

## Feature Story

# GLOBAL SHIPBUILDING MARKET ON SOLID PATH TO RECOVERY

- KOREAN SHIPYARDS SHARPENING THEIR COMPETITIVE EDGE TO WIN NEW ORDERS

## Technology

### SIF BACKS TM STEEL FROM DILLINGER: WELDABLE, TOUGH, DEPENDABLE

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## Issue

Korea's three shipbuilding heavyweights increased annual new order targets for 2018

ABB pioneers microgrid solution for installation on offshore platform

Shipbuilding Market Resource - Jack Up Values Increase 36% in One Year





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2016년 개정판

조선 & 해양 총람

# Guide Offshore & Shipbuilding

## 조선&해양 총람 '2016년 개정판' 발행

월간 KORSHIP은 지난 2013년 조선해양 관련업계의 관심과 협조에 힘입어 국내 처음으로 '조선&해양 기업총람(Offshore & Shipbuilding Guide)'을 제작해 발행했습니다.

이번에 월간 KORSHIP은 국내 조선업계의 요구에 따라 '2016년 개정판'을 새롭게 발행하게 되었습니다. 2016년 개정판은 기존 2013년 총람(1,008개 업체)에 비해 50% 이상 업체가 추가되어 총 1,600여 곳의 조선&해양 업체 정보가 수록되어 있습니다.

발행사: 프로콘 (Procon) / 월간 KORSHIP

발행일: 2016년 7월 20일

연락처: (02) 2168-8896~8899

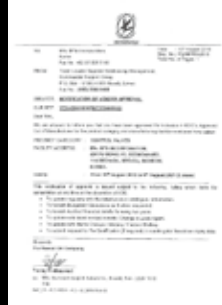
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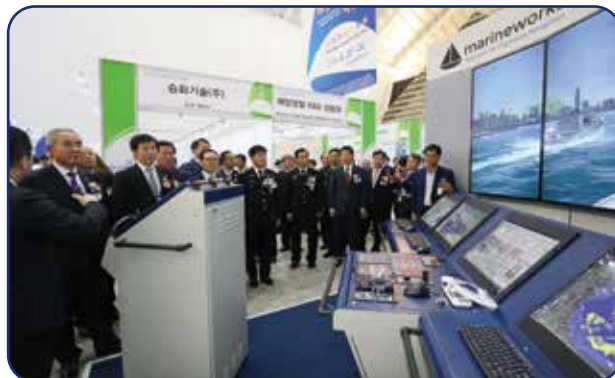
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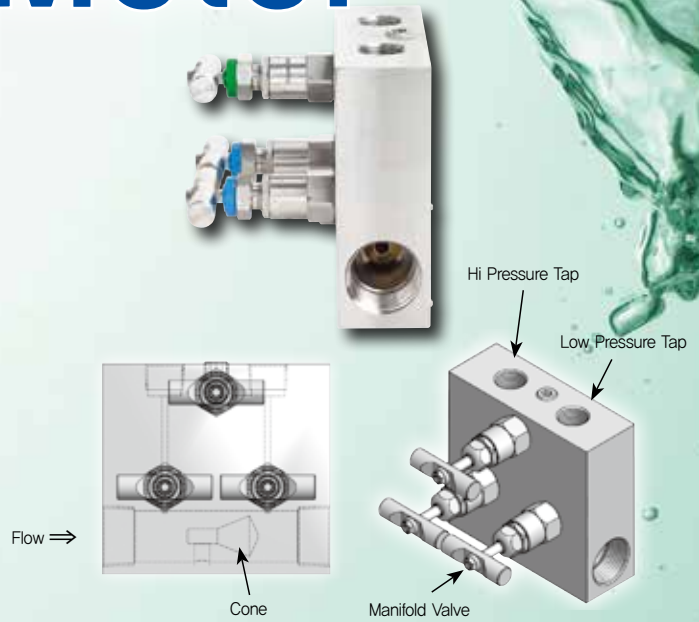
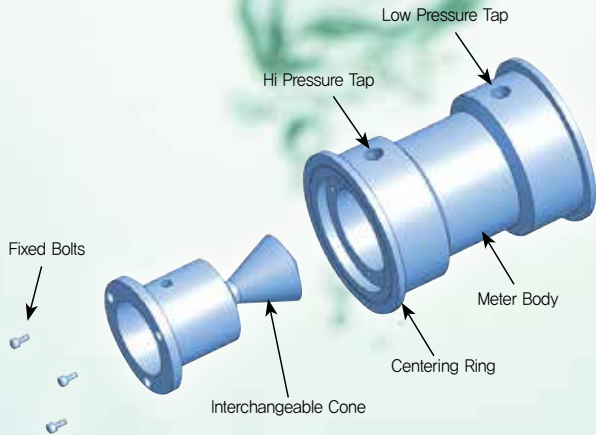


### 전시품목

조선, 안전·레저, 항해·통신, 항공 관련장비, 특수장비, 해양환경방제장비, 중소조선 및 워크보트,  
친환경 선박설비 및 선박지원, 여객·항만 소요장비 및 비품



# Cone Meter



## HFV-WM (Wafer type Cone Meter)

## IVCM (Integral Valve Cone Meter)

# DP HiCone Meter

DP HiCone Meter는 일반적인 차압유량계의 일종이며 차압유량계와 같은 물리적 원리에 따라 유량을 측정합니다. 조임부 역할을 하는 Cone은 Meter body 중앙에 위치하여 유체의 흐름에 따라 유속을 증가시키고 차압을 발생시킵니다. 두 개의 검출 Tap은 High 와 Low pressure를 DP 전송기로 보내 유량을 지시합니다.

