifying the status of Korea as the shipbuilding powerhouse.

Ultra Fuel Oil Saving A/F

A-LF-Sea

Advanced Low Friction Coating

10% ENERGY SAVING

Advanced Formula

Verified fuel-saving
Reduced CO_2 emissions
Biomimetic Technology

Worldwide Network
Brazil, Bulgaria, China, Estonia, Germany, Greece, India, Italy, Japan, Lithuania, Malaysia, Netherlands, Norway, Philippines, Poland, Russia, Singapore, Slovenia, South Korea, Spain, Taiwan, U.S.A., United Arab Emirates, United Kingdom, Vietnam.

Basic & New

NIPPON PAINT MARINE

1-26, KOMAGABAYASHI, MINAMI-CHO, NAGATA-KU, KOBE 653-0045, JAPAN. TEL. +81-78-6072, FAX. +81-78-735-5309
RM. 201, TAERIM BLDG, 85-13, JUNGANG-DONG 4GA, JUNG-GU, BUSAN 600-814, KOREA. TEL. +82-51-468-2989, FAX. +82-51-468-2940
Email : sales@npmk.com / Homepage : nipponpaint-marine.com

Kormarine
Official Magazine

코마린 전시회
독점 공식 지정 매체

Korea Monthly International
Offshore & Shipbuilding Magazine

KORSHIP

Tel: +82-2-2168-8898 Fax: +82-2-2168-8895
www.**korship**.co.kr

세상을 변화시키는 엔지니어

엔지니어링은 우리의 삶을 한 단계 더 발전시킵니다. 세상이 갈수록 복잡해짐에 따라 우리는 더욱 어려운 도전 과제들과 마주하게 되었습니다. 이러한 과제들을 해결하기 위한 혁신적 엔지니어링을 한발 앞서 실현시킬 수 있는 방법은 무엇일까요?
새로운 접근방식이 그 변화의 시작입니다. 내쇼날인스트루먼트는 엔지니어와 과학자들이 복잡해지는 제어•계측 시스템을 빠르고 혁신적으로 구현할 수 있도록 통합된 소프트웨어와 하드웨어 플랫폼의 이점을 제공합니다.

여러분의 비전은 무엇입니까? 내쇼날인스트루먼트는 비전을 실현하기 위한 툴을 제공합니다.

02) 3451-3400

NATIONAL INSTRUMENTS™

DNV GL merger approved by competition authorities

DNV GL will be the world's largest ship and offshore classification society to the maritime industry, a leading provider of technical assurance and risk management services to the oil & gas industry and a leading expert in wind and power transmission and distribution.

The competition authorities in South Korea, the USA, the EU and China have cleared the merger between the two well-regarded companies, both of which will soon celebrate 150 years of independent operations. The new company, formally called DNV GL Group, will comprise 16,000 employees across 300 sites in more than 100 countries, and have revenues of EUR 2,500 million per year.

"It is with great pride that we can now inform that this vision-driven merger for growth has been cleared by the competition authorities in all four required jurisdictions. The merging companies both represent leading market positions, complementary commercial positions and an acknowledged reputation for advanced technology and high quality and integrity" said, Henrik O. Madsen, Group CEO of DNV GL.

Also Madsen argues that this first consolidation of two classification societies will be a global game changer. "DNV GL will be uniquely positioned to offer a broader set of products and services, more in-depth expertise and a denser global network of sites second to none. And importantly, there is a strong commitment by both DNV and GL to the merged company continuing to invest heavily in technology, research and innovation."

While companies' compliance with standards and pursuit of safety and protection of the environment has undoubtedly improved over recent years, Madsen believes there is definitely room for improvements.

"Standards are improving, but there is a lack of international governance. The industry needs strong, independent players that promote greater openness, consistency and effectiveness in the profession and push the development of new adequate measures and standards."

DNV GL Group CEO Henrik O. Madsen

One operation

The past six months laid emphasis on integration planning so that the new company is ready to start operating as one company with effect from 12 September. This means that the former DNV and GL customers will now benefit from a broader service capability, while maintaining the same contact points in DNV and GL as the integration moves forward. All certificates and approvals from DNV and GL will remain valid. In the coming months, DNV GL will accelerate integration processes to ensure consistent and continuous service operations, avoiding any business interruption for customers.

"We look forward to offering the best capabilities of our respective organisations to further advance the industries we serve and make a global impact for a safe and sustainable future – a safer, smarter and greener future for our customers and society at large," concludes Henrik O. Madsen.

Wanted!

크로네와 더불어 변화를 일으키고 새로운 인생을 함께 할
개성있고 자율적인 새 가족을 찾습니다. HR@krohne.co.kr

크로네한국지사 : 82 2 782 1900, mail@krohne.co.kr, 서울 영등포구 여의도동 43 미원빌딩 508호

Wärtsilä targets the newbuilding market with its eco-friendly engine

Wärtsilä introduces game-changing 2-stroke dual-fuel engine technology. The company's new Generation X series will follow and will be available for delivery during 2015 and 2016.

Wärtsilä has successfully conducted full scale testing on gas of its low-speed 2-stroke dual-fuel engine and is now introducing a full new range of engines based on its established and well-proven low pressure technology. The implications of this for ship owners and operators are such that the new engine is already being referred to as a game-changer for merchant shipping. The first engine utilising this technology, the Wärtsilä RT-flex50DF, will be available for delivery in the third quarter of 2014.

Offering a broad range of benefits

The entire portfolio of Wärtsilä 2-stroke engines will be available as low pressure dual-fuel (DF) versions. The benefits of this technology are significant. Compared to other technologies, studies show that Wärtsilä's low pressure DF engines offer capital expenditure (CAPEX) reductions of 15-20 per cent. This is achieved through a substantially simpler and lower cost LNG and gas handling system operating at pressures below 10 bar, and by the fact that no further exhaust gas cleaning systems are needed to meet future emission regulations. The new engines are IMO Tier III emissions compliant in gas mode, and the minimum Tier II level is achieved with liquid fuel.

Furthermore, on the operating expenditure (OPEX) side, significant gains will be achieved with Wärtsilä's technology. This is because no high pressure gas compression system external to the engine needs to be operated onboard the vessel, and NOx abatement systems are not required. Another main advantage is that the Wärtsilä technology allows stable operation on gas across the entire load range. This means that at low loads, there is no need to switch to diesel fuel as is the case with other technologies. Moreover, the consumption of pilot fuel is approximately just one per cent of the total fuel amount, and therefore much lower than with other technologies.

Wärtsilä's low pressure gas system fulfils all safety requirements. Since low pressure gas technology is the standard for all 4-stroke engine makers today, the merit of this concept is clearly proven.

"The benefits of the new low pressure dual-fuel technology for 2-stroke engines are significant. Describing this as a game-changing development for

merchant shipping is certainly no exaggeration, since the many advantages of being able to use gas and LNG as primary fuel are now, for the first time ever, available to virtually all vessel types. Our well proven technologies for both the engines and the onboard gas and LNG handling systems, can now be applied to this wider market. With the adaption of low pressure dual-fuel technology to 2-stroke engines, Wärtsilä brings the proven advantages it has demonstrated in the 4-stroke, medium-speed DF engine market to its 2-stroke low speed engine customers," said Martin Wernli, Vice President, 2-stroke, Wärtsilä Ship Power.

Leading in dual-fuel engine technology

Wärtsilä has pioneered the development of dual-fuel engine technology, and is today the industry leader in this field. Throughout the years, Wärtsilä's R&D work has focused heavily on these technologies. Wärtsilä successfully introduced its low pressure dual-fuel engine technology for 4-stroke engines for land based applications in the 1990s, and for marine applications soon afterwards. Since then, the company has delivered more than 1,000 such dual-fuel engines accumulating more than 7 million running hours.

The application of natural gas as a widely accepted fuel for merchant shipping is likely to become a reality in the near future. The environmental benefits and attractive pricing that gas offers are expected to drive demand, with a resulting increase in market share for gas fuel. By introducing low pressure 2-stroke DF engine technology, Wärtsilä is accelerating this major

trend since it makes the application of gas as a marine fuel easier and safer for owners, operators and yards. Wärtsilä envisages that by 2020, more than a quarter of the ordered vessels could be designed to run on gas fuel.

Wärtsilä is currently in the process of finalising the documentation for the first of the new series of engines, the Wärtsilä RT-flex50DF. Preparations for Classification Society approvals are underway.

Hempel launches Versiline Vinyl Ester coatings on the global market

Specifically designed for the aggressive industrial environments found in many process industries, Versiline Vinyl Ester coatings deliver superior anti-corrosive protection and temperature, chemical and abrasion resistance. The Versiline Vinyl Ester range is already widely used in the US, and Hempel is now launching it on the global market for the first time.

Versiline is a range of tailor-made speciality solutions for highly challenging applications - such as chemical tanks, stack linings and absorbers. The range was initially developed by US company Blome, a company Hempel acquired in 2012. Hempel is now making the Versiline brand available globally, starting with the Versiline Vinyl Ester range, which was launched on 29 October this year.

The Versiline Vinyl Ester range includes five coatings that can be combined in various systems depending on the requirements of each application.

Vinyl ester coatings offer superior performance against high temperatures and aggressive chemicals - making them ideal for the extremely corrosive and abrasive environments encountered in many process industries. Strengthened with an epoxy backbone, the coatings in the Versiline Vinyl Ester range are also highly resistant to water penetration, delamination and humidity.

“In some environments and applications, vinyl ester is the only technology that can do the job,” said Oliver Rye, Project Manager in Hempel’s Protective Segment. “Versiline Vinyl Ester coatings have been used in the US by many tank operators and oil & gas and power generation companies for over 40 years. They have a good track record and have proven to reduce downtime and extend the service life of industrial equipment in harsh environments.”

DSEC unveiled the world's first F-LNG power generation facilities

DSEC, the affiliate of Daewoo Shipbuilding & Marine Engineering(DSME), proved the technological prowess of domestic shipbuilding industry with its Floating LNG Power Plant (FLPP) and Floating LNG Re-gasification & Power Plant (FLRP) which produce electricity at sea using the LNG.

The LNG-FPSO technology is currently widely known. However, it was DSEC that unveiled the FLPP technology for the first time in the world. This technology enables the marine storage of LNG and its conversion into electricity which is then transmitted to the neighboring region. Additionally, DSEC developed the LNG Re-gasification & Power Plant (FLRP) fitted with LNG regasification system that turns the liquid LNG to a gaseous state to produce electricity.

FLPP and FLRP facilities are the high-efficiency low-cost environment-friendly offshore power plants that integrate the LNG storage capability and regasification facility/power plant into one single unit. They are designed to store the LNG in storage tank, regasify it to operate the gas engine and produce electricity which is then transmitted. Particularly, FLPP and FLRP facilities integrated the LNG storage, regasification, and electricity production into single unit, and are eco-friendly power plants that generate less harmful substances such as carbon, etc., compared to the coal-fired power plants, etc.

Each offshore LNG power plant, developed by DSEC, has the power generation capacity of 200 to 900MW. Its maximum power output is 900MW equal to the power output of a nuclear power reactor, raising the expectations that it

can become an alternative for nuclear power. The LNG, used as fuel, has the advantage that it is the eco-friendly fuel which can reduce the emissions of carbon dioxide (CO_2) by 40%, nitrogen oxide (NOx) by 80%, and sulfur oxides (Sox) by 99%.

In fact, there is nothing new to the technology that enables the production, storage, and unloading of LNG at sea. However, DSEC explains that the LNG power plant afloat in water and in vicinity to the seashore can minimize the power transmission/civil engineering works for the construction of power plant, and drastically reduce the cost of power plant construction at sea.

Particularly, FLPP and FLRP facilities can be installed near the seashore in the region that has the demand, thus minimizing the power transmission/civil engineering works, and can reduce the investment and power generation costs. In addition, FLPP and FLRP facilities can be transported as necessary, and furthermore, take only 30 months until being put into operation after the contract is signed, thus enabling swifter supply of electric power compared to the thermal and nuclear power generation facilities that take 4 to 5 years before being put into service.

DSEC received basic approval for FLPP-L200 and underwent risk factor evaluation from the American Bureau of Shipping and French Bureau Veritas, the internationally certified classification societies, in the first half of this year to increase the safety and reliability of product.

Think Innovation

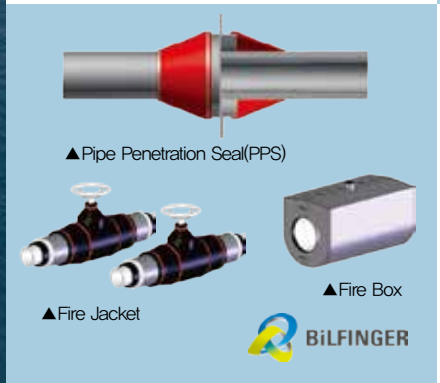
T&S was established on Sept 1st,
2001 based on the concept of providing sophisticated technology and services to customers.

At this present, T&S are dealing with almost all of shipbuilding companies in Korea such as HHI, DSME, SHI, STX as a local agent of Greenlee Textron of American Textron Group, Klauke Textron(Germany), Hellermann Tyton(Multinational), FireSeal(Sweden), BIS Lambda(Norway), NEK Cable(Norway), etc.

Whatever, Wherever, Whenever
We will give you High Quality

T&S
TECHNOLOGY & SERVICES

101-101, Auto-Parts Complex, Seo-Busan Yutongjigu,
Daejeo-2 dong, Gangseo-Gu, Busan, Korea
Tel. 051-832-4880 / Fax. 051-832-4882
www.tnsinc.co.kr



Outlook on CO_2 Emissions of the Worldwide Containership Fleet and Possible Reduction Targets: Part II

Germanischer Lloyd (GL)

Martin Köpke and Pierre C. Sames, Germanischer Lloyd SE

Photo: Dreaamstime / Mosole

Assumptions in the Current Prediction Model

The second IMO inventory study [13] with updates by the IMO Secretary in March 2010 [14] provides the most up-to-date and complete overview on ship fuel consumption and CO_2 emissions. It forecasts strong fleet growth, especially for container vessels, where a five percent annual growth is expected until 2050. For IPCC scenario A1B, considered by the authors of this study as one of the more likely scenarios, this will result in a doubling of the demand for tonne-miles between 2007 and 2020, and a further 4.5-fold increase from 2020 to 2050. (Figure 5)

For the current prediction, the authors of this study also analysed data from the IMF and IHSF to examine the interdependency between global GDP growth and the worldwide container fleet TEU capacity growth. (Figure 6)

The ratio between both growth rates was nearly constant over the last three decades, with both decreasing slowly over time. For this study, the authors used available short-term predictions from [15] as well as GL research, arriving at the growth rates shown in Figure 7. These allow modeling the container vessel fleet capacity growth rate based on predictions used by [13] IPCC, scenario A1B. In addition, different TEU capacity growth rates were used for different TEU size categories (Table 2). The total TEU capacity of the container vessel fleet and the underlying growth rates were adjusted to match the growth predictions from the second IMO inventory study [13]. (Figure 5 and 8)

This ensures compatibility of the results obtained from different models. However, it should be noted that the IMO's GHG study extrapolates tonne-miles as transport demand, while this study uses TEU capacity, with implicitly assumed constant distances and a constant ratio of transported mass and TEU. The second IMO inventory study [13] additionally documented typical operating days and load factors for main and auxiliary engines which were incorporated into the current model (refer to Table 2). The only exception is that the operating day values for the two largest classes were assumed to be equal. For the specific fuel oil consumption as provided by [12], the study differentiates engine sizes and years built. (Tables 3 and 4)

Using IHSF data on delivered vessels, the installed main engine power per nominal TEU was analysed to forecast its future evolution (Figure 9). Notably, the specific power of small container vessels is predicted not to decrease whereas significant improvement is foreseen in the largest vessels,

Size group	Long term TEU capacity growth rate	Main engine operating days	Auxiliary engine operating days	Main engine load	Auxiliary engine load
11,000+ TEU	8.0%	260	215	67%	60%
8–10,999 TEU	7.0%	260	215	67%	60%
5–7,999 TEU	5.0%	257	229	65%	60%
3–4,999 TEU	4.0%	250	223	65%	60%
2–2,999 TEU	2.0%	251	224	65%	60%
1–1,999 TEU	2.0%	259	231	65%	60%
<1,000 TEU	1.0%	180	161	65%	60%

Table 2. Assumptions used in the current model

Year	>15,000 kW	5,000 – 15,000 kW	<5,000 kW
1983	205	215	225
1984–2000	185	195	205
2000	175	185	195

Table 3. Assumed specific fuel oil consumption of main engines (g/kWh)

Engine age	Above 800 kW	Below 800 kW
Any	220 g/kWh	230 g/kWh

Table 4. Assumed specific fuel oil consumption of auxiliary engines

Photo: Hasenpusch

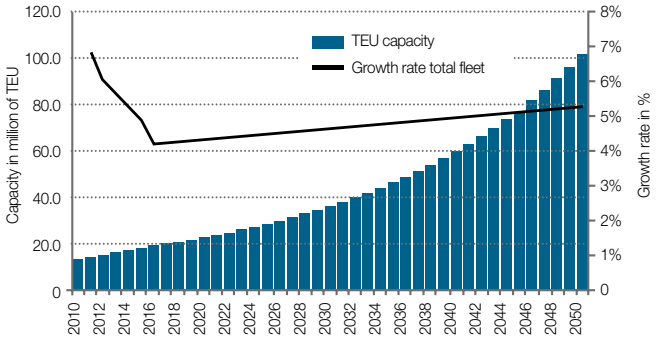


Figure 8. TEU capacity and its growth rate used in the model

Reduction measures	Abatement potential [Mt/a]		Cost efficiency [US $/t CO_2]
Design optimization	7.95	1.68%	–511
Propeller cleaning	9.31	1.97%	–508
Trim/draught	4.56	0.96%	–501
Hull openings	4.29	0.91%	–479
Hull coating and maintenance	9.31	1.97%	–468
Performance monitoring	5.48	1.16%	–458
Propulsion improvement devices	12.98	2.74%	–457
Voyage Execution	4.09	0.86%	–422
Speed control of pumps and fans	1.66	0.35%	–421
Hull form optimization	8.28	1.75%	–392
Weather routing	1.38	0.29%	–353
Air cavity systems	1.26	0.27%	–269
Power reduction	50.73	10.71%	–233
Reefer improvement	0.56	0.12%	–105
Waste heat recovery	2.74	0.58%	–61
Fuel cells	0.00	0.00%	0
Main engine retrofit	1.05	0.22%	31
LNG-fuelled ships	27.83	5.88%	53
Towing kite	0.20	0.04%	179
Air drag reduction	1.34	0.28%	3,481

Table 5. List of CO_2 reduction measures and potentials using 2025 as an example

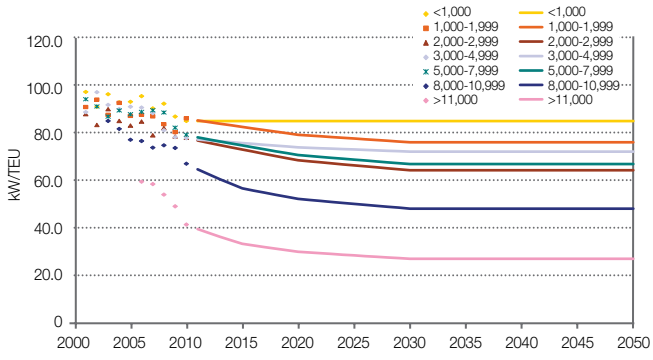


Figure 9. Specific installed main engine power for container vessels

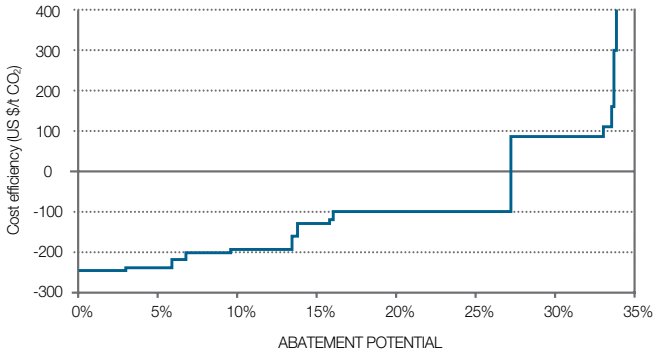


Figure 10. MACC for container fleet in 2025

enabled by a combination of factors such as improved engines and hulls as well as scale effects due to growing vessel sizes. In recent years the energy demand per TEU of the largest vessels has decreased significantly. However, without regulatory pressure this trend will likely slow down and eventually stagnate for technical reasons, which keep ships within the "business" as usual' scenario.