**70%** 전단 3D 후단 1D의 짧은 직관부를 가짐에 따라 플랜트 건설에 최대 70%까지 원가를 절감하는 효과를 가집니다. (미국 CEESI에서 API 22.2 TESTING)

**±8%** Cone Meter는 제조공정상의 사소하게 보이는 차이에도 교정하지 않으면 최대 ±8%의 오차가 발생할 수 있습니다. 정확도 ±0.5~1% 수준의 정밀한 유량측정을 위해서는 반드시 교정을 해야 합니다. (미국 CEESI에서 발표한 내용중)

하이트롤에서 생산되는 Cone Meter는 ISO 17025 국제공인 교정시스템에 의해 교정하며 ±0.5%의 정확도를 가집니다.



## HFV-WM

HFV-WM은 Meter body의 교체 없이 Cone을 교체하여 유량 범위를 변경할 수 있으며, 과도한 유속 또는 슬러그 문치의 충격으로 인한 Cone의 변형에 쉽게 교체 사용할 수 있는 특징을 가지고 있다. 또한, Water형태로 설치가 용이하고 모든 구성품이 정밀 기계가공되어 측정정확도가 우수하며, 용접부가 없어 압력부의 건전성이 확보 되었다.



(특 허 : 제 10-0915088호)

## IVCM

IVCM은 차압식 유량계의 필연적 구성품인 Manifold Valve를 Meter body와 일체형으로 제작하여 공정시 발생할 수 있는 연결부의 Leak를 최소화 하고, 설치 공사 비용 및 시간을 줄이는 장점을 가진다.



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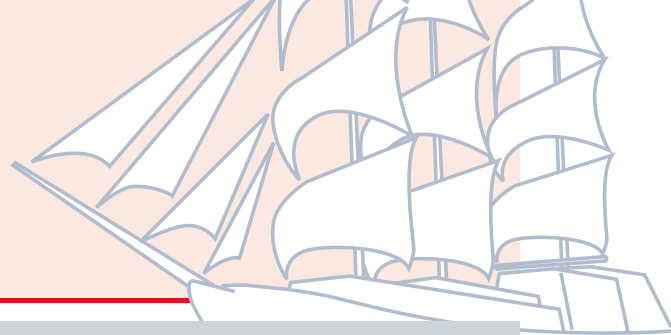
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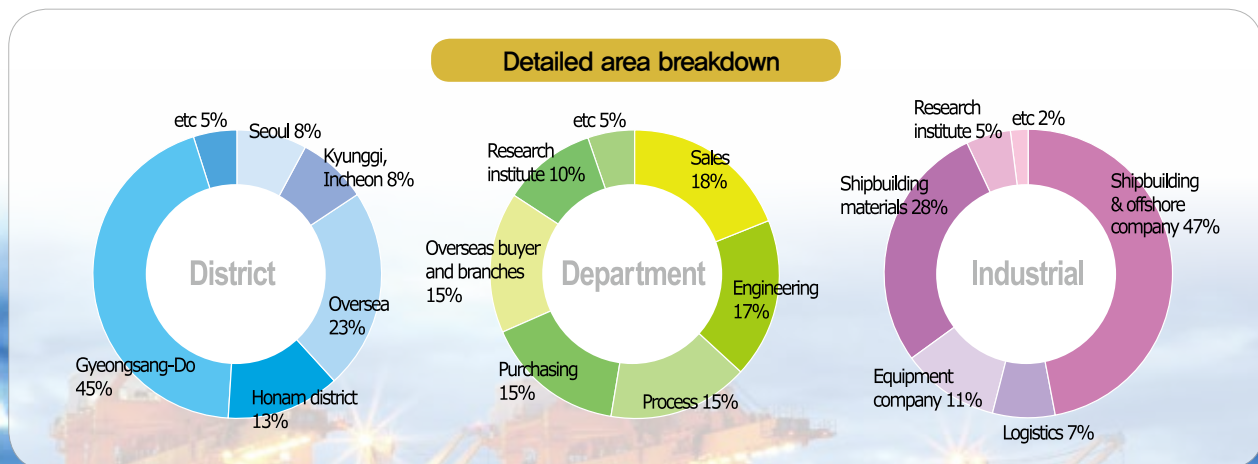
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## HMD built the world's first vessel adopting the high manganese steel

Hyundai Mipo Dockyard (HMD) held a naming ceremony for the 50,000-ton class bulk carrier ordered by Ilshin Marine Transport (IMT) June 2016. The event was attended by many domestic and foreign guests including HMD President Han Young-seok, POSCO President Oh In-hwan, IMT President Moon Chung-do, MOF (Ministry of Oceans and Fisheries) Marine Policy Director Jo Seung-hwan, and MOTIE (Ministry of Trade, Industry and Energy) Industry Foundation Director Moon Seung-wook.