Assumptions for Applying CO_2 Emission Reduction Measures to the Prediction Model

The CO_2 emission projections of this study reflect future energy efficiency improvements. The corresponding CO_2 abatement was derived from marginal abatement cost curves (MACC), which plot cost efficiency over the maximal achievable CO_2 abatement (Figure 10). The MACC approach can support policy decisions regarding the costs of achieving specific reduction targets, or regarding the environmental effects of market-based measures [13]. It can also help ship designers, builders, owners and operators decide on the implementation of new technology and operational changes for future and existing ships [16].

This study uses the MACC to improve the prediction of future CO_2 emissions of the container fleet. The advantage of this approach is that the MACC incorporates variables such as fleet growth and fuel price development. (Figure 11) The developed MACC includes the CO_2 emission reduction potentials of 20 different measures applied to container vessels. (Table 5) The study further assumes that cost-efficient and profitable measures are likely to be implemented first. In the MACC diagram these measures are shown with negative cost-effectiveness.

CO_2 Emissions from the Worldwide Container Vessel Fleet

Based on the above data and assumptions, the authors computed the annual CO_2 emissions per ship size group. The oldest vessels were removed from each group and new vessels added to match the TEU growth rates described above. Three scenarios were investigated:

- Business as usual (Figure 12)
- Implementation of all cost-effective energy efficiency improvements (Figure 13)
- Implementation of energy efficiency improvements and application of a market-based measure equivalent to a surcharge of about 100 US dollars per tonne of CO_2 (Figure 14)

Each scenario is compared to a possible reduction target suggested by the European Union to COP 15. It is assumed that both, the regulatory framework and market pressure will encourage energy efficiency improvements. The study differentiates between operational and design-based improvements. Design measures (EEDI style) were only considered for new vessels joining the fleet whereas operational measures (SEEMP style) are applied to the entire fleet.

IMO's EEDI and SEEMP instruments are the first measures to effectively stimulate CO_2 reduction in new designs as well as ships in service. Germanischer Lloyd was the first classification society to implement the EEDI and offer certification to IMO Guidelines MEPC.1Circ.681 [7] and Circ.682 [17]. With the adaption of the EEDI as an amendment of MARPOL Annex VI, the first flag states are giving incentives for ships with lower EEDI values, such as Singapore with its Green Ship Programme, to encourage the market to use energy-efficient ship designs [18].

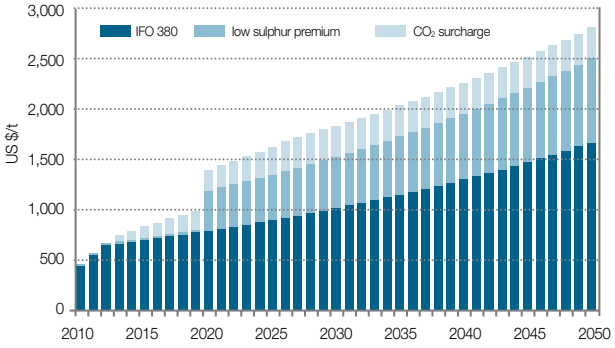


Figure 11. Assumed future fuel price development

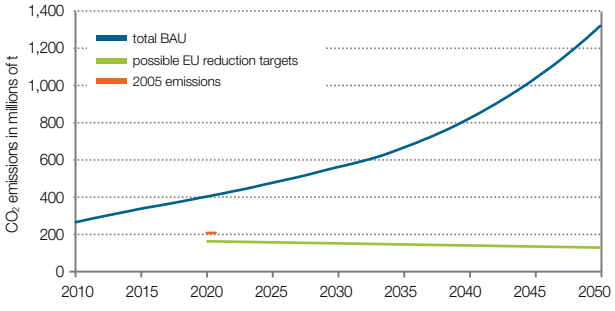


Figure 12. Projected CO_2 emissions from container shipping – BAU scenario

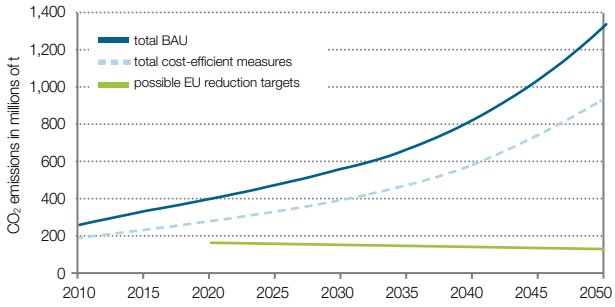


Figure 13. Projected CO_2 emissions from container shipping considering cost effective energy efficiency improvements

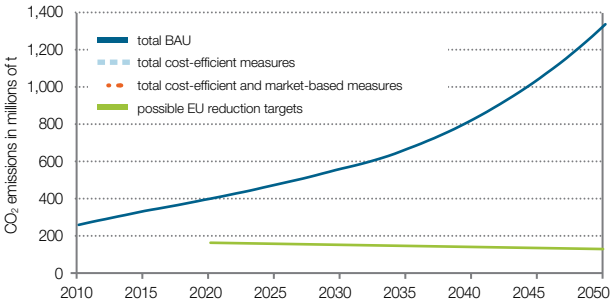


Figure 14. Projected CO_2 emissions from container shipping considering cost effective energy efficiency improvements and market-based measures

Conclusions

Global warming and its consequences are considered to be serious threats to the future well-being of mankind. Uncertainties related to the prediction accuracy of the science of climate change only highlight the necessity to take action. Each sector of the industry will need ambitious CO_2 emission reductions to prevent a further increase of global warming.

The IMO is developing measures to eventually reduce CO_2 emissions from ships. Based on a fleet-wide projection, the study predicts future CO_2 emissions from containerships, comparing them with a prospective emission target that has been derived from the most recent EU proposal to COP 15, without actually having been discussed at the IMO or UNFCCC to date. The study concludes that even after implementing far-reaching energy efficiency improvements in both design and operation, container shipping will probably fail to meet the potential emission target. Even market-based measures will not be sufficient to change this outcome.

As a consequence, the shipping industry may have to purchase emission credits from other sectors (in case an emission trading system is adopted as a market-based measure at IMO). Efficiency improvements should therefore be implemented at the earliest time possible to create the largest possible effect in terms of emission reductions. Furthermore, priority should be given to the development of cleaner, smarter and more energy-efficient vessels leveraging innovative technologies. It seems prudent for a maritime research and technology agenda to focus on the vision of a "zero emission ship". Realising the maritime energy-saving and decarbonising potential will help foster competitiveness and stimulate the development of the market for energy-efficient technologies, products and services.

Acknowledgements & Literature

The authors would like to thank Hannes Cordsen and Hauke Glaser for their special support during the production of this paper. The opinions expressed in this study do not necessarily represent the views of GL.

[1] Stern, N. (2007), Stern Review on the Economics of Climate Change, Cambridge University Press

[2] IPCC, Climate Change 2007 – Synthesis Report, www.ipcc.ch

[3] IMO, "IMO policies and practices related to the reduction of greenhouse gas emissions from ships", Resolution A.963 (23), Annex I

[4] IMO, "Interim guidelines for voluntary ship CO2 emission indexing for use in trials", MEPC/Circ.471, July 2005

[5] MEPC.1/Circ. 684, "Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)", Aug. 2009

[6] IMO, "Guidance for the development of a Ship Energy Efficiency Management Plan (SEEMP)", MEPC.1/Circ. 683, Aug. 2009

[7] IMO, "Interim Guidelines on the method of calculation of the Energy Efficiency Design Index for new ships", MEPC.1/Circ.681, Aug. 2009

[8] IHSF (2010), Lloyd's Register Fairplay. Version 11/10

[9] IMO, "Report of the Working Group on Energy Efficiency Measures for Ships", MEPC 61/WP10, Sept. 2010

[10] Denmark, Marshall Islands, World Shipping Council (2010): Recalculated baseline for container vessels, MEPC 60/4/14.

[11] IMO, "Report of the Drafting Group on Amendments to Man datory instruments (Part II)", MEPC 62/WP.11/Add.1/Rev.1, July 2011

[12] Sames, P., Köpke, "Future required energy efficiency of container vessels", 32nd annual Motorship Propulsions & Emissions Conference 2010, Hamburg, Germany

[13] IMO, Second IMO GHG Study 2009, Update of the 2000 IMO GHG Study, Final report covering Phase 1 and Phase 2, MEPC 59/INF.10.

[14] IMO, "Information to facilitate discussion on GHG emissions from ships", MEPC 60/WP.5, March 2010

[15] Drewry, "Container Market 2010/11 – Annual Review and Forecast – Incorporating the Container Forecaster – 3Q10", Drewry Shipping Consultants. Oct. 2010

[16] Institute of Marine Engineering, Science and Technology, "Marginal abatement costs and cost-effectiveness of energy efficiency measures", MEPC 59/Inf.10

[17] IMO, "Interim Guidelines for the Voluntary Verification of the Energy Efficiency Design Index", MEPC.1/Circ.682, Aug.682

[18] MPA of Singapore, Shipping Circular No. 12 of 2011, "Details of the Green Ship Programme under the Maritime Singapore Green Initiative", Singapore, June 2011

CHUGOKU MARINE PAINTS

$FIR(\%) = 2.62 \times \frac{Rz^2}{RSm}$

How to calculate the fuel efficiency of your vessel by 3D analysis on the surface profile.

FIR THEORY

Friction Increase Ratio
Comparison with Mirror Surface.

We have established FIR theory which can estimate the Friction Resistance by measuring and evaluating roughness(Rz) and wavelength (RSm) of the paint surface, and have been carrying out the evaluation of fuel saving effect with more accuracy.

Low Roughness + **Long Wavelength**
→ **Low Friction Resistance**
→ **Fuel Saving**

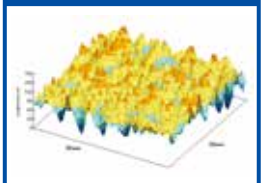
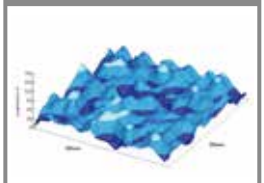
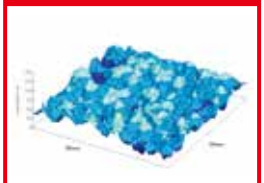
CMP Leading Edge Technology of *"Fuel Saving AF"*

LOW FIR

A Unique Anti-fouling "Beyond Silyl"

SEAFLO NEO Series

Smooth surface roughness by long wavelength play important roles to reduce hull friction. SEAFLO NEO Series are well designed in providing those two functions and achieved low friction and thus can contribute saving fuel.

Current AF	Silicone AF (CMP BIOCLEAN)	SEAFLO NEO
		
Rz= 102μ RSm= 3450μ	Rz= 52μ RSm= 6491μ	Rz= 56μ RSm= 5250μ
$FIR(\%)=2.62\times102^2\div3450$	$FIR(\%)=2.62\times52^2\div6491$	$FIR(\%)=2.62\times56^2\div5250$
FIR 7.9%	**FIR 1.1%**	**FIR 1.6%**

FIR7.9% − FIR1.6% = FIR 6.3%
In case of 6.3% of Friction Reduction ≒ **3〜5% Fuel Saving**
(Fuel saving is depending on vessel type and speed)

CHUGOKU SAMHWA PAINTS, LTD.

http://www.csp.co.kr

POST CODE : 617-800 ADDRESS : Bosaeng Bldg. 2F, 134-8, Gamjeon-Dong, Sasang-Gu, Busan, Korea
TEL : 82-51-329-3377 FAX : 82-51-329-3388 E-Mail : cspaint@csp.co.kr

More power

- New ABB motors make their mark

The chemical, oil and gas industries face huge challenges: As the source of the basic raw materials that underpin our daily lives, they have to deliver a wide range of highly competitive products at enormous volumes while managing multiple processes in extremely harsh and increasingly difficult environments. All along the production chain, from exploration and extraction to refining and processing, ABB has a wide range of motors and generators, mechanical power transmission products and services that help meet these increasing production demands safely, cost-effectively, and efficiently. ABB's two new motors, the HV flameproof motor AMD 900 and the HV modular induction motor AMI 800 2-pole, were developed to meet the requests of customers for more powerful motors.

ABB

Andrea Casiraghi, Andrea Lampugnani, Sami Myllykoski - ABB Group Discrete Automation and Motion, Motors and Generators

Dan Stelzner - Baldor, a member of the ABB Group

ABB has a wide range of motors and generators, mechanical power transmission products and services that help meet the increasing production demands of chemical, oil and gas industry safely, cost-effectively and efficiently.

ABB motors are powering pumps, compressors and drilling equipment used in all chemical, oil and gas production processes. These industries are seeing a global trend towards large-scale plants requiring motors with higher output to drive bigger machines.

This is true for new plants being built in emerging markets as well as for expansion projects in existing plants. In drilling and offshore sectors, keeping size and weight down is essential to keep operating costs down. To meet these trends, motor and generator technical developments are moving towards increased power density; i.e., high voltage, higher output motors that offer the ability to reduce weight and size while delivering more power and speed. And of course all of this has to be achieved while meeting stringent safety standards.

1a The HV flameproof induction motor AMD 900

1b The 2-pole HV modular induction motor AMI 800

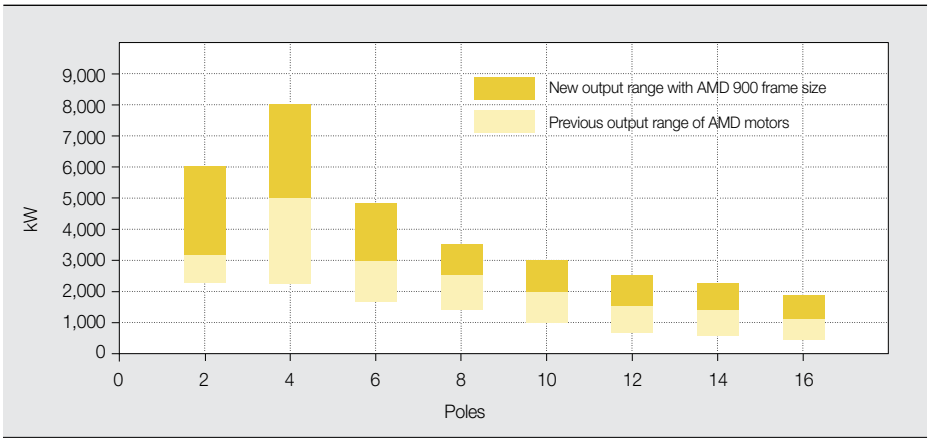
Figure 1. New ABB motors.

A versatile portfolio

ABB motors meet all national and international standards and requirements – including IEC, European (EN) and NEMA. All withstand demanding process requirements, including onshore or offshore, oil and gas pipelines, refineries or petrochemical plants, floating production storage and offloading oil platforms, or liquefied natural gas (LNG) plants. The motors also operate in harsh environments such as explosive atmospheres, extreme temperatures, corrosive dust or humidity.

The new additions extend ABB's Ex and safe area portfolio covering different installations and safety & power requirements.

ABB develops solutions to improve customers' processes over the entire product lifecycle. The initial purchase price and installation of a motor often represents a small percentage of the overall cost of ownership. Running costs, maintenance and repair bills can outstrip the original costs of a motor, so therefore selection of the right product can lower the total cost of ownership by avoiding downtime.



In drilling and offshore sectors, keeping size and weight down is essential to keep operating costs down.

Figure 2. AMD output at 6000 V 50 Hz

Powerful and cutting-edge motors

To better meet the needs of these industries, ABB has introduced two high-powered motors – the high-voltage (HV) flameproof induction motor AMD 900 and the 2-pole HV modular induction motor AMI 800. The new additions extend ABB's Ex and safe area motors portfolio covering different installations and safety and power requirements.

The HV flameproof motor AMD 900 is ideal for driving pumps and compressors where higher processing capacity is needed, a refiner, for example. The HV modular induction motor AMI 800 2-pole is designed for driving water injection pumps on floating production, storage and offloading units (FPSOs) and main oil pipeline pumps in addition to other broad applications in chemical, oil and gas installations and wastewater treatment plants.

Combining higher power with the requirements of flameproof protection (Ex d) involved considerable technical challenges.

The HV flameproof motor AMD 900 is Intended for fixed and variable speed applications from 333 rpm (18 poles) to 3000 rpm (2 poles), with 20-pole motors also available. Operating voltages are 3 to 11 kV, 50 Hz or 60 Hz. The motors are tube cooled either by IC511 or IC516 methods[1] and can be supplied for horizontal or vertical mounting. These motors do not require purging before starting, nor a pressurization system or inert gas. They can also be VSD fed. There is no thermal limitation for the "t_E" time[2], and no need for a system test in VSD applications – individual certification is not required.

Its low vibration levels increases the reliability for an extended lifetime, which, together with its reduced maintenance requirements, means lower cost of ownership. The motor is certified up to IEC frame size[3] 900 and rated up to 8 MW. The HV flameproof motor AMD 900 is an extension of ABB's HV flameproof motor family. The new frame size simply means more power.

Combining higher power with the requirements of flameproof protection (Ex d) involved considerable technical challenges. Internal clearances, referring to the minimum clearance distance between the joints in the frame and the labyrinth seal in mm, were optimized on the labyrinth seals and enclosure. Advanced finite element method (FEM) techniques were used to ensure that the new labyrinth seal design and thicker enclosure met all safety demands. Full compliance with all requirements has been confirmed by extensive testing, and both ATEX and IECEx certifications are available.

The high voltage modular induction AMI 800 2-pole motor expands ABB's Ex and safe area motor range and extends the IEC frame size from 400 to 800 for the 2-pole construction. Because of low vibration levels, rugged construction, low maintenance requirements and excellent reliability, the new motor provides a very low overall cost of ownership. High efficiency, along with a range of ventilation technologies, results in considerable energy savings over the life of the motor.

ABB met the challenge of cooling and stresses in the modular induction AMI 800 2-pole motor

By employing VSDs instead of throttling or using by-pass vanes, energy costs can be reduced by as much as 60 percent.

when implementing a combination of axial and radial ventilation. The rotor has a new bar construction to resist the axial and radial stresses that are generated in such a powerful motor, especially during start-up. The shaft is solid, ensuring the necessary rigidity with the rotor core shrink-fitted on.

The motor can be operated with supply voltage from 6 to 13.8 kV and is intended for fixed speed applications up to 3000 rpm, with a direct on line (DOL) connection, and is initially available for 50 Hz. VSD (variable speed drive) operation is possible, but the speed range is fixed on a case-by-case basis for each application. The motor is designed for horizontal mounting and is equipped with sleeve bearings. Available protection types are non-sparking (Ex n) and pressurized (Ex p).

ABB's range of 2-pole HV modular induction motors are available in IEC frame sizes 400, 450, 500, 560, 630 and 710 mm with a maximum output of 8 MW. This motor family has a standardized platform with options enabling production efficiency for almost all industrial applications.

The addition of the new 800 frame size means more output power. The new target output for the 2 poles is set to 13.5 MW (10 kV – 50 Hz – IC81W) and 12 MW (10 kV – 50 Hz – IC616). The HV modular induction 2-pole motors can be horizontally aligned, and cooling types are weather protected (IPW24) or totally enclosed, equipped with air-to-air (IC611, TEAAC) or with water-to-air (IC81W, TEWAC) heat exchangers.

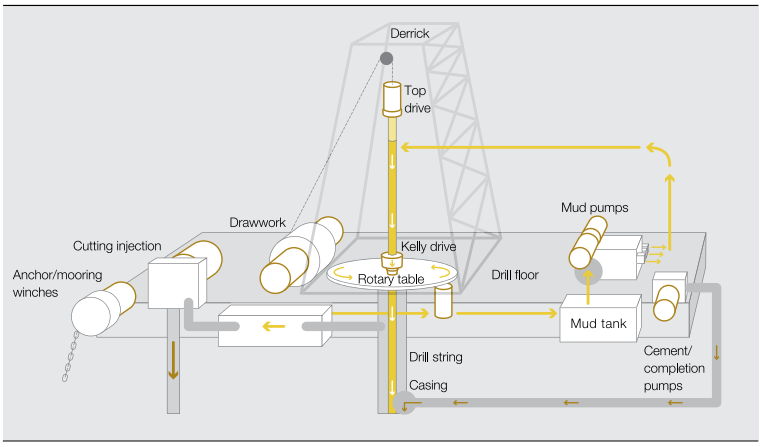


Figure 3. ABB's drilling drives system

Comprehensive systems dig deep

A complete AC drilling rig system is a complex mix of transformers, drives and motors. ABB knows the challenges of each application and has the right motor for each one.

ABB supplies Ex certified drilling motors for top drive, mud pump, drawworks (DW), cement pump, rotary table, cutting injection, hex pumps and winches. The motors output extend up to 1,655 kW or 2,250 hp. IEC frame sizes vary from 280, 315, 400, 423, and 450 up to 500. Typical operating voltages for VSDs are between 575 and 690 VAC at 50/60 Hz, and the motors are designed to work at ambient operating temperatures that range from – 45°C to 55°C.

AC motors are compact in size, supplied with a flange connection, and are foot supported.

ABB VSDs, together with ABB's drilling motors, are helping to lower the total cost of ownership through energy savings and reducing environmental impact. By employing VSDs instead of throttling or using by-pass vanes, energy costs can be reduced by as much as 60 percent. ABB electric drives reduce emissions (such as NOx and CO_2) onsite that could delay granting of a permit and incur penalties.

The new generation of top drives drilling systems, and the largest ones, rotate by AC motors and typically are connected to a gearing bit without the use of the conventional rotary table and kelly drive. In addition, the top drive can drill at a wider angle than a rotary table with swivel.

Generally, top drive motors in drilling rigs need to withstand higher acceleration forces than standard motors in other rugged industry environments. This equipment has to function in hazardous and corrosive environments. For onshore applications, typical power ratings range from 295

to 590 kW (400 – 800 HP), and for offshore are between 660 and 880 kW (900 – 1200 HP), with a speed range of 0 to 2600 rpm. The associated bearing needs to be able to carry the high axial force created by the swivel movement. One or two vertical AC top drive motors are used to drive the gearbox. The top drive is operated from a control console on the rig floor. Usually, top drive motors are controlled by VSDs, using either ducted air or a water cooling solution.

The benefits of VSDs are magnified when the driller controls the operating speed and power while enabling motor efficiency, but also keeps tripping pipe downtime smooth and safe. ABB top drive motors are designed, tested and certified for on- and offshore and VSD applications, optimizing total running costs. Together with modern AC technology they provide the optimum solution for drilling extremely deviated wellbores. The foot-mounted and flange-supported construction delivers a mechanically rigid solution. The specially selected bearing solution for vertical motors gives reliable operation and a long lifetime.

Mud pumps circulate the drilling fluid and maintain the correct pressure in the drilling well. Typical installations have two AC motors per pump, or one large AC motor with two shaft extensions. Normally they are VSD driven and suitable for hazardous and corrosive environments. They are mounted horizontally on top of the pump. Power ratings can be between 800 – 1,620 kW (1,100 – 2,200 HP) with typical speeds between 0 – 1,800 rpm and could experience a radial force <80 kN (kiloNewton) at the shaft end, and are either cooled by air or water.

ABB top drive Motors are designed, tested, and certified for on- and offshore and VSD applications, optimizing total running costs.

The power required to run a pump is roughly proportional to the cube of the speed. So a pump running at half speed can consume as little as one-eighth of the energy compared with one running at full speed. A small reduction in speed can make a big difference in energy consumption. As many pump systems often run at partial load, the use of a VSD can produce huge savings. The high performance and reliability increases plant availability and decreases maintenance costs. Smooth torque over the entire speed range reduces noise and vibration levels, which minimizes mechanical stress.

The DW is the heart of the electrically driven hoisting mechanism on a drilling rig. The DW reels the drilling line in and out to raise and lower the drill stem and bit. This equipment uses a VSD driven motor with a typical intermittent torque duty cycle between 0 and 800 rpm of 12,500 Nm, working in an intermittent speed range that could occasionally be as high as 2,400 rpm. ABB offers a complete drive package with a tested and optimized motor and drive solution for the DW. AC motors are compact in size, supplied with a flange connection, and are foot supported. Special bearing solutions are available for those situations where there are radial forces acting on the motor shaft.

Design, service, savings

ABB motors are engineered with the total running cost of motors as a priority and optimized for the application in which they will be used. They are available both as cast iron or rigid welded steel frame construction; the shaft design is high-fatigue-resistant material; and the special bearings can be either antifriction or sleeve. Both the shaft design and bearings are capable of carrying high radial and axial forces. To withstand harsh weather conditions corrosion treatment is done with the offshore industry's approved painting system.

Footnotes

[1] http://electrical-engineering-portal.com/cooling-and-ventilation-of-electric-motors-ic

[2] tE = stalled rotor time, in seconds, taken for an a.c. rotor or stator winding, when carrying the initial starting current, to be heated up to the limiting temperature from the temperature reached in rated service at the maximum ambient temperature (IEC 60079-7)

[3] Frame size refers to the distance from the center line of the shaft to the bottom of the feet.

MD-Series M-Series Voyager-Series MU- / MV-Series

Thermal imaging cameras for maritime applications

A full range of thermal imaging cameras

FLIR Systems markets a full range of thermal imaging cameras for the most demanding maritime applications. Our thermal imaging cameras are rapidly finding their way to pleasure craft and yachts, commercial vessels, work boats, fishing boats, cruise ships and many other types of vessels. They will help you to navigate in all circumstances, detect other vessels, assist in man overboard searches, secure your vessel in the harbour and at open water (anti-piracy) and give you a good overview of what is happening in the dark.

For more information please contact:

FLIR Systems Korea
6th Floor (Samsung-Dong, GuGu Building)
566 Samsung-Ro,Kangnam-Gu, Seoul
Tel: (02) 565-2714~7
Fax: (02) 565-2718
Email: flir@flirkorea.com

Figure 1. The Bahrain Vision is a small scale LNG carrier with a capacity of 12,000 m³. It has been in service since November 2011.

Delivering LNG in smaller volumes

Gas is increasingly becoming the fuel of choice for thermal power plants. Many regions do not have access to natural gas via pipelines, but liquefied natural gas (LNG) can be transported cost efficiently from one part of the world to another.

Wärtsilä Corporation

Sampo Suvisaari, General Manager, Power Plants, Central America and the Caribbean

The world's economically recoverable natural gas reserves have increased substantially during recent years. This is largely thanks to shale gas, and the advances made in developing efficient methods for extracting it. As a result, according to industry experts, there are now reserves of natural gas for more than 200 years. With this abundance of gas, it seems likely that gas prices will remain competitive over the long term. Add to this the fact that natural gas is the cleanest of all fossil fuels, and its popularity is easy to understand.

Transporting LNG

Liquefied natural gas (LNG) is an obvious way to transport gas where pipelines are not available. The traditional way to distribute LNG is to use dedicated ships that are as large as possible. These large ships transport LNG from major liquefaction facilities located in a handful of places around the world to the LNG import facilities, which are not that numerous either. Since many ships are not designed to transport partial loads, these import facilities need to have tanks large enough to receive the full cargo from an LNG ship.

While this large-scale approach keeps transportation costs down, the problem is that it creates limitations. Firstly, the receiving terminals need to be relatively large. A receiving terminal of say, 160,000 cubic meters, requires a very significant investment. For a power plant having a 100 MW of capacity, this 160,000 m³ would represent about half a

Figure 2. LNG truck unloading at a small two-tank LNG storage facility.

year's consumption, which is far too much for an efficient use of capitals.

The most common solution to this problem has been to build LNG import terminals only at locations where the gas consumption is large enough, thus completely ruling out smaller disconnected locations, such as islands or small countries. However, this is now changing.

Figure 3. Unloading an LNG truck can be a one man operation. The LNG tank in the truck is at a higher pressure than the recipient allowing LNG to flow from it without the need of any pumps. A clever, simple system.

Smaller-scale transportation

The transportation of LNG on a smaller scale is already happening in several places around the world, most typically using trucks. LNG trucks are essentially vehicles having a pressurised LNG tank. These are offered by many manufacturers, and come in different sizes. In some countries even multi-unit trailers are used. Unfortunately, this solves only regional and not overseas transport requirements.

Another method is to use dedicated LNG containers. This makes it possible to use the same container for both marine and road transport. The disadvantage is the relatively small capacity possible, which only makes sense for smaller power plants.

Using smaller vessels to transport LNG is not yet common, but it is already happening. Norway has been one of the early users of small vessels for the distribution of LNG, since the geography of the country is attractive for marine transportation, even in quantities as small as 1000 m^3.

The Caribbean, on the other hand, needs slightly larger scale transportation capacity. Vessels of around 10,000 m^3 are ideal for many locations, but such vessels are not yet shuttling back and forth from island to island. There needs to be LNG sources that make LNG available for smaller vessels, and in order for this to happen, their business model needs to take smaller scale vessels into account.

By trying to load smaller vessels from the same loading bays as the larger ones, valuable dock time would be uti-

lized for a smaller volume sale. LNG export terminals need, therefore, to have additional loading bays dedicated for these smaller vessels.
An analogy could be trains and trucks. Trains are more cost efficient for cargo transportation, but that does not mean that trucks are not needed, or that they are cost prohibitive. Both are essential for a functioning transportation system.
In the same way, LNG needs to be transported using both cost efficient large vessels, as well as flexible 10,000 m^3 small scale vessels that reach more places.

Hub and spoke concept

A natural solution for improving the efficiency of transporting LNG on a smaller scale is to use a hub. The hub can be a new, or even an existing LNG terminal. It can be land-based or floating. Smaller vessels could make 'milk runs' to several locations, or back and forth trips to a single location, which would keep the distances relatively short. The trips of the smaller vessels are the spokes, hence the name 'hub and spoke' for this distribution model.
At present this distribution model is not yet applied in the Caribbean. Nevertheless, due to the imminent widespread demand for gas, it would be surprising if this concept does not materialize within the next few years. On the other hand, as several new LNG export terminals have been announced in the region, including several terminals in the Gulf of Mexico and one in Colombia, some of the export terminals themselves may become regional small-scale LNG distribution hubs.

Boil-off gas

Liquefied natural gas needs to be at a very low temperature, approximately -160 degrees Celsius. No matter how well insulated the LNG tank is, the liquid will be constantly producing boiling off gas, which needs to be taken into account. Different tanks handle boil-off gas in different ways. Let us have a look at the different tank types:

Pressurised small-scale tanks

LNG can be stored in cylindrical metal tanks, which are essentially spherical tanks that are made longer. This is a geometrically strong shape, and the tanks are made to resist pressures of typically up to 8-10 bar (116-145 psi). The benefit of having such pressure resistance is that the boil-off gas, which is inevitable no matter how good the thermal insulation, can remain in the tank. An increased amount of boil-off gas will simply increase the pressure and temperature inside the tank.
The length of time that this can be sustained depends on the tank specifications, and on how full the tank is. The less fuel

Figure 4. A small scale LNG storage system can consist of a large number of prefabricated tanks. Ambient air evaporators seen in the back on the right side of the image.

there is, the more space there is for boil-off gas. Some manufacturers claim their tanks can stay idle for three weeks and more without the need for venting the boil-off gas. When the excess pressure is controlled by releasing gas through a control valve, the evaporation inside the container lowers the temperature and keeps the container in equilibrium.

The benefit of having a tank that can withstand pressure is that the tank does not need a reliquefication system at all. The boil-off gas will be used in parallel with the consumption of the LNG. As a result, the tank arrangement is extremely simple, having no compressors or rotating equipment of any kind. It simply consists of the tank, an emergency pressure relief valve, re-gasification heat exchangers, and an outgoing gas pressure stabilisation valve.

Pressurised small-scale LNG tanks come in different sizes, ranging from very small tanks for vehicular use, up to larger tanks of several hundred cubic metres, and even up to about 1000 m^3 in capacity. Their size is limited by transport constraints and weight. For example, a tank of 1000 m^3 is over 45 metres long and 6 metres in diameter. Typically, many tanks are placed side by side to get to the desired overall volume.

Even larger pressurised LNG tanks of 10,000 m^3 and more do, however, exist. The pressure resistance of the larger tanks tends to be smaller, about 4.5 bar (65 psi), as the weight and cost of the tank steel would otherwise become cost prohibitive. These larger pressurised tanks have so far been used only on ships and barges, due to transport limitations.

Atmospheric pressure tanks

Traditional large land-based LNG tanks are designed for atmospheric pressure only. These tanks are built on site over flat base concrete foundations, and their tops have such a large area (the diameter can be over 60 metres) that even a small internal pressure inside the tank would create a strong upward force against them. These tanks are not designed to withstand such upward forces, and the pressure inside the tank has to be maintained equal to the outside atmospheric pressure. The only way to ensure this is to have a system to compensate for the boil-off gas, by converting this gas back into liquid form via a reliquefaction system.

A natural gas reliquefaction system has to be sophisticated due to the cryogenic temperatures that it needs to create, and it is therefore an important cost element. For this reason, atmospheric pressure tank technology is typically selected for LNG storage tanks larger than 30,000 m^3, while storage tanks smaller than 30,000 m^3 are built using several pressurised tanks.

Figure 5. Vertical LNG tanks at a factory in the Dominican Republic. Vertical tanks are used even in areas where hurricanes are common.

Atmospheric pressure tanks can be built in three different ways; single containment, double containment and full containment. Each type has its own advantages and disadvantages, and selection is dependent on the location.

Safer than LPG and oil fuels

Liquefied Petroleum Gas, or LPG as it is known, has been used for a very long time all around the world as domestic gas. It is distributed in small bottles, or by trucks to somewhat larger domestic tanks. The concept is widely accepted. LPG is not cryogenic and can be maintained in a liquid state at normal ambient temperatures by controlling the pressure.

When LNG and LPG are compared many people will instintively think that LNG is more dangerous, due to its cold nature. In fact, LNG is less risky than common LPG. LNG does not ignite easily, and in liquid form does not ignite at all. It

Figure 6. LNG is loaded into distribution trucks at the AES LNG import terminal in the Dominican Republic. The large 160,000 m³ LNG tank in the background is an atmospheric pressure tank with a reliquefaction system.

can only burn within a narrow air-to-gas mix range. Natural gas is also lighter than air, and will dissipate in the atmosphere in case of a leak. Should a leak occur, it will not leave any greasy residues as oil spills do. All will evaporate, which is a very desirable quality for a fuel to be used in the Caribbean.

The worldwide safety track record of LNG has been exemplary over the last fifty years and more.

Floating or land-based?

A floating storage and regasification unit (FSRU) is a ship or barge that is fitted with LNG tanks and the required heat exchangers (gasifiers) for converting the liquid to gas. If the gas is used onshore, it is transported to land by a gas pipeline, which has to be at least partially flexible.

An FSRU may also be placed next to the gas consumer, such as a gas power plant, thereby avoiding the need for a submarine gas pipeline. Instead, a submarine power transmission line is all that is required.

The question of whether to use floating or land-based gas storage is largely determined by the proposed site, and the proposed marine conditions. Both solutions have their distinct merits.

Conclusion

As the use of gas fuel increases throughout the energy market, the entire infrastructure for ensuring adequate supplies are available to both large and small markets is in need of rapid development. For fragmented markets, such as the Caribbean islands, transportation and storage issues are of prime importance.

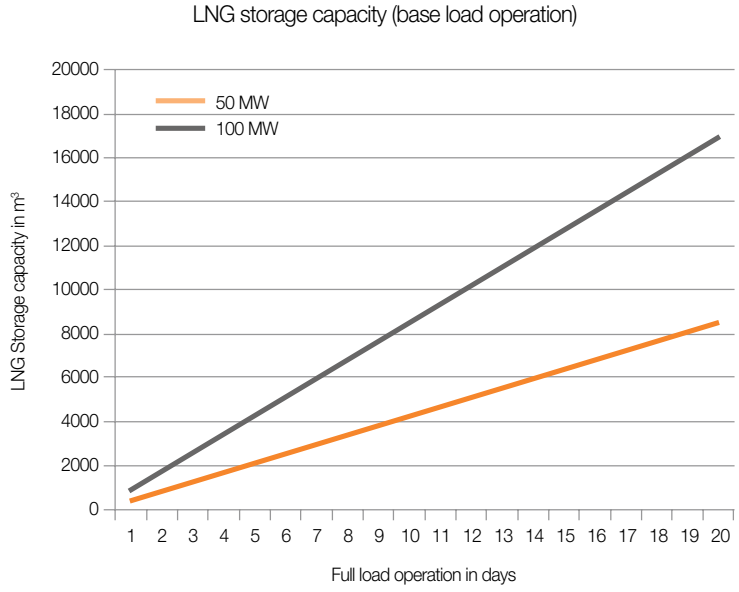


Figure 7. This chart shows the required net LNG storage capacity for 50 MW and 100 MW base load power plants and the respective number of days they can operate on full load. Some additional capacity may be needed for unloading flexibility.