This vessel, named 'Green Iris' by the ship owner, is equipped with a LNG fuel tank made of high manganese steel for the first time in the world, along with a dual fuel

engine operating on both bunker C oil and LNG. In particular, the high manganese steel used in LNG fuel tank of this vessel is a novel material developed by POSCO. It can withstand cryogenic temperatures of up to 196°C below zero, thus providing far more excellent strength and toughness and cost-effectiveness, compared to conventional alloy materials. After delivery in early next year, this vessel, measuring 191.0m in length, 32.2m in



width and 17.3m in height, will be used to carry the limestone used by POSCO from the East Coast of Gangwon Province to the Gwangyang Steelworks.

### 현대미포조선, 세계 최초 고망간강 적용 벌크선 건조

현대미포조선은 지난 2016년 6월 '일신해운'으로부터 수주한 50,000톤급 벌크선에 대한 명명식을 가졌다.

이날 행사에는 한영석 현대미포조선 사장, 오인환 포스코 사장, 문중도 일신해운 사장을 비롯해 조승환 해양수산부 해양정책실장, 문승욱 산업통상자원

부 산업기반실장 등 많은 내·외빈들이 참석해 새로운 선박의 탄생을 축하하고 안전항해를 기원했다. 선주사에 의해 '그린 아이리스(Green Iris)'라고 이름 붙여진 이 선박은 bunker C유와 LNG를 모두 사용할 수 있는 이중연료 엔진(Dual Fuel Engine)과 함께 세계 최초로 '고망간강(High Manganese Steel)' 재질의 LNG 연료탱크가 탑재됐다. 특히 이 선박의 LNG연료탱크에 적용되는 고망간강

은 포스코가 개발한 신소재로, 최대 영하 196도의 극저온 상태에서도 견딜 수 있어 기존의 합금소재에 비해 강도와 인성이 월등하고 가격이 저렴한 것이 장점이다. 한편, 길이 191.0m, 너비 32.2m, 높이 17.3m의 제원을 갖춘 이 선박은 내년 초 선주사에 인도돼, 포스코가 사용하는 석화석을 강원도 동해안에서 광양 제철소까지 운송하는데 투입될 예정이다.

## Emerson Opens Solutions Center in Singapore to Accelerate Digital Transformation

As part of its drive to make Singapore a hub for the delivery of Industrial Internet of Things (IIoT) technologies and services for customers across Asia Pacific, Emerson opened a customer-focused Solutions Center at the regional headquarters of its Automation Solutions business here in Singapore. To mark the opening, the company also unveiled a collaborative project implemented under the Memorandum of Cooperation signed with Singapore Polytechnic to advance training of the digital workforce of the future.

The newly opened Emerson Solutions

Center in Singapore brings to life the capabilities of Emerson's Plantweb™ digital ecosystem, the industry's most comprehensive Industrial IIoT automation platform. The Plantweb offering consists of standards-based hardware, software, intelligent devices, and services for securely implementing Industrial IIoT-based solutions that can



expand digital intelligence to the entire manufacturing enterprise.

The Emerson Solutions Center in Singapore has collaboration spaces with state-of-the-art multimedia technology, including augmented reality and virtual reality. Customers can get an immersive experience using Plantweb technologies to operate and maintain the digital plant of the future – with wireless sensors feeding data through a digital communications network that gets analyzed by software programs and becomes available for actionable use through apps and cloud-based services. At every step of the demonstrations, Emerson experts can help customers determine which digitalization projects provide the

greatest near-term and long-term business impact.

The Emerson Solutions Center in Singapore includes two built-out plant settings. The Digital Plant in the Center features a scaled-down replica of a process manufacturing facility equipped with Emerson's foundational digital solutions for process control and safety systems, as well as new Industrial IoT technologies. The Digital Plant simulates the processes of a typical facility, such as an oil refinery, a pharmaceutical plant or a power plant. The Center also includes a Central Control Room where customers can experience simulations of

critical manufacturing processes for process optimization.

"This is a first-of-its-kind facility that shows customers how automation and IoT technologies can drive measurable improvements to the bottom line of their manufacturing processes," said Ron Martin, Asia Pacific president, Emerson Automation Solutions. "Here in Singapore, we have the brightest minds in the industry collaborating with and helping our customers plan and execute their vision of future operations and working with them to reengineer their facilities to deliver Top Quartile operating performance."

### 에머슨, 디지털트랜스포메이션 가속화 위한 싱가포르 솔루션 센터 오픈

에머슨이 싱가포르를 아태 지역의 IoT 기술 및 서비스 중심지로 만들기 위해 오토메이션 솔루션즈 싱가포르 지역 본부에 디지털 솔루션 센터를 오픈했다. 오픈 기념으로 디지털트랜스포메이션 교육 강화를 위해 체결한 Singapore Polytechnic과의 공동 프로젝트도 함께 발표했다.