ISO 9001: 2000인증

Power Lifting Magnet

With an extensive track record worldwide, as well as in Korea, the world's largest shipbuilder and undisputed No. 1 leader in offshore plant sector, Geumgang Magnet and Geumgang Cable Reel will fulfill all your needs. We dramatically enhance your productivity.

Cable reel for container cranes

Cable reel installed in Hanjin Heavy Industries & Construction

Cable reel installed in Hyundai Hysco

Cable reel for export to Saudi Arabia

금강파워테크닉

Lifting Magnet for
- Stiil Plate
- Scrap
- Section BAR
- Billets

Cable Reel for
- Gantry Crane
- Harbor Crane
- RTGC
- RMGC

GPT Geum Gang Power Technique

Address: 818-19, Dohwa-dong, Nam-gu, Incheon, Korea
TEL: 032-872-8530 Fax: 032-872-8510
Web: http://www.**ggtec**.co.kr
E-mail: magreel@chol.com

Economics of Continuous Emission Monitoring Systems

Continuous emission monitoring systems save time and money in marine and on-shore monitoring applications.

Emerson Process Management

Koh Yee Tiong, business development director of analysers and solutions (Analytical, Asia Pacific)

The need to monitor fuel burning efficiency and emissions is common to many industries. Large boilers and gas turbines in the power industry, process heaters and sulfur incineration in refining, industrial boilers, cement kilns and cogeneration plants require accurate and regulatory-compliant emissions monitoring.

These requirements are now becoming more critical in marine applications due to stricter and more stringent regulatory requirements by the International Maritime Organisation (IMO).

Maritime companies suffer from rising energy costs requiring precise measurement of the flow of fuel in ships: Floating, Production, Storage and Offloading vessels (FPSOs) and other sea-faring crafts. At the same time, these vessels face challenges to install monitoring systems due to operational requirements and extremely limited space.

Likewise, on-shore maritime facilities need intensive emissions control to meet regional regulations but have chal-

lenging environments (eg: corrosion from the sea salt environment) that may require changes of configuration.

Like all industrial facilities in Asia, maritime installations experience high trenching costs which limit the potential for growth and changes to the facility. A suitable monitoring solution for these challenging environments is the simple, cost-effective elegance of a Continuous Emissions Monitoring System (CEMS), and in some cases, the ideal CEM solution may be wireless.

Operational Performance

For one shipbuilding and marine engineering company in Asia, CEMS equipment has allowed it to improve the operational performance of its FPSO vessel, meet regulatory requirements and perform real-time emissions monitoring of the gaseous composition emitted from the engines on the FPSO.

The installation of a CEMS allows the operator to monitor the emissions of the fuels being burned by vessels. This information helps determine the need for scrubbers to reduce CO_2, NOx and SO_2, which are required to meet IMO international maritime standards.

The FPSO CEMS that was selected is a system which is custom-engineered for the analysis of samples taken from various different streams. As the samples from these streams are laden with moisture, due consideration has to be taken to ensure all sample stream components are kept in the same gaseous phase.

Hence, all sample streams are heated from the sample takeoff points and also kept hot to prevent unwanted condensates within the system using the AISI 904L sample tubings. A sample conditioning system is used to properly condition the sample to suit each separate analysis by different analysers.

The sample system is designed to ensure quick response to the change of samples taken from each sample point. The sample conditioning system and analysers are housed in an IP65 weatherproof CEMS enclosure made of 316SS material. A Programmable Logic Controller (PLC) is used to perform certain functions within the sample conditioning systems.

An on-demand request to the PLC will activate the pneumatic blowback, typical of CEMS with high particulate content that may clog the sample filters at the respective take-off points. This blowback feature was implemented within the design of the sample conditioning system to clean the respective filters at the sample take-off points. The electrical components of this whole system met the requirements of ATEX Zone 1, Gas Group IIA.

The system is custom-engineered for the analysis of samples taken from various different streams.

The space limitations in a tightly knitted FPSO do not allow placement of an analyser house, so using an explosion-proof CEMS is most appropriate because it has a small footprint. In addition, the analysers used in CEMS do not require air conditioning since they are designed to be suitable for up to 50 deg C ambient temperature.

Air conditioning takes up space and generates heat, and the need to meet ATEX certification means a more expensive type of air conditioning system is used. The simplicity and reliability of the self-contained CEMS the company selected made it an ideal choice for these demanding marine applications where the FPSO is deployed.

Pollution Reception Facility

Another application for a large onshore marine pollution reception facility, located in Southeast Asia, for the collection and disposal of hazardous waste highlights how CEMS can also be the go-to technology for these challenging

requirements. The regulatory body requires that the emission data from the incinerators be reported daily, so continuous monitoring is required.

At the same time, the facility required a flexible system that could be moved easily, in case future growth requires relocating the control room or other facilities. To install a wired CEM system now and potentially move it later would be an inefficient and wasteful use of budget. The solution for the facility was an innovative wireless configuration.

As with the shipboard CEMS, the system devised for the facility used a sample probe to extract gas from the flue gas stack which was then conditioned using a sample handling system. The CEMS consists of process gas analysers, oxygen/combustible analysers and opacity monitors as required by the application. Wireless adaptors connected to each analyser system transmit data wirelessly to the control room.

The system takes advantage of the IEC 62591 (Wireless HART) international standard for industrial wireless communications. In its self-organising mesh network topology, every device in the network can also pass information for its neighbouring devices, so if something disrupts communications between two devices, the network automatically provides an alternate path.

Therefore, changes to the plant's configuration no longer interfere with transmission paths. As a result of this highly flexible system, the facility would be able to relocate the CEMS and add additional analytical measurements should expansion or application requirements demand.

Maritime applications are just one example of the flexible, cost effectiveness of CEMS at work. Whether wired or wireless, CEMS are an ideal solution for meeting country-specific requirements for emissions reporting throughout Asia. Continuous emissions monitoring systems not only save money in installation and operational costs, but with the addition of wireless, they may greatly reduce project costs over time.

Maritime & Offshore HMI

5 reasons for
Beijer Electornics HMI

- **30** — Three decades of experience means reliable products and services
- In-house hardware and software development delivers seamless HMI
- iX software offers scalable vector graphics and an open platform
- Multiple communication drivers, remote access features with VNC, FTP and Web server and the solid HMI functionality essential for maritime and offshore industries
- Cutting-edge solutions certified by major nautical associations

Success Story

MAN Diesel & Turbo, Germany

It is no accident that MAN Diesel & Turbo uses industrial computers from Beijer Electronics as human machine interface (HMI) for the company's giant B&W engines. Mounted directly on a diesel engine, the HMI needs to be able to withstand vibration, heat and even ingress by water. HMI solutions from

Beijer Electronics deliver the ruggedness, efficiency and dependability essential to HMI for maritime propulsion units.

EUROPEAN HMI HARDWARE VENDOR OF THE YEAR AWARD 2005 — IMS

2007 FROST & SULLIVAN European Human Machine Interface Competitive Strategy Leadership Award

if product design award 2005 ■ 2006 ■ 2007 ■

Beijer ELECTRONICS

Beijer Electronics AB
Box 426, 201 24 Malmö, Sweden
www.beijerelectronics.com | +46 40 358600

Korean office | Beijer Electronics Corp.
No.1225, 12F, A-Dong, SK HUB-SU, 650-4,
Guro-dong, Guro-gu, Seoul, Korea
info.kr@beijerelectronics.com | +82-70-8249-7192

Lloyd's Register · DNV · BUREAU VERITAS · ABS

DSME won orders for 3 units of 10,500TEU containerships

Daewoo Shipbuilding & Marine Engineering (DSME) received an order for 3 large containerships from a European shipping company, according to the foreign press.

In October, the Norwegian shipping magazine TradeWind reported in October that Hamburg Sud, a German-based shipping company, placed an order at DSME for 3 units of 10,500TEU containerships. ,

These vessels are the post-Panamax containerships, valued at approximately USD 90 million per unit. The contract is worth USD 270 million. DSME will deliver these vessels from the second half of 2015. Post-Panamax vessel refers to the vessel that increased the width to fit through the Panama Canal slated for expansion.

Vessels with a capacity ranging from 9,000TEU to 10,000TEU were popular among the container shipping companies, considering that such vessels could flexibly adjust the cargo volumes in response to the fluctuations in trade volumes. Hamburg Sud ordered large vessels this time to cope with the possible increase in regional cargo traffic in Central and Latin America.

In 2011, Hamburg Sud awarded an order worth approximately USD 1 billion to Hyundai Heavy Industries(HHI) for the construction of 9,800TEU Post-Panamax containership. The 10,500TEU containership ordered to DSME this time will be the largest vessel to be owned by Hamburg Sud.

TradeWinds predicted that Korean and Japanese shipyards would receive a series of additional orders for large-scale containerships in the period ahead.

대우조선해양, 1만500TEU급 컨테이너선 3척 수주

대우조선해양이 유럽선사로부터 대형 컨테이너선을 3척을 수주했다는 소식이 외신을 통해 전해졌다.

지난 10월 노르웨이 해운 전문지 트레이드윈즈에 따르면, 독일 선사인 함부르크 수드(Hamburg Sud)사는 대우조선해양에 1만500TEU급 컨테이너선 3척을 발주했다. 이들 선박은 포스크-파나막스급 컨테이너선으로 척당 발주금액이 약 9000만 달러로 알려졌으며, 계약 금액은 총 2억7000만 달러에 달한다. 대우조선해양은 2015년 하반기부터 선박을 인도할 예정이다. 포스트-파나막스 선박은 파나마운하의 폭 확장 공사에 따라 너비를 더 넓힌 선박이다.

컨테이너선사들에게 인기가 높은 선박은 9000TEU~1만 TEU급 선박이었다. 교역량 규모 변동에 따라 탄력적으로 화물량을 조절할 수 있는 선박이기 때문이다. 함부르크 수드가 종전 선박에 비해 대형 선박을 발주하는 것은 중남미 지역 물동량이 늘어날 것을 대비한 것으로 분석되고 있다.

한편 함부르크 수드는 지난 2011년 현대중공업에 약 10억 달러 규모의 9800TEU급 포스트-파나막스 컨테이너선을 발주한바 있다. 이번에 대우조선해양에 발주한 1만 5000TEU급 컨테이너선은 이 선사가 보유한 선박 중 가장 크다.

한편 트레이드윈즈는 앞으로 한국 및 일본에 대형 컨테이너선의 추가 수주가 이어질 것으로 전망했다.

Samsung LNG Carriers Powered and Propelled by GE Power Conversion

Liquefied natural gas (LNG) is one of the fastest growing energy markets worldwide, and global production capacity could be more than double by the end of the decade. Higher natural gas prices and growing efficiencies in the LNG value chain are making it economically attractive to ship LNG over long distances, transforming natural gas from a regional to a global market.

GE's Power Conversion business is working closely together as a partner with the Power & Control Systems division (PCSD) of Samsung Heavy Industries (SHI). Power Conversion has been

appointed to equip four LNG carriers to be built by SHI at its Geoje facility in South Korea.
SHI is a leader in the market with its LNG carriers and ultra-large container ships. SHI has shown that electrical variable speed propulsion in combination with dual fuel engines delivers outstanding results - maximizing efficiency and lowering fuel consumption and emissions. Dual fuel diesel electric has become a standard on LNG carriers as it offers greater flexibility and cost optimization in operation, as well as using less power and offering greater reliability and more load carrying capacity. All in all, these ships will have less impact on the environment through greater efficiency with lower emissions.
The four vessels have been ordered and are being constructed for Bonny Gas Transport Ltd (BGT), a subsidiary of Nigeria LNG Ltd. Thanks to an extensive worldwide network, GE will be able to provide BGT with a local content of expertise as well as an after sales service for this project. For each vessel, GE, in partnership with SHI PCSD, will supply four power and propulsion systems comprising generators, main and cargo switchboards, transformers, MV7000 converters, motors and remote control. GE is responsible for the design, engineering, commissioning, training and assistance during the whole project execution including the sea and gas trials.

GE전력변환사업부, 삼성중공업 LNG 운반선에 동력 및 추진 시스템 공급

액화천연가스(LNG) 시장은 세계에서 가장 빠르게 성장하는 에너지 분야 중 하나로 전세계 생산량은 2020년까지 두 이상 늘어날 전망이다. 천연가스의 가격 상승과 LNG 가치 사슬의 효율성 증가로 현지에서 전세계로 LNG를 장기 수송하는 방안의 경제적 매력 또한 높아지고 있다.
이 가운데 삼성중공업의 파트너사인 GE전력변환사업부(Power Conversion)가 삼성중공업이 건조 중인 LNG 운반선의 주요시스템 제공업체로 선정됐다.
삼성중공업은 LNG 운반선과 초대형 컨테이너 선박 시장을 주도하고 있다. 삼성중공업은 전기변속 추진시스템이 2중 연료 엔진과 함께 사용돼 탁월한 결과를 제공하는 것은 물론, 엔진 효율을 극대화하고 연료 소모와 배기가스를 줄일 수 있다는 점을 보여주었다.
이중 연료 디젤 전기(DFDE) 추진 시스템은 LNG 운반선의 표준이 되었다. 유연성과 비용 최적화가 우수한데다 적은 전력에도 운용 신뢰성과 적화능력이 월등하기 때문이다. 전반적으로 이들 선박은 향상된 효율성과 배기가스 저감으로 환경영향 또한 적을 것으로 기대된다.
4척의 LNG 운반선을 발주한 곳은 나이지리아 LNG의 자회사인 BGT(Bonny Gas Transport)사로, GE는 글로벌 네트워크를 이용해 BGT에게 현지에서 필요한 전문 역량과 A/S를 제공할 수 있다. GE는 삼성중공업의 전력제어시스템사업부와 함께 각각의 선박에 동력과 추진 시스템을 제공할 계획이다. 이들 시스템은 발전기, 주 배전반과 선적실 배전반, 변압기, MV7000 컨버터, 모터, 원격제어 장치 등으로 구성된다. GE는 프로젝트가 시행되는 전기간 동안 설계, 시공, 시운전, 훈련, 지원 업무를 담당한다. 여기에는 해상 및 가스 시운전도 포함된다.

HHI won an order for 2 units of VLGCs

Hyundai Heavy Industries (HHI) secured an order from the Switzerland-based Geogas for the construction of 2 units of very large gas carriers (VLGCs). These 84,000 CBM VLGCs will incorporate eco-friendly features, and are priced at approximately USD 78 million per unit according to the foreign media. This order brings the total value of orders placed at HHI this year to USD 21.4 billion, which accounts for about 90% of its annual new order target of USD 23.8 billion.

현대중공업, VLGC 2척 수주

현대중공업이 스위스 선사인 Geogas사로부터 초대형가스운반선(VLGC) 2척을 수주했다. 친환경 선형으로 건조되는 이들 선박은 84,000 CBM급 초대형 VLGC로 척당 가격이 약 7,800만 달러 수준이라고 외신을 통해 확인됐다. 이번 수주로 현대중공업은 올해 총 214억 달러를 수주하며, 수주목표인 238억 달러의 약 90%를 달성하게 됐다.

SSME secured an order for 10 tankers from Maersk

Sungdong Shipbuilding and Marine Engineering (SSME) won the shipbuilding orders in a row, thus standing at the forefront of effort to spur the recovery of shipbuilding market. SSME received an order from A.P. Moller Maersk Group, the largest shipping company, for 2 units of 115,000 DWT tankers, including 4 units of 50,000 DWT MR tankers. The newbuilding price is said to be approximately USD 35 million per unit of 50,000 DWT class vessel and approximately USD 51 million per unit of 115,000 DWT class vessel. This contract includes 2 optional vessels for each ship model.

The 50,000 DWT product carrier ordered to SSME satisfies the carbon emission regulations and EEDI of IMO, and is equipped with the newest propeller and G-type engine that have the proven fuel efficiency. These vessels will be delivered to the ship owner on a staggered basis from the second quarter of 2016. Maersk Group which is based in Copenhagen, Denmark, is the world's largest ship operator in various sectors such as transportation, energy, etc., and has the branches and offices in more than 135 countries worldwide.

성동조선해양, 머스크사 탱커 10척 수주

성동조선해양이 선박 수주에 연이어 성공하며 조선 업황 회복을 주도해 나가고 있다.

성동조선해양은 세계 최대 선사인 A.P. 몰러 머스크 그룹(A.P. Moller Maersk Group)과 50,000 DWT급 MR 탱커 4척을 비롯해 115,000 DWT급 탱커 2척을 수주한 것으로 전해졌다. 신조선가는 50,000 DWT급이 척당 약 3500만 달러이며, 115,000 DWT급이 약 5100만 달러 수준으로 알려졌으며, 각각의 선형에 대해 추가 발주 옵션 2척씩이 포함되어 있다.

성동조선해양이 이번에 수주한 50,000 DWT급 정유운반선은 IMO의 EEDI 및 탄소배출규제를 만족시키는 것은 물론 연료 효율성이 입증된 G타입 엔진과 신형 프로펠러가 탑재된다. 이들 선박은 2016년 2분기부터 순차적으로 선주 측에 인도될 예정이다.

덴마크 코펜하겐에 본사를 둔 머스크 그룹은 운송, 에너지 분야 등 다양한 사업 영역에서 활동하고 있는 세계 최대의 선박 운용 기업으로 전 세계 135개국 이상에 지사 및 사무실을 보유하고 있다.

HMD achieved its annual new order target of USD 3.2 billion earlier

Hyundai Mipo Dockyard (HMD) signed a contract with Italy-based D'Amico International Shipping, a shipping company specializing in product carriers, to build 4 units of 39,000 DWT handysize vessels on October 24. These vessels will be built at Hyundai-Vinashin Shipyard and delivered from the second half of 2015 to 2016 on a staggered basis.

Moreover, HMD was awarded a contract worth an approximately USD 280 million by the U.K.-based Navig8 Chemical Tankers Inc to build 6 units of 37,000-ton product carriers(with 6 optional vessels separately) on October 8. The product carriers ordered to HMD this time will incorporate the eco-friendly technology developed independently by HMD and measure 184m in length, 27.4m in width, and 17.2m in height. These vessels will be built from May next year and delivered consecutively to the ship owner from January, 2015.

In September, HMD won an order from the 2 shipping companies in Greece for 5 units of 12,000 CBM LEG

(liquefied ethylene gas) carriers and 2 units of 38,000 CBM fully refrigerated LPG carriers (with optional vessels separately), respectively.
Particularly, these vessels will adopt the industry's best eco-friendly technology that ensures high fuel efficiency and reduction of pollutant emissions, and apply the ship model developed independently with the advanced technology of HMD. HMD has seen its efforts to develop eco-ship technology bearing fruit amid the spike in the demand for eco-friendly vessels as a result of the surging oil prices and mandatory EEDI (Energy Efficiency Design Index) this year.
These recent new orders bring the total orders placed at HMD to 98 units (with the optional vessels separately) worth approximately USD 3.3 billion this year, including 69 medium-sized PCs, 11 bulk carriers, 7 gas carriers, 7 containerships, 4 PCTCs(Pure Car and Truck Carriers), which accounts for 104% of its annual new order target of USD 3.2 billion.

현대미포조선, 올해 수주목표 32억 달러 조기 달성

현대미포조선은 지난 10월 24일 석유제품운반선 전문 선사인 이탈리아 다미코(D'Amico International Shipping)사로부터 3만9000 DWT급 핸디사이즈 선박 4척에 대한 건조계약을 체결했다. 현대-비나신 조선소(Hyundai-Vinashin Shipyard)에서 건조되어 2015년 하반기부터 인도를 시작해서 2016년까지 차례로 인도될 예정이다.

또한 현대미포조선은 지난 10월 8일 영국 '나빅8(NAVIG8 CHEMICAL TANKERS INC.)'사로부터 3만7000톤급 PC선 6척(옵션 6척 별도)을 약 2억800만 달러에 수주했다. 이번에 수주한 PC선은 자사가 독자 개발한 친환경 기술이 적용되며, 길이 184m, 너비 27.4m, 높이 17.2m로 내년 5월부터 건조가 시작된다. 2015년 1월부터 순차적으로 선주에 인도될 예정이다.
앞서 현대미포조선은 지난 9월 그리스 현지에서 두 곳의 선사로부터 1만2000 CBM급 LEG(liquefied ethylene gas) 운반선 5척, 3만8000 CBM급 풀 냉동 LPG 운반선 2척(옵션 별도)을 각각 수주한바 있다.
특히 고연비 및 오염 물질 배출을 저감하는 업계 최고 수준의 친환경 기술이 채택될 이들 선박은 현대미포조선의 앞선 기술력을 바탕으로 독자 개발한 선형이 신규 적용된다. 현대미포조선은 올해 들어 유가 급등 및 EEDI 의무화에 따른 친환경 선박에 대한 수요가 늘고 있는 가운데, 한발 앞선 에코십 관련기술 개발 노력이 결실을 맺고 있다.
이로써 현대미포조선은 올 들어 중형 PC선 69척, 벌크선 11척, 가스운반선 7척, 컨테이너운반선 7척, 자동차운반선 4척 등 모두 98척(옵션 별도)의 선박을 총 33억여 달러에 수주함으로써 수주목표(32억 달러) 대비 104% 초과 달성했다.

DSME won a contract for 1 unit of high-efficiency eco-friendly LNG carrier

Daewoo Shipbuilding & Marine Engineering (DSME) was awarded a contract worth approximately USD 200 million by a shipping company in Americas to build 1 unit of 173,400m^3 LNG carrier. This vessel will be built at Okpo shipyard and delivered to the ship owner by early 2017. The LNG carrier ordered to DSME this time is the optional vessel that was included in the LNG carrier contract awarded to DSME in July. Furthermore, 3 more optional vessels can be firmed up in the period ahead, raising the expectation of additional orders.
This LNG carrier will be fitted with the MAN Diesel & Turbo's eco-friendly natural gas engine (ME-GI engine) and high-pressure natural gas fuel supply system which was developed independently by DSME. Therefore, this vessel will increase the energy efficiency by more than 20% compared to the existing LNG carriers equipped with DFDE (Dual-Fuel Diesel Electric) engines. Moreover, this LNG vessel, which uses the LNG as the main fuel, will reduce the emissions of various pollutants, such as carbon dioxide (CO_2), nitrogen oxide (NOx), sulfur oxide (SOx) etc., by more than 30%, compared to the existing vessels fitted with diesel engines.

DSME has shown strong performance in this sector, winning the orders for LNG carriers of similar specification, each 2 units, in December last year and July this year. Particularly, DSME made a clean sweep of the 5 natural gas-powered LNG carries ordered

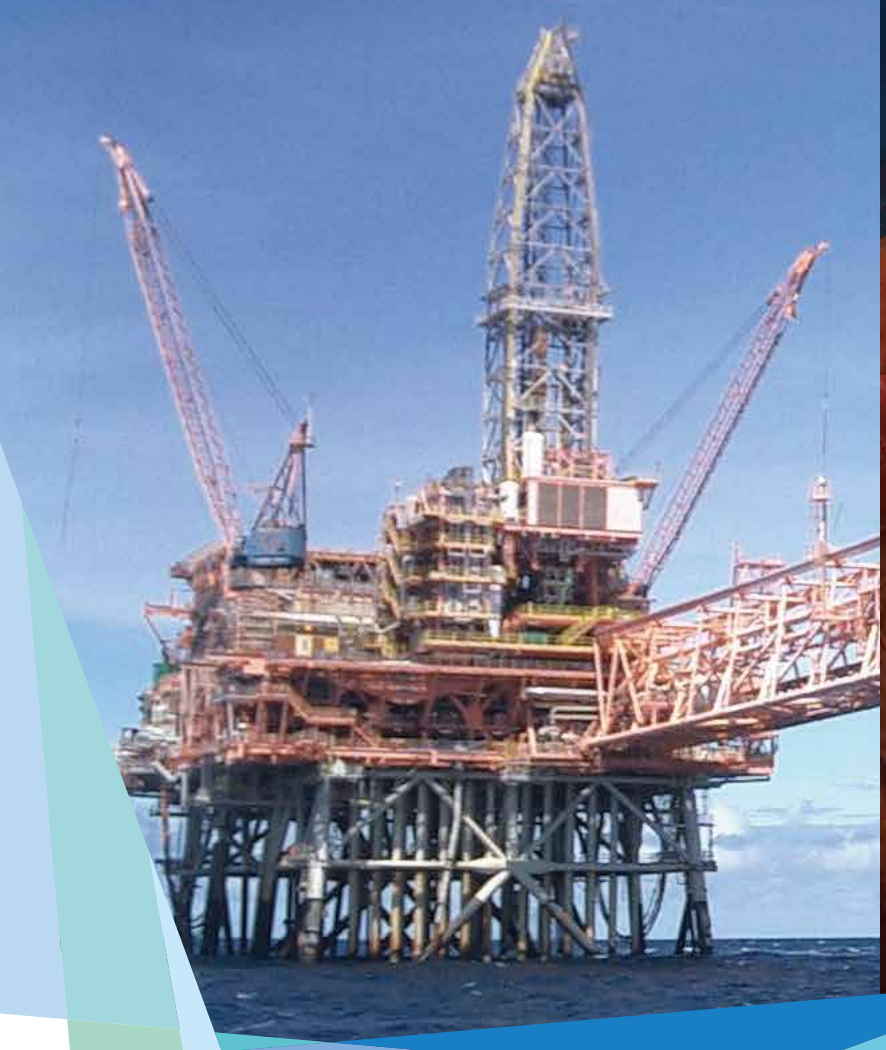
worldwide to date, including the vessel ordered this time, thus strengthening its leadership in the market for eco-friendly and high-efficiency LNG-powered vessels.
An official from DSME said, "LNG has emerged as the next-generation clean energy source that is both cost-effective and environment-friendly. I expect that DSME will dominate the eco-friendly vessel market on the back its technological prowess that was proved when it exported the related core technology to the world's largest marine engine maker."
The latest new order brings the total number of orders placed at DSME to 44 units worth approximately 11.98 billion so far this year, including the ordinary commercial vessels, offshore facilities, and special purpose vessels.

대우조선해양, 고효율 친환경 LNG선 1척 수주

대우조선해양은 미주 지역 선주사로부터 173,400㎥급 LNG선 1척을 수주했다. 수주 금액은 약 2억 달러로 옥포조선소에서 건조되어 2017년 초까지 인도될 예정이다. 이번 계약은 지난 7월 말 수주한 LNG선 계약의 옵션분 1척을 추가 수주한 것으로, 현재 옵션 3척이 더 남아있어 추가 수주도 기대되는 상황이다.
이번에 수주한 LNG선은 만디젤 & 터보(MAN Diesel & Turbo)사의 친환경 천연가스 엔진(ME-GI engine)과 대우조선해양이 독자 개발한 고압 천연가스 연료공급장치가 함께 장착된다. 따라서 이중연료 전기추진방식(DFDE: Dual-Fuel Diesel Electric) 엔진을 탑재한 기존 LNG선보다 연료 효율이 20% 이상 높다. 또한 LNG를 주연료로 사용하면서 기존 디젤 엔진 대비 이산화탄소, 질소화합물(NOx), 황화합물(SOx) 등 각종 오염물질 배출을 30% 이상 감소시킨다.
이미 지난해 12월과 올해 7월 유사한 사양의 LNG선을 각각 2척씩 수주했던 대우조선해양은 이번 계약까지 포함해 현재까지 전 세계에 발주된 천연가스 추진 LNG운반선 5척을 모두 수주하며 친환경 고효율 LNG 연료 선박 시장을 선도해 나가고 있다.
대우조선해양 관계자는 "LNG는 경제성과 친환경성 모두를 확보할 수 있다는 점에서 차세대 청정 연료의 대표주자로 떠오르고 있다"며 "세계 최대 선박엔진 회사에 관련 특허를 수출할 정도로 관련 핵심 기술을 확보하고 있는 대우조선해양이 향후 친환경 선박 시장을 주도해 나갈 것으로 기대된다"고 밝혔다.
한편 현재까지 대우조선해양은 총 44척/기, 약 119억 8000만 달러 상당의 일반상선과 해양설비, 특수선을 수주했다.

Ramboll Standardizes on Intergraph® SmartMarine® Enterprise for All Oil and Gas Projects

Ramboll, a global provider of engineering, design and operational support services in the oil and gas, energy, environment and transportation industries, has standardized on Intergraph® SmartMarine® Enterprise for all of its onshore and offshore oil and gas projects.
Ramboll chose SmartMarine Enterprise to bring more integration to the company's intelligent engineering design applications, providing a common and agile project delivery environment to improve the management of data exchange through all project phases. The standardization entails integration of several Intergraph tools, including Intergraph Smart™ 3D, SmartPlant® Reference Data, SmartPlant Instrumentation, SmartPlant P&ID and SmartPlant Electrical.
Ramboll is striving to achieve higher data integration levels within its engineering activities in line with their SPODE (Single Point of Data Entry) strategy. Its aim is for more intelligent work processes, to reduce errors and administration tasks, higher data reuse, reduced costs, shorter time schedules and improved efficiency for its customers. Working with SmartMarine Enterprise allows the engineering service provider to enjoy greater connectivity, better communication and improved coordination, which ultimately translates into more effective work processes.
"The integrated engineering environment that SmartMarine Enterprise offers enables us to work more intelligently. Intergraph's solutions merge nicely with our growth plans and strategies for the future and will help us getting ahead start in the market," said Nigel John Michaels, CAD Systems Manager at Ramboll Oil & Gas. "The next phase of our implementation plan focuses on deploying the tools worldwide and fine tune them in our global workflows."
Gerhard Sallinger, Intergraph Process, Power & Marine president, said, "Intergraph's long-standing collaboration with Ramboll has allowed them to standardize on a common environment. The result is improved efficiency and lower costs in project schedules without compromising quality. Intergraph understands the challenges engineering service providers face nowadays and we remain committed to support their activities and respond to their needs."

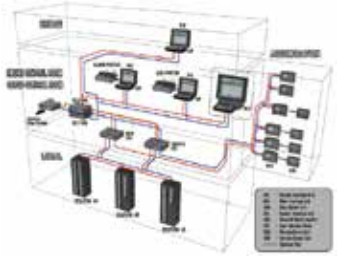


Explosion proof

Binconet creates the world that we dream of.

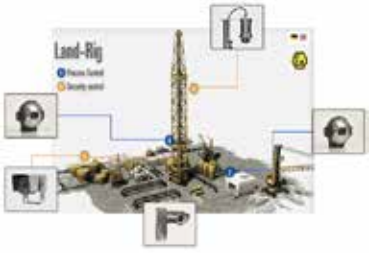
Customer's satisfaction challenges us to achieve better solutions! Smarter than what exists, smarter than competitive solutions and products, smarter functionality, technology and innovation.
An large assembly of engineers in BMS with technical knowledge and experiences have created a big synergy.
The high quality technical base and abundant man power pool have made Binconet Marine Solutions Co.,Ltd.

Marine UPS



Integrated Monitoring & Control System

Navigation System



CCTV

Monitoring Equipment customizing
(Marine, Military & Offshore)

Binconet
Marine Solutions

Binconet Marine Solutions Co.,Ltd.
#50, 74Beongil, Cheonggangro Gijang-Eup Gijang-Gun, Busan, Republic of KOREA
Tel. +82 51.513.6950 Fax. +82 51.980.0428 www.binconet.co.kr
Certificate : ISO 9001, 14001, DNV, IEC60945, IACS E10, MIL-STD-461, 167

www.효성레이저.com

고객이 선택한 이유!

- ◈최고의 성능
- ◈사용자 위주의 편리성
- ◈지속적인 레이저 교육실시
- ◈신속한 A/S 및 사후 관리

LASER MOULD WELDER

LASER JEWELRY SPOT WELDER

FIBER LASER MARKER

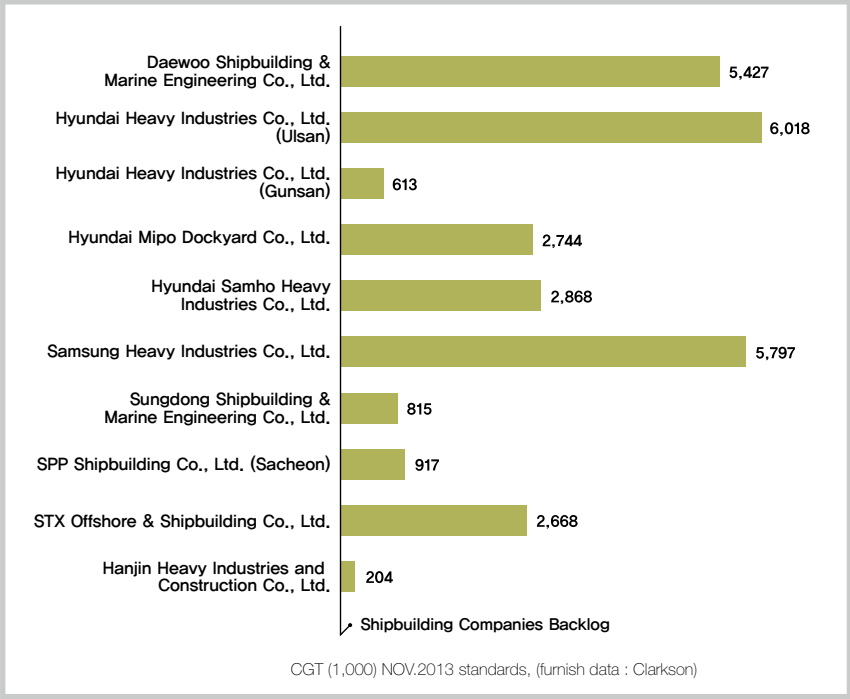
CO2 LASER MARKER

DP SIDE PUMP LASER MARKER

효성레이저
HYOSUNG LASER
Tel. 02-303-0816 | Fax. 02-303-0814

Global newbuilding orders increased more than 70% year-on-year to approximately 35 million CGT as of October this year. According to Clarkson, new orders placed in October alone stood at 3.16 million CGT, and among them, Chinese shipyards secured 1.8 million CGT, overwhelmingly outperforming the Korean shipyards which won 550,000 CGT. This year, China and Korea registered the order intake of 14.5 million CGT and 11.75 million CGT, respectively.

The newbuilding market has witnessed sharp increase in new orders for ordinary commercial vessels with the Chinese shipyards showing strong performance. Based on the ship type, new orders for bulk carriers (BC) and containerships soared compared to the previous year's level, and new orders for product carriers (PC) have been steadily placed.



Domestic shipbuilding industry has seen the growth in new order intake driven by high value-added vessels such as LNG carrier, eco-ship, product carrier, drillship, etc. Particularly, the 3 domestic shipbuilding giants have already met their annual new order target.

Here, we take a close look at the performance of major domestic 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 awarded to domestic shipyards in 2011-2013

Data		Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard
2011	Jan	Drillship	1 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	KRW 1 trillion	Noble Drilling, U.S.A	On a staggered basis until Sep 2013	Hyundai Heavy Industries
		Deepwater drillship	1 vessel	-	Atwood Oceanics, U.S.A	Second half of 2013	Daewoo Shipbuilding & Marine Engineering
	Feb	Offshore facility carrier	1 vessel	KRW 265 billion	Dockwise, Netherlands	October 2012	Hyundai Heavy Industries
		FPSO for the North Sea	1 vessel	USD 1.2 billion	BP (British Petroleum), U.K	Early 2015	Hyundai Heavy Industries
		Platform Supply Vessel	1 vessel	-	-	2012	STX OSV
		Fisheries Research Vessel	1 vessel	EUR 35 million	Ministry of Fisheries and Marine Resources, Republic of Namibia	Early 2012	STX Finland
	Mar	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 vessels	KRW 1.2 trillion	Aker Drilling, Norway	Second half of 2013	Daewoo Shipbuilding & Marine Engineering
		Drillship	2 vessels	USD 1.1 billion	Ship owner, U.S.A	-	Samsung Heavy Industries
		Platform Supply Vessel	1 vessel	-	Norsea Group AS, Norway	June 2012	STX OSV
		Platform Supply Vessel	1 vessel	-	-	2012	STX OSV
	Apr	Drillship	1 vessel	-	Fred Olsen Energy, Norway	August 2013	Hyundai Heavy Industries
		Drillship	2 vessels	USD 1.12 billion	Maersk, Denmark	-	Samsung Heavy Industries
		Drillship	1 vessel	USD 680 million	Ocean Rig, Greece	October 2013	Samsung Heavy Industries
		Shuttle Tanker	2 vessels	USD 200 million	European Navigation, Greece	2013	STX Offshore & Shipbuilding
	May	Drillship	2 vessels	USD 1.12 billion	Rowan, U.S.A	Second half of 2013	Hyundai Heavy Industries
		Deepwater drillship	1 vessel	-	Vantage Drilling, U.S.A	Late May, 2013	Daewoo Shipbuilding & Marine Engineering
		Offshore Platform (Top side)	-	USD 414 million	Statoil, Norway	-	Samsung Heavy Industries
		FPSO	1 vessel	USD 636 million	Teekay Petrojarl, Norway	Mid 2013	Samsung Heavy Industries
		Platform Supply Vessel	2 vessels	KRW 120 billion	Farstad Shipping, Norway	First half of 2013	STX OSV
		FSO	1 unit	-	PTSC, Vietnam	Early 2013	Sungdong Shipbuilding & Marine Engineering
		LNG-FPSO	1 unit	USD 3.026 billion	Royal Dutch Shell, U.S.A	2016	Samsung Heavy Industries
	Jun	Platform Supply Vessel	2 vessels	KRW 150 billion	Island Offshore, Norway	First quarter, third quarter of 2013	STX OSV
		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
	Jul	Drillship	2 vessels	USD 1.1225 billion	Maersk, Denmark	July 2014	Samsung Heavy Industries
	Aug	LNG-FSRU	1 vessel	USD 280 million	Excelerate Energy, U.S.A	First quarter of 2014	Daewoo Shipbuilding & Marine Engineering
	Sep	Semi-submersible Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Second hallf of 2014	Daewoo Shipbuilding & Marine Engineering
		Well Intervention Vessel	2 vessels	USD 420 million	Eide Marine Services AS, Norway	2013	STX Finland
		Drillship	1 vessel	KRW 600 billion	Noble Drilling, U.S.A	Second half of 2014	Hyundai Heavy Industries
	Oct	Fixed Offshore Platform	-	USD 1.4 billion	Chevron, U.S.A	Second half of 2014	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 unit	USD 550 million	Offshore drilling company, Americas	-	Daewoo Shipbuilding & Marine Engineering
		Platform Supply Vessel	1 unit	-	Troms Offshore Supply AS, Norway	First half of 2013	STX OSV
		Offshore Plant Module	2 units	-	-	From 2013 to 2014	STX OSV
		Platform Supply Vessel	4 units	KRW 2 trillion	Island Offshore, Norway	Consecutively from the 3rd quarter	of 2013 to the 1st quarter of 2014
	Nov	Pipe Laying Support Vessel	2 units	USD 500 million	Odebrecht, Brazil	August of 2014	Daewoo Shipbuilding & Marine Engineering
	Dec	Offshore facilities (Gas platform and various facilities)	-	USD 900 million	Major multinational oil companies	2nd half of 2014	Hyundai Heavy Industries
	Jan	CPF (Central Processing Facility)	-	KRW 2.6 trillion	INPEX, Australia	4th quarter of 2015	Samsung Heavy Industries
		Semi-submersible rig	1 unit	USD 620 million	Odfjell, Norway	by mid 2014	Daewoo Shipbuilding & Marine Engineering