에머슨은 솔루션 센터를 통해 전방위적으로 활용 가능한 IoT 기반의 자동화 플랫폼, 에머슨 플랜트웹™ 디지털 에코시스템의 역량을 한 층 더 끌어올릴 계획이다. 에머슨 플랜트웹은 표준기반 하드웨어, 소프트웨어, 지능형 디바이스, 디지털 인텔리전스를 산업 전방위로 안전하게 구현/확대하는 서비스 등

을 제공한다.

센터에는 증강현실과 가상현실을 포함하는 최신 멀티미디어 기술을 갖춘 공간이 있다. 여기에서 고객은 미래의 디지털 플랜트를 운영 및 유지에 활용될 에머슨 플랜트웹 기술의 직접적인 경험이 가능하다.

예를 들어, 디지털 통신 네트워크에 기반한 무선 센서의 데이터 수집과 데이터를 분석하는 소프트웨어 프로그램은 물론 엣지와 클라우드 서비스를 통해 트렌드를 읽기까지 전반적인 과정이 해당된다. 각 단계에서 에머슨 전문가들은 고객이 디지털 프로젝트가 장/단기적인 면에서 어떤 영향을 미칠지 판단할 수 있게 돕는다.

여기에 더불어 프로세스 제어와 안전 시스템을 위

한 에머슨의 기초적인 디지털 솔루션과 새로운 IoT 기술을 갖춘 프로세스 설비의 축소 모형을 갖추고 있다. 정유 공장, 제약 공장, 발전소 등 일반적인 시설의 프로세스를 시뮬레이션한다. 고객들이 프로세스 최적화를 위한 주요 제조 프로세스의 시뮬레이션을 경험할 수 있는 중앙제어실도 있다.

에머슨 오토메이션 솔루션즈의 Ron Martin은 "이번 솔루션 센터는 고객에게 자동화 및 IoT 기술이 어떻게 제조 프로세스의 향상을 가져올 수 있는지 보여주는 최초의 시설"이라며, "이곳 싱가포르에서는 산업 내 가장 뛰어난 전문가들이 고객과 함께 미래 사업 운영의 목표를 계획 및 실행하고 Top Quartile 운영 성과를 낼 수 있도록 시설을 재설계하고 있다"고 말했다.

### KR starts to provide statutory services to Portugal

Korean Register (KR) has been granted authorization by the Portugal Maritime Authority (DGRM) to deliver statutory services on behalf of the Portugal flag state. KR's surveyors will now be carrying out vessel surveys and issuing certificates in accordance with international conventions. KR will act as a 'Recognized Organization (RO)' conducting surveys and audits, issuing certificates to Portuguese flagged ships including those from Madeira, and ensuring full compliance with the SOLAS, MARPOL,

ITC, ILL, and MLC regulations.

This is an important achievement for KR which has been working to expand its services to clients across Europe. With offices in key locations across the European region, KR ensures that its customers receive immediate, high quality services wherever they are.

Lee Jeong-Kie, Chairman and CEO of KR said, "Successfully obtaining authorization to act as an 'RO' for the Portuguese administration clearly demonstrates our continu-

ous efforts to increase customer service levels and enhance customer satisfaction across Europe. It also shows our commitment to providing the best quality and widest range of services, to support our client's business operations wherever they are."

KR continues to expand its services to international governments and this latest authorization brings the total number of countries where KR is authorized to carry out ship survey and certification work to seventy-eight (78).

## 한국선급, 포르투갈 정부대행검사권 수임

한국선급(KR)은 지난 1월 10일 포르투갈 해사청(DGRM)과 국제협약에 따른 선박검사 및 증서발급 서비스를 대행하는 정부대행업무에 관한 협정을 체결했다고 밝혔다.

이번 협정에 따라 한국선급은 마데이라(북대서양에 위치한 포르투갈령의 해외 섬) 선박을 포함한 포르

투갈 국적선박의 해상인명안전협약(SOLAS), 해양오염방지협약(MARPOL), 국제선박톤수측정협약(ITC), 국제만재흡수선(LL), 해사노동협약(MLC) 등에 대한 검사·심사 및 관련 증서를 발급할 수 있게 되었다.

한국선급 이정기 회장은 “이번 포르투갈 정부와의 협정은 우리가 유럽 전역에서 고객 만족도를 높이기 위해 지속적으로 노력한 결실이며, 앞으로 최상

의 품질과 광범위한 서비스 제공으로 고객의 비즈니스 운영을 지원할 것”이라고 말했다.

한국선급은 현재까지 대한민국 정부를 포함하여 총 78개 국가로부터 정부대행검사권을 위임 받았으며, 향후 더 많은 외국 정부대행검사권 수임을 통해 선주의 편의를 도모하고 세계적 수준의 검사 서비스를 제공할 계획이다.

## First LR classed hydrogen-powered vessel launched

Antwerp maritime group Compagnie Maritime Belge (CMB) has launched its new hydrogen-powered passenger vessel, Hydroville, classed by LR.

The catamaran crew boat is the first LR classed vessel to use hydrogen to power a diesel engine. The advantage of hydrogen is that no CO<sub>2</sub>, particulate matter or sulphur oxides are released during combustion. The novel concept of hydrogen injected diesel engines aren't covered by standard LR rules, so a risk based design approach to approval was required.