2012	Feb	LNG-FSRU	-	-	Hoegh, Norway	-	Hyundai Heavy Industries
	Mar	Offshore Platform	1 unit	USD 560 million	DONG E&P A/S, Danish	April 2015	Daewoo Shipbuilding & Marine Engineering
		FPSO	1 unit	USD 2.0 billion	INPEX, Australia	April 2016	Daewoo Shipbuilding & Marine Engineering
	Apr	Drillship	1 vessel	USD 645 million	Ensco plc	Third quarter 2014	Samsung Heavy Industries
	May	Semi-submersible Drilling Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Mid 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 vessel	USD 600 million	Seadrill, Norway	Second half of 2014	Samsung Heavy Industries
		Drillship	1 vessel	USD 655 million	Diamond Offshore Drilling Limited., U.S.A	4th quarter of 2014	Hyundai Heavy Industries
	Jun	Semi-submersible drilling rig	1 unit	USD 700 million	Fred Olsen Energy, Norway	March 2015	Hyundai Heavy Industries
		LNG-FPSO	1 unit	-	Petroliam Nasional Berhad, Malaysia	June 2015	Daewoo Shipbuilding & Marine Engineering
	Jul	Drillship	1 vessel	USD 645 million	Ensco plc	-	Samsung Heavy Industries
		Gas Compression Platform	1 unit	USD 420 million	(Letter of Award)	Second half of 2015	Hyundai Heavy Industries
	Aug	LNG-FSRU	8 vessels	-	Excelerate, U.S.A	Between early 2015~2017	Daewoo Shipbuilding & 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
	Oct	Drillship	4 vessels	USD 2.06 billion	Transocean, U.S.A	One-by-one from mid 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 vessel	USD 560 million	Atwood Oceanics, U.S.A	-	Daewoo Shipbuilding & Marine Engineering
		LNG-FSRU	1 vessel	USD 270 million	Hoegh LNG, Norway	First half of 2015	Hyundai Heavy Industries
	Nov	Drillship	1 vessel	USD 700 million	-	2nd half of 2015	STX Offshore & Shipbuilding
	Dec	offshore platform (Top side)	1 unit	USD 1.77 billion	Statoil, Norway	The end of 2016	Daewoo Shipbuilding & Marine Engineering
2013	Jan	Gas Production Platform (topside)	1 unit	USD 1.1 billion	Statoil, Norway	Mar 2016	Hyundai Heavy Industries
		LNG-FSRU	1 vessel	-	BW Maritime, Singapore	2015	Samsung Heavy Industries
	Mar	Floating Production Unit (FPU)	1 unit	USD 1.3 billion	Total, France	First half of 2016	Hyundai Heavy Industries
		Tension Leg Platform (TLP)	1 unit	USD 700 million	Total, France	First half of 2015	Hyundai Heavy Industries
	Apr	FPSO	1 unit	USD 1.9 billion	Chevron, U.S.A	-	Hyundai Heavy Industries
	May	Semi-Submersible Drilling Rig	1 unit	USD 750 million	Diamond Offshore, U.S.A	Nov of 2015	Hyundai Heavy Industries
	Jun	Ultra-deepwater Drillship	1 unit	USD 515 million	Ensco, United Kingdom	Third quarter of 2015	Samsung Heavy Industries
		FPSO	1 unit	USD 3.0 billion	Nigeria	Second half of 2017	Samsung Heavy Industries
		Jack-up Rig	2 units	USD 1.3 billion	Statoil, Norway	-	Samsung Heavy Industries
	Jul	Ultra-deepwater Drillship	2 units	USD 600 million	Seadrill, Norway	Second half of 2015	Samsung Heavy Industries
		Semi-Submersible Rig	1 vessel	USD 718 million	Stena, Sweden	First half of 2016	Samsung Heavy Industries
		Ultra-deepwater Drillship	1 unit	USD 570 million	Atwood Oceanics, U.S.A	The end of 2015	Daewoo Shipbuilding & Marine Engineering
	Sep	Drillship	1 unit	USD 550 million	-	Dec of 2015	Samsung Heavy Industries
		Ultra-deepwater Drillship	1 unit	USD 600 million	Ocean Rig, Greece	Dec of 2015	Samsung Heavy Industries
		Jack-up Rig	1 unit	USD 530 million	Maersk Drilling, Denmark	The middle of 2016	Daewoo Shipbuilding & Marine Engineering
	Oct	Drillship	2 vessels	USD 1.24 billion	-	Second half of 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 vessel	USD 520 million	Transocean, U.S.A	The middle of 2016	Daewoo Shipbuilding & Marine Engineering
		LNG-FSRU	1 unit	-	Gas Sayago (Joint venture)	Sep of 2016	Daewoo Shipbuilding & Marine Engineering

*Note : Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until Nov 15, 2013)

Korea cements its status as the world's undisputed No. 1 shipbuilder

Armed with the high value-added and cutting edge technology, Korean shipyards are edging out the Chinese rivals, solidifying the status of Korea as the global shipbuilding powerhouse.

The drillship of Denmark-based Maersk, the world's largest shipping company, was built by a large Korean shipyard and will drill down to 1.2km in water depths of 3km in the Gulf of Mexico. This drillship is equipped with the crane that can withstand the waves as high as 9m while drilling for oil. The vessel is fixed by 3 engines, which was unthinkable a few years ago but realized by Korea's shipbuilding technology. China has maintained its top spot in terms of order intake quantity, wining the orders for low and medium-priced vessels. However, Korean shipyards, buttressed by high value-added cutting-edge technology, have outperformed the Chinese rivals in terms of the order value by a wide margin. This year, Korean shipyards achieved the order value which is nearly two times higher than that of Chinese shipyards.

Even now, Korean shipyards are opening up new fields through the development of innovative technologies.

Hyundai Heavy Industries clinched a USD 1.1 billion order for an ultra large offshore platform

Daewoo Shipbuilding & Marine Engineering has put the finishing touch on the eco-friendly LNG-powered vessel dramatically reducing the fuel costs and emissions of contaminants.

Daewoo Shipbuilding & Marine Engineering received an order for 1 unit offshore platform from Statoil

Hyundai Heavy Industries clinched an order worth USD 750 million for a semi-submersible drilling rig.

Sungdong Shipbuilding & Marine Engineering clinched an order worth USD 500 million for 10 capesize bulk carriers

DSEC was awarded a contract for the material supply and design of ECO MR tanker.

Hyundai Heavy Industries worn an order worth USD 2 billion for ultra large offshore facilities from Total.

Hanjin Heavy Industries & Construction speeds up normalization of its business by clinching large-scale orders for containerships and LNG carriers

Hyundai Heavy Industries secured an order for 6 units of very large gas carriers (VLGC) from a Norway-based ship owner.

Hyundai Mipo Dockyard clinched orders from 4 shipping companies for 10 eco-friendly vessels.

Hyundai Samho Heavy Industries reached a milestone of 50 million DWT.

Samsung Heavy Industries received an order for 7 units of 9,300TEU containerships.

Samsung Heavy Industries secured an order for the world's largest jack-up rig, successfully making inroad into the market for large-scale jack-up rigs which have emerged as new growth engine for shipbuilding industry.

New Product

Sewage Treatment Plant for Shipbuilding

HOSEUNG Ent. Co.,Ltd.

Sewage Treatment system, which consists of Sewage Collecting Tank and Sewage Treatment Plant (STP), biologically decomposes grey or black water into clean water. HOSEUNG`s produces both Sewage collecting tank and STP as a system. When it comes to our STP product, the product is more compact, more simple, and lighter than that of other competitors. In addition to the fact, it dramatically reduces the maintenance fee and effort resulting from more effective and efficient cleaning process and method.

Sewage in the ship needs to be discharged into sea in accordance with certain terms. The Sewage Treatment Plant is a piece of equipment that treats sewage in accordance with MEPC.159 (55) of the International Maritime Organization (IMO). Our company produces both Sewage collecting tanks and STP.

Features

- *STP Test result [IMO MEPC 159(55) Standard*
- *Compact size and high efficiency guaranteed as above data*
- *Eco-friendly and semi-permanent product (Green technology product)*
- *No remains due to the recirculation system*
- *Nearly no need for inner parts replacement owing to effective, and eco- friendly treatment process.(Minimized maintenance cost)*
- *Quality Certificate: ISO9001 Certificate, GL shop approval, ABS, LR, DNV, NK approval, IMO Type Approval, Green technology certificate, Green technology product certificate, CE MED marking.*

-TEL: +82-51-831-2233
-http://www.hosent.co.kr

New backpressure regulators/relief valves

Emerson Process Management

Emerson Process Management has introduced a new lightweight, corrosion-resistant version of its Fisher® 98 Series Backpressure Regulators/Relief Valves. With a body made from high strength titanium, product weight is significantly reduced and maintenance requirements are minimized – helping to increase overall platform safety. The new regulators/valves are designed to meet the need for reliable, high quality devices that are resistant to the highly corrosive conditions and aggressive chemicals typically used in offshore applications.

Titanium is strong and light, reducing product weight by up to 50% - an important factor on offshore platforms. Titanium also performs well in offshore conditions because of its low galvanic corrosion factor when exposed to sea water. The improved corrosion resistance and extended service life reduces the need for maintenance, lowering costs and enhancing safety as the need for personnel to visit hazardous areas is minimized.

Emerson's Fisher 98 Series regulators/valves are used for backpressure or relief applications in liquid, gas, air, and steam service. They have a fast response speed, which is very important in safety shut-down applications. Their compact design makes them easy to install in the skid-based systems found on oil offshore platforms where space is at a premium. Because they are self-operated, they do not need any external power source (electric or pneumatic). This is another feature which makes the device easy to install. It also removes the potential for a supplementary source of ignition, which helps to reduce the risk of fire on the platform.

The Fisher 98 series range comprises direct-operated and spring-loaded regulator/valves and versions with additional pressure loading to maintain relief differential pressures, backpressures or for remote set-point adjustment. The Fisher 98HM is a direct-operated, spring to close regulator, which requires no external power to operate and features a sensing line connection for sensing pressure externally from the regulator.

-TEL: +82-2-3438-4600
-http://www.emersonprocess.co.kr

New Product

Rexroth develops hydraulics for deep-sea applications

Bosch Rexroth Korea Ltd.

The Subsea Crawler from Aker Wirth with modified hydraulics by Rexroth.

With worldwide demand for oil, natural gas and minerals rising, and recent discoveries of sources located in the deep sea, new machinery will be needed to harvest these resources from increasingly harsh environments.

Rexroth is the first to adapt numerous standard components to fit the special requirements for deep-sea applications such as pressure compensation and corrosion protection to provide equipment with a longer maintenance-free life span and optimal performance.

In order to test its designs, Rexroth developed a Subsea test power unit equipped with a water-proof motor/pump assembly that can drive an axial piston motor and hydraulic cylinders via an encapsulated valve control. The hydraulic system comes in a pressure-compensated design. Rexroth tested the equipment in a unique pressure chamber facility, was able to demonstrate suitability of its hydraulic components to a depth of 6,000 meters below sea level.

-TEL: +82-31-270-4200
-http://www.boschrexroth.co.kr

Universal Safety Relays

Wieland Electric

The S4000 safety relays offer customized solutions for the safety of man and machine. These devices combine excellent technical performance with efficient use in everyday industrial applications. Compact design, flexible use and flexible connection methods are the decisive advantages of these devices.

Basic devices - The basic devices of the SNA, SNO, SNS, SNt and SNZ device families feature a safe internal logic component for the monitoring of the respective safety functions.

Basic devices with time function - The basic devices of the SNv device families feature a safe internal logic component for the monitoring of the respective safety functions. In addition, these devices offer time-delayed, safe outputs and a corresponding time setting on the device.

Contact expansion relays - The contact expansion relays of the SNe device family feature a redundant internal structure and are used for contact multiplication on, for example, basic devices.

New product SNE 4024K extension relays are developed with redundant internal circuit and used for contact extension of the safety relay and safety controllers up to PL e / SIL 3.

Features

- *2 x 2 enabling current paths and 2 x 1 messaging current path (SNE 4024K)*
- *2 enabling current paths and 1 messaging current path (SNE 4012K)*
- *High switching capacity 6 A / 230 V AC*
- *Intermateable screw or spring-loaded terminals*
- *Secured separation of control and output circuits and the output circuits among themselves*

Wieland Electric was founded in Bamberg in 1910 and is one of the pioneers in electrical connection technology. Its range of products includes well above 20,000 components for industrial automation, building installation and building automation.

The Wieland Group includes, in addition to the Wieland Electric GmbH, the STOCKO Contact GmbH & Co. KG (since 1998). Wieland Electric has been certified according to the Quality and Environmental Management Systems EN ISO 9001:2008, EN ISO 14001 and the EC Environmental Management and Audit Scheme EMAS.

www.korship.co.kr

조선 & 해양 총람

Guide

Offshore & Shipbuilding

Korea's first Shipbuilding &Offshore Guide Catalogue promoting domestic shipbuilding and offshore companies worldwide (English-Korean)

We are pleased to announce the long-awaited publication of "Offshore & Shipbuilding Guide Catalogue" containing the information about the companies in domestic and overseas shipbuilding & offshore industries.

The Offshore & Shipbuilding Guide Catalogue contains the information such as major products, location, contact details of companies including the shipyards, marine equipment manufacturers.
This catalogue consists of several sections based on sector(shipbuilding, offshore) and area(shipyards, equipment, shipping/port, etc) in Korean alphabetical order, providing the information of domestic/overseas ship-building and offshore companies at a glance.

Discount to mark the publication of the Catalogue

KRW 80,000 per issue, 30% D.C / discounted price: KRW 56.000(excluding VAT)
For more information about the purchase of the Catalogue,
visit our website(www.korship.co.kr).

Publisher: Procon / MONTHLY KORSHIP
Tel: (02) 2168-8898
Fax: (02) 2168-8895

한국 조선, 해양 업체들을 국내외로 널리 알리는 국내 최초 조선 & 해양 기업총람 발간 (국문/영문 혼용)

국내외 조선 & 해양 기업들의 정보를 수록한 "Offshore & Shipbuilding Guide 총람"이 발간되었습니다.

본 총람은 조선소 및 조선 & 해양 기자재 업체 등을 비롯한 관련 업체들의 주요 제품, 소재지, 연락처 등 각종 정보가 담겨 있습니다.
특히 국내외 조선해양 기업들의 정보를 한눈에 파악할 수 있도록 (조선, 해양) 분야 및 (조선소, 기자재, 해운/항만 등) 영역별로 구성되어 있으며, 가나다 순서로 일목요연하게 정리되어 있습니다.

총람 발행기념 할인행사

권당 정가 80,000원, 30% D.C / 할인가 56.000원 (VAT 별도)
총람 구매에 관한 자세한 내용은 홈페이지(www.korship.co.kr)를 참조바랍니다.

procon KORSHIP

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, VLOCs, Ro-Ro Ships, PCTCs, Passenger Car Ferries, FPSOs, FSOs, FPUs, Drill Ships, Semi-Submersible Drilling Rigs, Fixed Platforms, Submarines, Submarine Rescue Vessels AUVs, Destroyers, Battle Ships*

SAMSUNG HEAVY INDUSTRIES CO., LTD. (SHI)

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

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

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

STX OFFSHORE & SHIPBUILDING CO., LTD.

• 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, Speical Purpose Ships, Offshore and offshore support vessel, Etc*

HYUNDAI MIPO DOCKYARD CO., LTD. (HMD)

• Address : 1381, Bangeo-dong, Dong-gu, Ulsan, 682-712 Korea • Tel : +82-52-250-3031~3040 • Fax : +82-52-250-3056 • http://www.hmd.co.kr
• 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, Navel Ships, Special Purpose Ships, Bulk Carriers*

SHINASB YARD CO., LTD.

• 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*

DAESUN SHIPBUILDING & ENGINEERING CO., LTD.