Hydroville is a showcase for the use of clean fuels and is primarily a project to test hydrogen technology for applications on larger vessels. It will serve as a shuttle on the river Scheldt to provide CMB employees with environmentally-friendly transport to and from their office. The project is a key part of CMB's efforts to make its fleet greener.

“The project is a showcase for LR as well,” said LR's Global Head of Engineering Systems Ed Fort, “It demonstrates our capabilities in hydrogen risk assessments and is a stepping stone towards the wider use of hydrogen as a fuel for combustion engines and alternative power generation technologies such as fuel cells. LR is taking a leading role in assuring the safe deployment of alternative fuel sources for shipping.”

Last week LR and University Maritime Advisory Services (UMAS) released 'Zero Emission Vessels 2030', a study examining the viability of zero emission vessels – identifying what needs to be in place to make them a viable and competitive solution for decarbonisation. One of the conclusions of the report was that for vessels with niche



access to a low-cost supply of zero carbon fuel or energy, the gap may already be closed, as the Hydroville project demonstrates.

Katharine Palmer, LR's Global Sustainability Manager, said “There is no doubt that decarbonisation is a huge challenge for our sector and we all have a clear responsibility to ensure actions are taken to drive our operational emissions to zero at a pace matching actions taken across the rest of the world and other industry sectors.”

## Hexagon PPM acquires Plant Design Solutions

Hexagon PPM announced the acquisition of Plant Design Solutions (PDS), a Houston-based software and services distributor. With this announcement, the CADWorx® & Analysis Solutions group, part of Hexagon PPM, will transition to a U.S. direct sales model during the first quarter of 2018.

“Over the years, we've had many requests from clients across the United States who want to work more directly with us. As these requests have grown, we have chosen to move to a direct sales model to more closely serve our U.S. clients,” said Rick Allen, president of CADWorx & Analysis Solutions.

“The U.S. is our largest market and it's important to have this direct interaction in the development of our products. The PDS acquisition will help us enhance our future interactions thanks to more direct engagement with clients.”

PDS and all of its employees are now part



of Hexagon PPM. Clients can continue to work with their familiar PDS professionals. Len Kalmer, president of PDS, and Carl Adams, vice president of PDS, are now executive consultants with CADWorx & Analysis Solutions. "At PDS, our commitment to our clients has

always come first," said Kalmer. "We are very happy that our clients will still get the best support and services from the Hexagon PPM team." "We've worked closely with the CADWorx & Analysis Solutions group for many years," said Adams. "We always felt like we were

one team, and now we're very excited to officially join Hexagon PPM." "We are growing with new hires in addition to the PDS employees coming on board. This is an exciting time for the group," said Billy Rasco, vice president of Global Sales & Marketing at CADWorx & Analysis Solutions.



## I-Tech AB appoints exclusive importer and agent in South Korea in response to high demand for Selektope®

I-Tech AB, has responded to strong market demand in South Korea by appointing KhaiEL as the exclusive importer and agency for the unique antifouling ingredient Selektope®.

Under the new agreement, I-Tech will continue to manage sales of Selektope® in South Korea while KhaiEL will exclusively handle imports.

"We are delighted to be working with such a highly reputed company in KhaiEL to strengthen the supply of Selektope to South Korea. This business relationship reflects the need to address increasing demand for our product in South Korea,

particularly from the shipyards and many owners running risks of extended idling in conjunction with new buildings and subsequent operations," said Philip Chaabane, CEO I-Tech AB.

"KhaiEL is very proud to partner with I-Tech to represent the highly innovative Selektope® technology in the Korean market," said Paul Cho, Marketing Director KhaiEL.

The organic, non-metal compound Selektope® is the only ingredient of its kind used in a marine antifouling application. It is characterized by high efficacy at extremely low concentrations (approx.0.1% w/w), ultra-low leaching and flexibility and can boost the



performance of copper-based paint formulations or replace copper completely. Due to the low concentration required, Selektope® does not compromise the chemical structure, color or other cooperative biocides of a marine coating.

KhaiEL GmbH is a chemical company based in Germany and South Korea that has a distribution business and has been developing specialty chemicals since 2007.



## CSSC Launches Global Service Agreement for WinGD Engines

CSSC Marine Service (CMS) formally launched its global service product lifecycle support and aftersales service with an emphasis on an agreement signed with Winterthur Gas and Diesel (WinGD) engines at a ceremony held on 18th January 2018, in Shanghai.

During the event, which was attended by over 40 representatives from major ship owners, shipyards and engine builders, Anil Soni, General Manager Operations and Deputy Managing Director, China, presented the authorization to CMS, to formally represent the start of their global service

support agreement for all WinGD products (WinGD, Wärtsilä and Sulzer two-stroke engines). The new agreement will allow CMS to perform and offer worldwide services to all WinGD low speed diesel engines. This includes field services, technical services, repair centres and the supply of solutions. This agreement also



(left to right) Andrew Stump, President, CSSC Marine Service being presented with supplier approval from Anil Soni, GMr Anil Soni, General Manager Operations and Deputy Managing Director, China.

emphasises and enables a platform for sharing of engine data, particularly to ensure that service solutions and findings are directly fed back into the engine design for faster improvement. The agreement includes the added benefit of a 24/7 customer hotline, operated by CMS service engineers and technical experts, with the support of WinGD experts in their key global locations.

"Since the establishment of CMS in 2017

we have been focussing on the necessary business processes, regulations, databases, stock investments, getting our warehouse operational and cultivating relations with important business partners such as WinGD," said Andrew Stump, President of CMS. "We are committed to providing consistent and reliable product support, and with the advantage of easy access to the technical knowledge of engines and ships built by our fellow CSSC companies, this

approved supplier agreement with WinGD was the next logical step in our journey."

CMS have also recently signed exclusive after-sales agreements with CSSC-MES Diesel Co.,Ltd (CMD), and Hudong Heavy Machinery (HHM) engine factories that includes management of all warranty processes for both WinGD and MAN brand engines. Other agreements signed by CMS recently includes; CSSC Jiujiang Fire Equipment, O.M.T, Italy and Technava, Greece.



## Cobham SATCOM GX antennas approved by Japanese regulator

Cobham SATCOM has secured approval in Japan for the GX100 and GX60 terminals it has designed for Fleet Xpress, after radio equipment certification and testing body TELEC confirmed their compliance with standards laid down in Japan's Telecommunication Business Act.

The certification allows the Cobham GX100 and GX60 terminals that enable Inmarsat's revolutionary Fleet Xpress high-speed maritime broadband service to be used without any further need of verification of connectivity by the telecommunications carrier. It means that Fleet Xpress can be fully adopt-

ed by shipping companies in Japan without certified terminal hardware from Cobham SATCOM requiring separate testing.

"As owners reach to secure the benefits of data-driven operations, this validation will give them assurance that the improved connectivity, reduced opex and enhanced data speeds available through Fleet Xpress can be delivered to Cobham SATCOM's maritime quality standards," said Casper Jensen, Senior Vice President at Cobham SATCOM.

"Terminals developed for reliability, ease of installation and integration with high speed



data transmission that bring internet access at sea are the gateway to the enhanced vessel efficiency and crew welfare promised by Fleet Xpress."



## ABS Awards AIP For Innovative HHI FPSO Hull Design

ABS granted Approval in Principle (AIP) to Hyundai Heavy Industries (HHI) floating production storage and offloading (FPSO) hull design.

"As the offshore industry strives to design more cost-effective production units, ABS remains committed to evaluating novel designs that meet our class standards," said ABS Executive Vice President, Global Offshore Ken Richardson. "Awarding HHI this AIP is another example of ABS's commitment to promoting safety in innovative concepts."

"The Newbuilding Conversion FPSO hull design can be built for about half the cost as compared to a conventional FPSO hull," said Jae-Eul Kim, HHI Senior Vice President, Shipbuilding Division. "In the current difficult energy market, the competitive Ready-to-



Convert FPSO hull, with AIP from ABS, offers a practical approach to floating production units - enabling stakeholders to take confident financial investment decisions.”

ABS and HHI worked together with the objective of developing a technically feasible and class compliant FPSO hull design, using the latest technologies while maintaining high safety standards. The ABS AIP

demonstrates the design substantially complies with Class and Regulatory requirements, giving regulatory agencies and other key stakeholders confidence in the design.

The design basis is storing 2 Mbbbl of crude oil in the barge-shaped hull, applying mainly shipbuilding standards, and combining offshore production facility features, such

as a 25-year lifetime without drydocking, and structural reinforcement for Topside structure installation.

ABS has been the preferred classification organization for the offshore and energy industry for more than 60 years. ABS applies its experience and knowledge to support members and clients involved in oil-related projects, including floating production units.



## MacGregor acquires Rapp Marine to strengthen its offering for the fishery and research segment

MacGregor has signed an agreement to acquire Rapp Marine Group (RMG) in order to strengthen its offering for the fishery and research vessel segment. MacGregor's existing portfolio includes already various deck handling equipment, such as cranes and booms, but with RMG, MacGregor is able to offer complete solutions with advanced winches and related control systems. The enterprise value of the acquisition was approximately EUR 16 million.

“We are happy to join forces with MacGregor and be part of the company. The agreement will benefit the niche customer base, which will be now offered a wider portfolio of safe and efficient equipment from one provider to their specific vessels,” said Terje

Amesen, CEO of RMG.

“I am happy to see that Rapp Marine Group, under our five years of ownership, has developed to become a global leader in providing winches and related equipment to fishery and research vessels. Many of these projects have been developed and delivered in close cooperation with MacGregor Triplex, and as such I am convinced that the positive development in RMG will continue under Macgregor's new ownership,” said Bjørn Hesthamar, managing partner in Nord Kapitalforvaltning,



the PE-company now selling RMG.

The results of RMG business will be consolidated in MacGregor business area results once the transaction has been completed which is expected during the first quarter of 2018.



## Aqua-Tools to provide free training and support with every B-Qua ballast water monitoring solution

Shipowners, test labs, ballast water manufacturers and Port State Control Authorities that use aqua-tools' B-QUA rapid ballast water monitoring kit can now benefit from a year's free training and support.