• Address : 12, 4-ga, Bongrae-dong, Yeongdo-gu, Busan, Korea • Tel : +82-51-419-5090~1 • Fax : +82-51-416-7965 • http://www.daesunship.co.kr
• Products : *Container Ships, Bulk Carriers, Tankers, MPC & General Cargo Ships, Gas Carriers, Ro/Ro ships, Tug Boats, Fishing Boats/Vessels, Special Purpose Vessels*

KOMEA (Korea Marine Equipment Association)
Member List

AMS CO., LTD.
Head office : HAEUNDAE-GU, BUSAN
Homepage add : www.albatros.co.kr
Main products : Unit Toilet/Wall&Celling Panel, Heat Exchangers(Plate Shell&Tube) etc
TEL : +82 51 293 1035

A-TECH
Head office : GANGSEO-GU, BUSAN
Homepage add : www.atech2004.co.kr
Main products : Small davit, Air motor, Air winch
TEL : +82 51 832 0723

BC TAECHANG CO., LTD.
Head office : JUNG-GU, BUSAN
Homepage add : www.bcinternational.co.kr
Main products : Ultimate Solution for Onboard crew maintenance, Deck Scaling Machine
TEL : +82 51 442 6191

Bethel Engineering CO., LTD.
Head office : NAMYANGJU-SI, GYEONGGI
Homepage add : www.magicgrating.com
Main products : Magic Grating(Steel Grating)
TEL : +82 31 593 2712

BIP INDUSTRIES CO., LTD.
Head office : GEUNJEONG-GU, BUSAN
Homepage add : www.bn-bip.com
Main products : Wall panel, Ceiling panel, Bathroom unit, Cabin unit, Floating floor, TLQ, Marine furniture, Marine door etc
TEL : +82 51 519 2000

Bumhan Industries CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add : www.bumhan.com
Main products : Air Compressor, N2 Generator, High Pressure Control Valve
TEL : +82 55 251 6070

BY CONTROLS, INC.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.bycontrols.com
Main products : Watertight Door, Pilot Door, Hydaulic Hatch etc
TEL : +82 55 345 6110

BYT CO., LTD.
Head office : JINRAE-MYUN, GIMHAE
Homepage add : www.byhd.co.kr
Main products : HARDWARE, OUTFITTING, MARINE OUTFITTING, NEW PRODUCTS
TEL : +82 55 345 1951

CAPE INDUSTRIES LTD.
Head office : YANGSAN-SI, GYUNGNAM
Homepage add : www.capeind.com
Main products : Cylinder Liner
TEL : +82 55 370 1234

CENTURY CORPORATION
Head office : YANGSAN-SI, GYUNGNAM
Homepage add : www.capeind.com
Main products : Cylinder Liner, Man b&w sulzer(wartsila)type
TEL : +82 55 370 1234

CHK CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.chkj.co.kr
Main products : Ref. Container Socket, Juction Box
TEL : +82 51 831 9500

ChungSol Marine CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.chungsolmarine.co.kr
Main products : Window Wiper, Straight Line Type, Clear View Screen, Window, Door, Hatch
TEL : +82 51 832 2226

ChungSong Industry CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.koweld.co.kr
Main products : Welding Auto Carriage, LWS etc
TEL : +82 55 329 9500

CMR KOREA CO., LTD.
Head office : KUMJUNG-GU, BUSAN
Homepage add : www.cmrkorea.com
Main products : Marine Telephone System, Public Address System, Communal Aerial System, Marine CCTV System, Marine Clock System, Anemometer System, Rudder Angle Indicator System, Temperature Sensor, Pressure Sensor
TEL : +82 51 521 2883

Dae Chang Metal CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.dcm.co.kr
Main products : Propeller boss, Chain Wheel cam, Dummy ring, Valve body etc
TEL : +82 51 264 0831

Dae Heung Cooler CO., LTD.
Head office : POCHEON-SI, GYEONGGI
Homepage add : www.cooler.co.kr
Main products : Heat Exchanger
TEL : +82 31 532 9667

Daechun Industrial CO., LTD.
Head office : KIMHAE-SI, KYUNGNAM
Homepage add : www.daechun.co.kr
Main products : Multi Core Tube, Stainless Steel Tube
TEL : +82 55 345 2288

DaeJin Dampha CO., LTD.
Head office : ULJU-GUN, ULSAN
Homepage add : www.dampha.co.kr
Main products : Ceiling Panel
TEL : +82 52 225 2361

Daemmstoff Industrie Korea LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.daemmstoff.com
Main products : KVM SEALING COMPOUND, MANGANA TETAINING COMPOUND(PUTTY, FIRE STOP, PANDA-90 etc
TEL : +82 51 261 7073

Daeyang Electric CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.daeyang.co.kr
Main products : Lighting Fixtures, Instruments, SAUV, UUV
TEL : +82 51 200 5221

DAEYANG INSTRUMENT. CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : http://dic.daeyang.co.kr/08_affiliate/affiliate_01.php
Main products : precision instrument-anemometer rudder angle indicator etc
TEL : +82 51 200 5212

DaiHan Anchor Chain MFG. CO., LTD.
Head office : NAM-GU, INCHEON
Homepage add : www.dhac.co.kr
Main products : Anchor Chain, Offshore Mooring Stud etc
TEL : +82 32 862 0091

DHMC CO., LTD.
Head office : KIMHAE-SI, KYUNGNAM
Homepage add : www.dhmc-rudder.com
Main products : Rudder, Block etc
TEL : +82 55 346 3663

DK Tech Corporation
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.dklok.com
Main products : Instrumentation fitting&valve
TEL : +82 55 338 0114

DMC CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.dongnam-crane.co.kr
Main products : Offshore Crane, Deck Cranes, Froating Cranes
TEL : +82 55 720 3000

DNP CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.dnpco.kr
Main products : Accommodation System
TEL : +82 51 831 4551

Dong Hae Machinety Co.,Ltd
Head office : SEO-GU, INCHEON
Homepage add : www.east-sea.co.kr
Main products : Grab Bucket, Orange Grab, Motor Grab, Wood etc
TEL : +82 32 583 8061

Dong Kang M-Tech CO., LTD.
Head office : GANGNAM-GU, SEOUL
Homepage add : www.dkmtech.com
Main products : Water Jet, Night Navigator
TEL : +82 2 553 0181

Dong Woo Machinery&Engineering CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add :
Main products : Engine room over head crane, F.O hose handling Davit etc
TEL : +82 55 295 3261

Dong-A Valve Ind. CO.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.donga-valve.com
Main products : Manufactured low&high pressure valves, Flap Check(duo-check) valve etc
TEL : +82 51 831 1500

Dongbang Marine CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.dbmarine.co.kr
Main products : MARINE FIRE DETECTION & ALARM SYSTEM, MARINE FIRE EXTINGUISHING SYSTEM
TEL : +82 51 205 1585

DONGHWA ENTEC
Head office : GANGSEO-GU, BUSAN
Homepage add : www.dh.co.kr
Main products : Heat Exchanger, Plate Cooler etc
TEL : +82 51 970 1000

DongHwa Pneutec CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.dhkomp.co.kr
Main products : Air/Gas Compressor
TEL : +82 51 974 4800

Dong-I Industrial CO., LTD.
Head office : JINJU-SI, GYEONGNAM
Homepage add : www.dongico.co.kr
Main products : Marine Transmission, Steering system, P.T.O
TEL : +82 55 755 9928

DooSan Engine CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add : www.doosanengine.com
Main products : Marine Diesel Engine, Diesel Engines for Power Generation
TEL : +82 55 260 6000

DRB Holding CO., LTD.
Head office : YEUNGDEUNGPO-GU, SEOUL
Homepage add : www.drbworld.com
Main products : Marine rubber fender, Industrial rubber sealing & gasket, Industrial rubber track, Rubber damper
TEL : +82 2 2168 9133

Emerson Process Management Korea LTD.
Head office : SEONGNAM-SI, GYEONGGI
Homepage add : www.emersonprocess.co.kr
Main products : Pressure, Temperature, Level, Analytical&Flow Measurenet, Valves, Tank radar level guaging etc
TEL : +82 2 3438 4600

ESAB SeAH Corp.
Head office : CHANGWON, GYUNGNAM
Homepage add : www.esab.co.kr
Main products : Flux Cored Wire
TEL : +82 55 289 8111

Flutek, LTD.
Head office : SEONGSAN-GU, GYEONGNAM
Homepage add : www.flutek.co.kr
Main products : Axial Piston pumps, Axial piston motors&reduction gear, Electro-hydraulic steering gear, Deck machinery, Staffa motor, ECO servo
TEL : +82 55 570 5800

FRIEND CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.thefriend.co.kr
Main products : Engine Valve Spindle, Cable Tray
TEL : +82 51 974 7911

G.S HIGH-TECHER CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.gshightecher.koreasme.com
Main products : Air vent head, Convex coupling
TEL : +82 51 832 0456

GENERAL MARINE BUSINESS INC.
Head office : NAM-GU, INCHEON
Homepage add : www.gmbmarine.com
Main products : Marine system(ship shore comm.system, emergency shut down system etc), Defense Eng. (Control&monitoring system integration etc), Manufacturing &services(new shipbuilding, module production)
TEL : +82 52 270 3500

GS-Hydro Korea Ltd.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.gshydro.com
Main products : Flare Flange system, Retain ring system
TEL : +82 51 266 8221

H.K.E CO., LTD.
Head office : YOUNGDO-GU, BUSAN
Homepage add : www.hk-eng.kr
Main products : Expansion Joint, Fuel Injection Pipe, Air Filter, L.O Filter, F.O Filter
TEL : +82 51 415 2494

Haean Machinery Ind. CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.haean21.com
Main products : Marine Crane, Deck Machinery
TEL : +82 55 345 2024

Haewon Ind. CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.haewon.net
Main products : Water Seal, Inflatable/Mating Ring
TEL : +82 51 831 4600

Hal La Industrial CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.hallaiq.co.kr
Main products : Non Seal Canned Motor Pump, Gear Pump
TEL : +82 51 264 2201

Han Jo CO., LTD.
Head office : YOUNGDO-GU, BUSAN
Homepage add : www.hanjoms.co.kr
Main products : Lubication Oil Filter, Fuel Oil Filter, Filter Elements
TEL : +82 51 414 7201

HanKuk Miboo CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.hankukmiboo.co.kr
Main products : Spiral Duct, Cold Chamber, Deck Covering, Level
TEL : +82 51 263 3621

HANLAIMS CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.hanlaims.com
Main products : Instruments(Level gauge/Level Switch) Tank Remote Sounding System/Cargo mornitoring system vlave Re
TEL : +82 51 601 7016

HANSHIN ELECTRONICS CO., LTD
Head office : YOUNGDO-GU, BUSAN
Homepage add : www.ehanshin.com
Main products : Public Address Sys., Telephone Sys.
TEL : +82 51 412 5551

HEARTMAN CO.,LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.heartman.co.kr
Main products : The fuel injection nozzle for marine diesel engine, The fuel injection plunger ass'y for marine diesel engine
TEL : +82 51 264 8826

HI AIR KOREA CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.hiairkorea.co.kr
Main products : Air Handling Unit, Spot Cooler, Refrigeration condensing unit, Fire damper, Provision refrigeration plant, MGO cooling system, Packaged air conditioner, Ventilation fan, Spiral duct
TEL : +82 55 340 5000

Ho Seung Enterprise CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.hosent.co.kr
Main products : Package Unit for Engine Room
TEL : +82 51 831 2233

HODU INDUSTRIAL CO.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.hoducompany.com
Main products : Catering Furniture, Galley Hood W/Fire Fighting,Galley E/Q(Deep Fat Fryer/Cooking Range etc.)
TEL : +82 51 271 3342

HWASEUNG R&A
Head office : YANGSAN-SI, GYUNGNAM
Homepage add : www.hsrna.com
Main products : Stern Tube Seal, Hatch Cover Seal, GRE pipe, Cathodic Protection Equipment(I.C.C.P/M.G.P.S)
TEL : +82 55 370 3331

Hy-Lok Corporation
Head office : GANGSEO-GU, BUSAN
Homepage add : www.hy-lok.com
Main products : Tube Fitting&Valve, Double lock&Bleed Valve, Crygenic valve
TEL : +82 51 970 0800

HYUNDAI EHEAVY INDUSTRIES CO., LTD.
Head office : DONG-GU, ULSAN
Homepage add : www.hhi.co.kr
Main products : Marine Diesel Engine & Machinery
TEL : +82 52 202 7291

Hyundai Elevator CO., LTD.
Head office : INCHEON-SI, GYEONGGI
Homepage add : www.hyundaielevator.co.kr
Main products : Elevators, Escalators & Moving Walks, Meterial Handling Systems, Parking Systems, SOC Infra Systems
TEL : +82 31 644 5114

Hyundai Fitting CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.hdfco.co.kr
Main products : Flange
TEL : +82 51 831 0891

HYUNDAI LIFEBOATS CO., LTD.
Head office : ULJU-GUN, ULSAN
Homepage add : www.hdboat.com
Main products : Life Boat , GRP Rigid Type Rescue Boat
TEL : +82 52 240 3500

Hyundai Marine Machinery CO., LTD.
Head office : INCHEON-SI, GYEONGGI
Homepage add : www.hmmco.co.kr
Main products : W.O. Incinerator, Aux/Blower, F.D FAN
TEL : +82 32 583 0671

HYUNDAI WELDING CO., LTD.
Head office : GANGNAM-GU, SEOUL
Homepage add : www.hyundaiwelding.com
Main products : Covered electrode arc welding consumables, Sub-merged arc welding flux&wire, Soild wire arc welding consumables, Flux cored wire, MIG TIG arc welding consumables, Welding machines
TEL : +82 2 6230 6883

I.M.E. CORPORATION
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.promarine21.com
Main products : Engine Valve Spindle&Seat
TEL : +82 55 346 1127

ILJIN AND CO., LTD.
Head office : GIJANG-GUN, BUSAN
Homepage add : www.iljinamst.co.kr
Main products : Fire detection system, Gas detection system, emission monitoring system, Water spray&cargo spray system etc
TEL : +82 51 755 6191

ILSHIN ENGINEERING CO., LTD.
Head office : SIHEONG-SI, DYEONGGI
Homepage add : www.ilshineng.com
Main products : Chemical Equipment, Storage Tank
TEL : +82 31 499 4502

ILSUEUNG CO., LTD
Head office : GANGSEO-GU, BUSAN
Homepage add : www.ilseung.co.kr
Main products : Sewage tTretment Plant, Fresh Water Generator, Oil Purifier
TEL : +82 51 831 4110

IL-SUNG IND. CO.
Head office : SASANG-GU, BUSAN
Homepage add : www.ilsunghs.co.kr
Main products : Hot Water Calorifier, Silencer (For M/E, G/E, Fan), Mist Eliminator, Washable Air Filter, Pneu. Fire Damper (For Funnel, Em'cy G/E Room)
TEL : +82 51 312 4056

International Machine Tool CO.
Head office : SASANG-GU, BUSAN
Homepage add : www.clampimt.com
Main products : Vertical Clamp, Horizontal Clamp etc
TEL : +82 51 314 2038

INTRA PRECISION MANUFACTURE CO., LTD
Head office : DONG-GU, BUSAN
Homepage add : www.intraspare.co.kr
Main products : PISTON CROWN, CYLINDER LINER, CYLINDER COVER, PISTON SKIRT, WATER JACKET
TEL : +82 51 466 4635

JHK INC.
Head office : YANGSAN-SI, GYUNGNAM
Homepage add : www.jonghap.biz
Main products : Container Fittings, Lashing Fittings
TEL : +82 55 370 2600

JINSEONG LINER&PISTON
Head office : DAEDEOK-GU, DAEJEON
Homepage add : www.jinseong.com
Main products : Sylinder liner, Piston
TEL : +82 42 931 8558

JONGHAP MACHINERY CO., LTD
Head office : YANGSAN-SI, GYUNGNAM
Homepage add : http://jonghap.biz
Main products : Sewage Treatment Plant, T-bar auto welding machine
TEL : +82 55 370 2600

JS CABLE CO., LTD.
Head office : CHEONAN-SI, SHUNGNAM
Homepage add : www.jscable.co.kr
Main products : Shipboard Cable
TEL : +82 41 559 4800

JUNG GONG IND. CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.jung-gong.com

Main products : Marine window, Fire resistant window, Marine wiper, Clear view scree, Anti-glare sunscreen
TEL : +82 51 261 2911

JUNG-A MARINE
Head office : GANGSEO-GU, BUSAN
Homepage add : www.jung-a.co.kr
Main products : Accommodation Ladder, Pilot slant ladder, Wiper, CVS, Sunscreen davit, Cpastan, Al structure, Hatch, Helideck, Special product
TEL : +82 51 970 6420

JUNGSAN ENTERPRISE CO., LTD.
Head office : ULJU-GUN, ULSAN
Homepage add : www.jungsan.com
Main products : Marine Engine Part
TEL : +82 52 254 3290

K.C. LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.iccp-mgps.com
Main products : Impressed Current Cathodic Protection(I.C.C.P) system, Anti-fouling system(M.G.P.S), Shaft earthing device
TEL : +82 51 831 7720

Kangrim Heavy Industries CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add : www.kangrim.com
Main products : Marine Boiler, Plant, LTG Tank
TEL : +82 55 269 7700

Kangrim Insulation CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.kangrim.com
Main products : Tank, Pipe Insulation, Cold Provision Store
TEL : +82 51 200 6000

Keonchang Industry CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.keonchang.co.kr
Main products : TOP CHARGING EQUIPMENT, HOPPER&CONVEYER, SIDE GUIDE ASS'Y
TEL : +82 51 203 0161

Keum Yong Machinery CO., LTD.
Head office : BUK-GU, DAEGU
Homepage add : www.beumyong.com
Main products : Exh. Valve Complete with Spindle
TEL : +82 53 382 9044

Key Sung Metal CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.deysungmetal.com
Main products : Marine Valve
TEL : +82 51 831 3391

Keystone Valve(Korea)
Head office : ANSEONG-SI, GYEONGGI
Homepage add : www.keystonekorea.com
Main products : All kind of valves apply to offshore and shipbuilding
TEL : +82 51 604 4000

KHAN CO., LTD.
Head office : GEOJE-SI, GYEONGNAM
Homepage add : www.khan-offshore.com
Main products : Engineering Service, Sea-trian&Commissioning service, Facility for Fabricaton, Modification
TEL : +82 55 639 7600

Kion Printing&Packaging Inc.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.kiwon.com
Main products : Marine Equipment & Vacuum System
TEL : +82 55 313 9913

KOC ELECTRIC CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.kocelec.com
Main products : H/V Transformer(ATEX, WATER COOLED TYPE), UPS(Uninterruptible Power Supply), Bus way/Bus Duct
TEL : +82 51 970 6302

Kokako CO., LTD.
Head office : YEOUNGDO-GU, BUSAN
Homepage add :
Main products : Exhaust Valve Spindle&Bottom Piece Grinding Machine
TEL : +82 51 403 4114

Komeco CO., LTD.
Head office : GIJANG-GUN, BUSAN
Homepage add : www.komeco.net
Main products : Tacho Sys., Electronic Equip.
TEL : +82 51 724 5070

Kongsberg Maritime Korea Ltd.
Head office : GIJANG-GUN, BUSAN
Homepage add : www.km.kongsberg.com
Main products : Alarm monitoring system, Cargo monitoring system, Offshore technology
TEL : +82 51 749 8600

KOREA FILTER CO., LTD.
Head office : GIJANG-GUN, BUSAN
Homepage add : www.korea-filter.co.kr
Main products : STRAINER, OIL FILTER, AIR FILTER, AUTO STRAINER
TEL : +82 51 727 8360

Korea Flexble CO.
Head office : KUMJUNG-GU, BUSAN
Homepage add : www.hkflex.com
Main products : Metalic Flexible Hose, Metalic Expansion Joint, Manufacturing of Matalic Flexible hose Assemblies
TEL : +82 51 508 6291

KOTO Technical CO.
Head office : SAHA-GU, BUSAN
Homepage add :
Main products : Maintain&repair item(all hydraulic system, Adjust alignment(centering)
TEL : +82 51 417 8501

KSP CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.kspvalve.com
Main products : Exhaust Valve Complete, Exhaust Valve Spindle
TEL : +82 51 831 6274

KSV(Korea Special Valve) CO., LTD.
Head office : YOUNGDO-GU, BUSAN
Homepage add : www.ksv-valve.co.kr
Main products : Valve spindle and Valve seat, for marine diesel engine
TEL : +82 51 415 4466

KTE CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.kte.co.kr
Main products : High Voltage Swichboard, Side Thruster, Low voltage swichboard, Side thruster Control system, Group Starter Panel, Alarm Monitoring system, electic equipment etc
TEL : +82 51 265 0255

Kuk Dong Elecom CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.kukdongelecom.com
Main products : Lighting Fixture
TEL : +82 51 266 0050

KUKDONG ELECTRIC WIRE CO., LTD.
Head office : JINCHEON-GUN, CHUNGBUK
Homepage add : www.nexans.co.kr
Main products : All kind of cable for Offshore and Shipbuilding including JIS, BS, IEC, DIN, IEEE etc
TEL : +82 2 2140 3064

Kum Kang 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 4894

KUNSUL CHEMICAL IND. CO., LTD.
Head office : BUSANJIN-GU, BUSAN
Homepage add : http://jebi.co.kr/
Main products : Main products : Shop Primer, Anti-Corrosive Coatings, Anti-Fouling Coatings etc
TEL : +82 51 892 4221

KWANG SAN CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.kwangsan.com
Main products : AIR VENT HEAD, EXP.JOINT, HEATING COIL, PIPE SPOOL etc
TEL : +82 51 974 6316