The full scope of services that aqua-tools will provide with its ATP 2GTM technology includes full web-based and in-field training for technicians, engineers and crew; the issuance of training reports and certifi-

cates; recommendations for optimum ballast water sampling; regulatory updates and scientific studies relating to ballast water treatment and analysis; along with comprehensive reports on the efficacy of the installed ballast water treatment plant.

Carine Magdo, aqua-tools' Business Development Manager, said “To help our customers develop greater understanding of the complexities involved in the different methods



available for ballast water sampling, monitoring and analyses, we can now offer free in-field and online training courses provided by internal and external ballast water treatment experts.”

The traditional method for monitoring ballast water – microscopy – needs highly sophisticated equipment, skilled observers, and a relatively long timescale to obtain results. As a result, there has been an emphasis on indicative methods, such as aquatools’ rapid ATP 2GTM technology, which is a less complicated but similarly effective method for use by ships’ crew, shipping agency personnel and Port State Control

inspectors.

These tests do not rely on an accurate count of the various organisms but instead rely on indicators to assess biomass and/or viability, thus providing a quick indication of compliance or non-compliance with BWMC discharge standards.

Typical indicative analysis methods include adenosine triphosphate (ATP), which detect the amount of cellular energy, pulse amplitude-modulation (PAM) methods, which rely on the natural auto-fluorescence properties of the chlorophyll-protein complex present in algal cells, and fluorescein diacetate (FDA) methods, which variously use FDA stain to

measure enzymatic activity.

The training and support procedures aquatools has implemented is intended to help the industry implement ATP-metry technology (sampling, analytical protocols, interpretation, microbiological mapping, etc.) to best fit a company’s specific needs.

The France-based water specialist can also advise companies that specialise in developing new eco-friendly solutions for disinfecting water and other fluids to help them identify the most active compounds and determine dose-response curves for managing biological contamination.



## 현대미포조선, 새해 첫 선박 인도

현대미포조선은 지난 1월 4일 모나코 스킨피오(SCORPIO)로부터 2015년 8월 수주한 51,000톤급 PC선에 대한 인도식을 가졌다고 밝혔다. 새해 들어 처음으로 열린 이날 행사에는 현대미포조선 및 선주·선급 관계자가 참석해 새로운 선박의 탄생을 축하하고 안전 항해를 기원했다.

별도의 명명식 없이 선주사에 의해 ‘STI 에스레스(ESLES) II’라고 이름 붙여진 이 선박은 길이 183.3m, 너비 32.2m, 높이 19.1m의 제원을 갖추고 있으며, 인도식 후 첫 선적품을 싣기 위해 말레이시아로 출항했다.

1970년 모나코(Monaco)에 설립된 스킨피오

사는 167척(클락슨 기준)의 선대를 운용 중에 있으며, 지금까지 42척의 선박을 현대미포조선에 발주해 깊은 신뢰를 보내고 있다.

한편, 현대미포조선은 이 선박을 비롯해 1월 한 달 동안 모두 10척을 시작으로, 2018년 한 해 동안 모두 42척(PC선

26척, LPG운반선 8척, LEG운반선 4척, LNG 병커링선 1척, 로팍스선 1척, RO-RO선 1척,



벌크선 1척)의 선박을 인도할 계획이다.



## 한국선급, 원스톱 선대 관리 프로그램 ‘e-Fleet V2’ 출시

한국선급(KR)은 원스톱 선대 관리 프로그램인 ‘KR e-Fleet’ 2차 버전 개발을 완료하고 서비스 제공에 들어갔다고 밝혔다. 지난 2011년 3월 개발된 한국선급의 KR e-Fleet 프로그램은 선박검사 준비사항, 검사 및 국제협약 심사 관련 정보, 특정 선박 검사이력과 같은 주요정보를 선사들에게 실시간으로 제공해왔다.

이번에 새롭게 출시된 KR e-Fleet V2는 기존 버전의 기능을 더욱 향상시키는 물론 보다 다

양한 콘텐츠 탑재와 온라인 기반의 서비스를 강화해 사용자 편의성을 극대화했다. 주요 기능으로는 온/오프라인 검사신청서를 통합해 제공하고, 선박 및 회사 심사의 온라인 신청 기능을 추가해 선사는 선박의 검사와 심사 관리를 한곳에서 효율적으로 할 수 있도록 했다. 또한 선사가 보유한 선박들의 효율적 관리를 위해 선사별 전체 선박에 대한 검사 관련 정보를 제공하는 서베이 플래너(Survey Planner)기

능이 새롭게 추가됐다. 이외에도 올해 1월부터 시행되는 EU MRV 규제에 발 맞추어 온실가스 모니터링 계획서를 작성하고 한국선급으로부터 검증까지 받을 수 있는 플랫폼을 구축해 선주의 편의를 극대화했다.

온실가스 모니터링 계획서는 유럽연합(EU) 항만에 출도착하는 5,000GT 초과 선박이 필수로 제출해야하는 보고서로 이산화탄소 배출량에 대한 모니터링 및 보고 절차 등을 담고

있다. EU MRV 영향을 받는 선박을 보유한 전 세계의 선주들은 한국선급과 같은 EU 공식 검증기관의 검증을 받아 유럽연합 집행위원회

(EC)에 보고해야 한다. 한국선급 관계자는 “앞으로도 고객 편의와 효율적 선대관리를 위해 KR e-Flag 프로그램을

지속적으로 향상시킬 예정이며, 미주 및 유럽지역 한국선급 고객들을 위해 2018년 상반기 내 클라우드 서버를 구축할 계획”이라고 말했다.