Kwang Seong CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.ikwangsung.com
Main products : PIPE CABLE HANGER, SPARE PART SEAT ETC
TEL : +82 55 338 2271

Kyung Eun ceramics CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.ke-ceramics.com
Main products : Ceramic Packing
TEL : +82 55 345 7761

Kyungsung Industry CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.e-clamp.com
Main products : LNG carrier, sus corner & Anchor Sprips&Pipe clamp etc
TEL : +82 51 831 4960

Leeyoung Industrial Machinary CO., LTD.
Head office : ULJU-GUN, ULSAN
Homepage add : www.leeyoung.co.kr
Main products : Lashing bridge, T-bulk head block, Cuvered-block, Engine casing&funnel, Upper deck&module unit etc
TEL : +82 52 231 5800

LHE CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.lhe.co.kr
Main products : Plate Heat Exchanger, Fresh Water Generator
TEL : +82 55 340 0625

LS Cable &System
Head office : ANYANG-SI, KYEONGGI
Homepage add : www.lscns.com
Main products : Power Cable, Marine&Offshore Cable, Telecom Cable, SUBMARINE CABLE, WINDSOL, SUPERCONDUCTIVITY
TEL : +82 51 310 6781

LUXCO CO., LTD
Head office : SAHA-GU, BUSAN
Homepage add : www.luxco.co.kr
Main products : Electrical Equipment for Internal Combustion Engines, Magnet Products etc
TEL : +82 51 260 1300

MIN SUNG CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.minsung.co.kr
Main products : Steel Outfitting, Access Hatch, Swing away hatch, Cable tray, Electric cable box etc
TEL : +82 51 305 8862

Mirae Industries CO., LTD.
Head office : HAMAN-GUN, GYEONGNAM
Homepage add : www.miraewinch.com
Main products : Winch, Chain Stopper, Capstan
TEL : +82 55 587 8520

MODERN INTECH CO., LTD.
Head office : SASANG-GU, BUSAN
Homepage add : www.mo-dern.com
Main products : Fire retardant curtain, mattress, upholstery furniture, fire retardant fabric, carpet, rubber flooring
TEL : +82 51 325 0260

MRC(Marine radio CO., LTD.)
Head office : YOUNGDO-GU, BUSAN
Homepage add : www.mrckorea.com
Main products : Public Address System, Auto telephone sys
TEL : +82 51 414 7891

MSL Compressor CO., LTD.
Head office : POCHEON-SI, GYEONGGI
Homepage add : www.mslcomp.com
Main products : Breathing Air Compressor
TEL : +82 31 541 7000

Mt.H Control Valves CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.mth.co.kr
Main products : Main Starting Valve, Crank Case Relief Valve, Cyogenic Safety Valves&Control Valve
TEL : +82 51 974 8800

NK CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.nkcf.com
Main products : Ballast Water Treatment Sys., Co2 Sys.
TEL : +82 51 200 0152

Oriental Precision&Engineering CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.opco.co.kr
Main products : Deck House, Funnel & Engine Casing
TEL : +82 51 202 0101

OSCG CO., LTD.
Head office : SASANG-GU, BUSAN
Homepage add : www.oscg.net
Main products : Cable gland and accessories, GRP junction box
TEL : +82 51 305 3910

PANASIA CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.worldpanasia.com
Main products : Ballast water treatment system/level instrument, seawater coarse filtration/emission gas control system, engineering service
TEL : +82 51 831 1010

Pie Plus CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.piplus.co.kr
Main products : Crank Shaft, Rudder Stock, Motor Shaft
TEL : +82 51 831 9338

S&W CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.snwcorp.com
Main products : Cam/Cam Shaft, Valve/Seat ring, Engine Bolts/Nuts, Bolts
TEL : +82 51 205 7411

S. A. M-Tech
Head office : INCHEON-SI, GYEONGGI
Homepage add : www.samartkr.com
Main products : Engine control lever, Engine control cable, Hydraulic steering system, Stern drive, Helm pump, Cylinder etc
TEL : +82 32 815 3614

SAE JIN INTECH CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.saejinintech.com
Main products : Emergency Towing System
TEL : +82 51 971 9911

Sam Gong Industrial CO., LTD.
Head office : PYEONGTAEK-SI, GYEONGGI
Homepage add : www.samgongkorea.co.kr
Main products : Inflatable rubber products, Ship's ballast water treatment system, Life rafts, Speed boats, River boats, Fishing boats, Water tanks, High speed boats
TEL : +82 31 651 3012

SAMGONG CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.sam-gong.co.kr
Main products : Oil Purifier, Ship's Window, Ship Accommodation ladder, Cathodic protection system, Elevator type tower gangway, Ship ballast water treatment system, Quick Realease mooring hook&road monitoring system
TEL : +82 51 200 3040

SAMKUN CENTURY CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.samkunok.com
Main products : F.W.supply unit, BWTS, PE coating, Piant
TEL : +82 70 4034 0226

Samyang Ind. CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add :
Main products :
TEL : +82 51 263 4460

Samyoung Machinery CO., LTD.
Head office : GONGJU-SI, CHUNGNAM
Homepage add : www.sym.co.kr
Main products : Cylinder Head, Cylinder Liner, Piston&Carrier etc
TEL : +82 41 840 3000

Samyoung M-TEK CO., LTD.
Head office : HAMAN-GUN, GYEONGNAM
Homepage add : www.symtek.co.kr
Main products : MBS, Chain Wheel, Cylinder Cover etc
TEL : +82 55 589 7000

SAMYUNG ENC CO., LTD.
Head office : YOUNGDO-GU, BUSAN
Homepage add : www.samyungenc.com
Main products : AIS/GMDSS Radio Equip etc
TEL : +82 51 601 5555

Saracom CO., LTD.
Head office : GANGNAM-GU, SEOUL
Homepage add : www.saracom.net
Main products : GMDSS Equipment
TEL : +82 2 566 4248

Scana Korea Hydraulic LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.scana.co.kr
Main products : Actuators, HPU and Local Control Panel, Offloading systems/winches and mooring system/turret/swivel etc)
TEL : +82 55 343 9007

SEJIN IND CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add : www.sejin89.co.kr
Main products : Tank top unit, module unit, purifier unit, supply unit
TEL : +82 55 239 4700

SEOUL ELECTRIC CABLE CO., LTD.
Head office : UMSUONG-GUN, CHOONGBUK
Homepage add : www.seoulcable.com
Main products : Offshore & Shipboard Cables
TEL : +82 43 879 7200

Seun Electric CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.seunelectric.co.kr
Main products : Battery Charger, Alarm Sys.
TEL : +82 51 208 4641

SEWON INDUSTRIES., LTD.
Head office : HAMAN-GUN, GYEONGNAM
Homepage add : www.sewon-ind.com
Main products : High velocity P/V valve, Air Vent Head, Expansion Joint, Flame Arrester / Breather Valve
TEL : +82 55 580 7200

Shin Han Machinery CO., LTD.
Head office : ULJU-GUN, ULSAN
Homepage add : www.shinerpia.com
Main products : Deck House, Rudder
TEL : +82 52 240 5000

Shin Heung ENG. CO.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.shinheungeng.co.kr
Main products : Curtain, Upholstery, Sofa&Chair, Mattress, Carpet, Roller Blind
TEL : +82 51 817 6455

Shin Myung Tech CO., LTD.
Head office : YANGSAN-SI, GYUNGNAM
Homepage add : www.smdavit.com
Main products : Air motor, Winch, Davit, Crane, Reel, Capstan, Pump etc
TEL : +82 55 363 7091

Shin Yeong CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.sy-ind.com
Main products : Man-hole, Access Hatch
TEL : +82 55 346 0034

Shin-A CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.shina-ent.com
Main products : Navigational/Communication Equip.
TEL : +82 51 204 6221

Shin-A Metal Tech CO., LTD.
Head office : BUK-GU, ULSAN
Homepage add : www.shinametal.com
Main products : Engine Metal Bearing, Bearings for medium&small engines, Main Bearing Shells, Segment&Segment Holder, Guide Shoe, Top&Bottom end bearing, Mesta Bearing
TEL : +82 52 298 2100

Shindong Digitech CO., LTD.
Head office : YEOUNGDO-GU, BUSAN
Homepage add : www.shindong.com
Main products : Navigation&communication, Internal communication equipment
TEL : +82 51 461 5141

Shinshin Machinery CO., LTD.
Head office : GIJANG-GUN, BUSAN
Homepage add : www.sspump.com
Main products : VID(Cooling F.W&S.W Pump), EHC(Volute Casting Centrifugal Pump), NLG(External Gear Pump)
TEL : +82 51 713 0000

Silla Metal CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.sillametal.com
Main products : Pixed Pitch Propeller(FPP), Controllable Pitch Propeller(CPP, Shafting, Stern Equipment
TEL : +82 51 831 5991

Simulation Tech Inc.
Head office : GEUMCHEON-GO, SEOUL
Homepage add : www.simulationtech.co.kr
Main products : Voyage Data Recorder
TEL : +82 2 3281 0960

SMECO CO., LTD.
Head office : YEONGI-GUN, CHUNGNAM
Homepage add : www.smecopiston.com
Main products : Piston, Piston Liner
TEL : +82 44 864 3030

SMS CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.sms-marinesystem.com
Main products : Hatch Cover, Lashing Bridge, Ro Ro Equipment, Hydro Door
TEL : +82 51 290 1000

SPECS Corporation
Head office : BUNDANG-GU, SEONGNAM
Homepage add : www.specs.co.kr
Main products : Oil Mist Detector
TEL : +82 31 706 5211

STACO CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.staco.co.kr
Main products : Wall & Ceiling Panel, Unit Toilet
TEL : +82 51 831 7000

STX Engine CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add : www.stxengine.co.kr
Main products : Marine diesel engine, Military diesel engine, power plant diesel engine, electronic communication equipment
TEL : +82 55 280 0114

STX Heavy Industries CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add : www.stxhi.co.kr
Main products : Turbocharger, Diesel engine parts, Industrial componests, Shipuilding machinery, Cargo pump system, Casting parts
TEL : +82 55 280 0700

Suh Han Ind. CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add :

Main products : Cable Try and Duct, Hot Dip Galvanizing, Ship's Window
TEL : +82 51 204 1920

SUNBO INDUSTRIES CO., LTD
Head office : SAHA-GU, BUSAN
Homepage add : www.sunboind.co.kr
Main products : Package module unit, Tank top unit, E/R Block etc
TEL : +82 51 260 5551

Sung Jin Geotec CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.sgtkor.com
Main products : Ship Block, Fin Tube, Header Pipe
TEL : +82 52 228 5801

Sung Kwang Bend CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.skbend.com
Main products : Butt Welding Pipe Fittings
TEL : +82 51 330 0200

Sung Mi CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.sung-mi.co.kr
Main products : Door Frame, Wall Panel, Ceiling Panel, Door Hardware, Unit Toilet
TEL : +82 55 329 1117

SUNG SIN INDUSTRIES CO., LTD.
Head office : GYEONGJU-SI, GYEONGBUK
Homepage add : http://sungsin.koreasme.com
Main products : hatch Coaming, T-Block, Water Mist Catcher, Water Separator, Ltuver
TEL : +82 54 776 6441

Sungil SIM CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.sungilsim.com
Main products : Pipe bending, Pipe spool, Marine Engine, Gas Turbine
TEL : +82 51 831 8800

Suro Profeller & Machinery CO.
Head office : YOUNGDO-GU, BUSAN
Homepage add : www.suropump.co.kr
Main products : Propeller, Propeller Shaft
TEL : +82 51 415 0445

T.K. Corporation CO., LTD.
Head office : GANGSEO-GU, BUSAN
Homepage add : www.tkbend.co.kr
Main products : Butt-Welding Fittings, Forged Fittings, Flanges
TEL : +82 51 831 6600

TAE YOUNG TRADING LTD.
Head office : NOWON-GU, SEOUL
Homepage add : www.marine-matarial.com
Main products : Receptacles & Wire Accessories, Flood Light, Deck Light, Reflected Lamps, HRF Mercury Lamps, Sodium Lamps, Marine Electrical Equipment
TEL : +82 2 2272 1960

TANKTECH CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.tanktech.co.kr
Main products : Water-mist fire fighting system for engine room and accommodation, LNG fuel tank system, Offshore steel structure
TEL : +82 51 979 1600

Techcross Inc.
Head office : JUNG-GU, BUSAN
Homepage add : www.techcross.com
Main products : Ballast Water Management System
TEL : +82 51 603 3500

TechMarine S/W CO., LTD.
Head office : DONG-GU, BUSAN
Homepage add : www.techmarine.net
Main products : Loading Computer program, CAOS, Stowage Program, LOFOS, LMS
TEL : +82 51 467 7003

TMC CO., LTD.
Head office : CHEONAN-SI, SHUNGNAM
Homepage add : www.tmc-cable.com
Main products : Marine Cables, Oil&Rig Cables, Onshore Cables, Seecial Cables, Optical Fiber Cables
TEL : +82 41 589 6500

TOPSAFE CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.topsafe.co.kr
High Velocity Pressure Vacuum Valve, Breather Valve, Falme
Main products : Arrester, Emergency Vent Cover, Detonation Flame Arrester
TEL : +82 55 338 9986

VISER CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add : www.viser.co.kr
Main products : PHE GASKET, Valve Seat, Dust Packing etc
TEL : +82 55 346 5575

WARTSILA ACCOMMODATION SYSTEMS KOREA, INC.
Head office : GOSEONG-GUN, GYEONGNAM
Homepage add : www.waskorea.co.kr
Main products : Unit Toilet, Unit Cabin, Wall Panel, Ceiling Panel
TEL : +82 55 673 7315

WhaYoung CO., LTD.
Head office : MIRYANG-SI, GYUNGNAM
Homepage add : www.whayoung.co.kr
Main products : Fuel Pump Ass'y for Ship's Engine
TEL : +82 55 359 1100

WONIL CO., LTD.
Head office : MASAN-SI, GYEONGNAM
Homepage add : www.ms-wonil.com
Main products : Cylinder Cover, Common Rail Unit, Silencer, Spraying Plate, Rotor Shaft
TEL : +82 55 253 1500

Woo Chang Ind. CO., LTD.
Head office : GIMHAE-SI, GYUNGNAM
Homepage add :
Main products : Weather Tight Steel Door, Louver Vent, Steel Window Box, Morning fitting
TEL : +82 55 337 1651

WOOJOO M & E CO., LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.wjme.com
Main products : Exp.Junction box, Warning Alarm etc
TEL : +82 51 264 9130

Yoo Won Industry LTD.
Head office : SAHA-GU, BUSAN
Homepage add : www.yoowonind.com
Main products : Steering Gear, Filter, Deck M/C
TEL : +82 51 205 8541

You Jeon Industry CO., LTD.
Head office : CHANGWON, GYUNGNAM
Homepage add :
Main products : Marine engine parts, Engine bed
TEL : +82 55 297 2121

YoungkWang Machine CO., LTD.
Head office : GYEONGJU-SI, GYEONGBUK
Homepage add : www.ykmc.com
Main products : Skid Unit, Pressure Vessel, Heat Exchanger
TEL : +82 54 776 6456

KORSHIP

Shipbuilding
Design
Manufacture
Control and all kinds of devices

Registration No. : Youngdungpo Ra 00220

Published on Dec. 5. 2013

Publisher Yoseob Choi

Editorial Director Wooseung Cha

Editor-in-Chief Chunghoon Lee

Senior Editor Chanyoung Choi

Designer MiHwa Choi

Marketing Manager Sungsu Park
Kijong Seo
Jongki Hong

Printed by Hyung-Je Art Printing

Printed (CTP) by Hyung-Je Art Printing

Published by PROCON

Adress : Rm 708 ACE Techno Tower #55-7,
Mullae-dong 3 ga, Youngdungpo-ku,
Seoul, Korea

Tel : +82-2-2168-8898

Fax : +82-2-2168-8895

International : +82-10-5604-7311
(Chanyoung Choi)

www.korship.co.kr www.procon.co.kr

E-mail : korshipeditor@gmail.com

Price per Copy : ₩10,000

Annual Subscription Fee : ₩100,000

Bank of receipt	
Kiup Bank	083-038571-04-013
Kook Min Bank	757-21-0285-181
Shin Han Bank	284-05-012954
Woo Ri Bank	182-07-168838
* Deposit person : PROCON (Choi Yo Seob)	

Application of Subscription

Company's Name : _____

Applicant : _____

Address : _____

Term of Subscription : From M/Y ~ To M/Y _____

Tel : Fax : _____

Rate of Subscription : 1 Month / 10,000(Korean Won)
1 Year / 100,000(Korean won)
(Air postage will be charged for foreign countries.)

Inquiry : Tel / +82-2-2168-8898
Fax / +82-2-2168-8895
E-mail : victory@procon.co.kr

Gastech 2014 컨퍼런스 & 전시회

Gastech 2014 공식 지정 매체 '월간 KORSHIP'

– 2014년 3월 KINTEX 개최

Gastech은 영국 DMG사 주관으로 18개월 주기로 개최되는 국제 가스 전시회입니다.
'Gastech 2014'는 한국가스공사 주최로 일산 킨텍스(KINTEX)에서 2014년 3월 24일부터 27일까지 4일간 개최됩니다. 세계 각국의 에너지 분야 장관 및 차관급 VIP, 글로벌 에너지 기업 및 관계자 등 약 40,000명 이상이 참관할 예정입니다.

월간 KORSHIP은 'Gastech 2014'의 공식 매체로서 행사기간 동안 귀사의 홍보 및 마케팅에 도움을 드리고자 합니다.

- 참가업체 및 관람객 대상 약 8,000부 이상 'KORSHIP' 잡지 무료 배포
- 제품 카탈로그 모음집 제작 및 참가업체 무료 배포

Gastech 2014와 관련해 잡지 광고 및 기사 게재, 그리고 카탈로그 모음집에 관심 있는 업체는 문의 바랍니다.

* Gastech 전시회의 참가업체 및 자세한 정보는 해당 홈페이지(www.gastechkorea.com)에서 얻을 수 있으니 참고 바랍니다.

MONTHLY KORSHIP, the official media of Gastech 2014

Gastech 2014 Conference & Exhibition

- Slated to open at KINTEX in March, 2014

Gastech is the international gas exhibition held every 18 months under the sponsorship of the U.K.-based DMG. 'Gastech 2014' will open at KINTEX, Ilsan, and run for 4 days from March 24 to 27, 2014. This event is expected to draw more than 40,000 visitors, including the energy-related ministerial and vice-ministerial VIPs from all over the world, global energy companies, etc.

MONTHLY KORSHIP, the official media of 'Gastech 2014', would like to support the public relation and marketing activities of your company during the event.

- Distribution of more than 8,000 free 'KORSHIP' magazine issues to exhibitors and visitors
- Production of product catalog collections and free distribution to exhibitors

We welcome your inquiry about magazine advertisements, articles, and catalog collections in relation to Gastech 2014.

* For more information about exhibitors and other information, visit the related website (www.gastechkorea.com)

Gastech 2014 공식 지정 매체 월간 KORSHIP
MONTHLY KORSHIP Official Media of Gastech 2014
TEL : +82-2-2168-8898
FAX : +82-2-2168-8895
www.korship.co.kr