## 한국수출입은행-한국무역보험공사 손잡고 해외프로젝트 수주지원 강화

한국수출입은행은 지난 1월 22일 한국무역보험공사와 ‘해외프로젝트 수주 및 일자리 창출 지원을 위한 업무협약서’를 체결했다. 이번 협약은 세계경기 침체 지속으로 수주가 위축된 상황에서 국내 기업의 해외 프로젝트에 대한 정책지원을 강화하기 위해 마련됐다.

양 기관은 사업 초기단계부터 두 기관의 프로젝트 정보를 상세히 공유하고 금융지원에 협

력하기로 했다. 또한 중소기업이 프로젝트에 참여해 양질의 일자리를 창출하거나, 국산 부품과 기자재 사용비중이 높은 사업에 대해선 우선 지원을 통해 정책재원의 효율성을 높이기로 했다.

최근 해외프로젝트 규모가 대형화되고 있는 점을 감안해 민간 재원의 활용도도 끌어올리기로 했다. 한편 이번 협약을 실효성 있게 이

행하기 위해 임원급이 참석하는 협의회를 정례화하는 등 긴밀한 협력을 약속했다.

한국수출입은행 관계자는 “국내 기업의 해외 대형프로젝트 수주를 위해 양 기관 협력이 어느 때보다 절실한 상황에서 이번 협약이 체결됐다”면서 “이를 계기로 우리 기업 수주경쟁력이 한층 제고될 것으로 기대된다”고 말했다.



## 삼성중공업, 2019년 흑자 전환 다짐

삼성중공업 남준우 사장이 2018년 수주목표 달성과 2019년 흑자 전환에 대한 의지를 밝혔다. 남 사장은 지난 1월 16일 대한상공회의소에서 열린 기자간담회에서 “2019년에는 매출이 7조원 수준으로 회복되고 흑자 전환을 이룰 것”이라고 말했다.

삼성중공업은 2019년 흑자 전환의 배경으로 수주 실적 개선에 따른 매출 증가와 그에 따른 고정비 부담 감소, 고부가가치 특수선 수주 증가에 따른 수익성 개선, 해양플랜트 분야의 독보적인 경쟁력, 인력 구조조정을 비롯한 지구노력 지속 등을 강조했다.

남 사장은 “올해는 업황 개선에 힘입어 82억 달러 수주가 예상된다”면서 “LNG선과 셔틀탱커 등 적정 이익 확보가 가능한 선종의 수주가 늘어나면서 수익성도 개선될 것”이라며, “2019년부터 적용되는 선박평형수 규제와 2020년에 적용되는 황산화물 규제가 앞으로 대규모 선박발주를 이끌어 내는 촉매제가 될 것”이라고 말했다.

삼성중공업은 지난 2015년 이후에도 대형 해양플랜트를 지속적으로 수주하며 설계, PM 분야의 인력 규모를 유지해 왔으며, 리스크 관리 능력이 확대됨에 따라 수익성 확보가 가능해 졌다. 이는 해양플랜트 발주가 예정된 북해, 서아프리카, 호주 등지에서 두각을 나타

내고 있기 때문이다.

삼성중공업은 국내 경쟁사의 2배 규모인 1,100여명의 해양플랜트 설계 인력을 보유하고 있으며, 2011년 Shell의 프렐류드 FLNG 프로젝트를 시작으로 지난 7년간 7건의 대형 해양공사를 연속적으로 수행하며 경험과 역량을 축적해 왔다.

특히 삼성중공업은 과거 해양플랜트 건조 과정에서 겪은 시행착오를 바탕으로 ‘Lessons Learned’ 시스템을 구축했으며, 이를 통해 입찰 단계에서부터 공사 수행 각 단계별 예상되는 리스크를 사전에 파악하고 개선 방안을 마련하는 등 리스크 관리에 획기적인 전환점을 마련했다.

삼성중공업은 가혹한 해상 작업 환경과 환경보호 제약 등으로 인해 트랙레코드가 신규 수주의 가장 중요한 기준이 되는 북해 지역에서 2000년 이후 발주된 23개 프로젝트 중 10개를 수주하며 43%의 압도적인 시장 점유율을 기록하고 있다.

또한 국내 3사 중 유일하게 서아프리카 지역에 현지 제작장을 보유하고 있어, Zabazaba FPSO, Shell Bonga Southwest FPSO 등의 공사 수주 경쟁에서 유리한 고지를 점하고 있다.

호주 지역에서도 삼성중공업은 익시스 가스



플랫폼과 Shell 프렐류드 FLNG를 성공적으로 인도한 바 있으며, 이러한 실적을 바탕으로 현재 코노코필립스 개발하고 있는 Barossa 필드의 가스 FPSO 원청 계약자 입찰에 국내 3사 중 유일하게 초청받는 등 시장에서 선도적인 위치를 차지하고 있다.

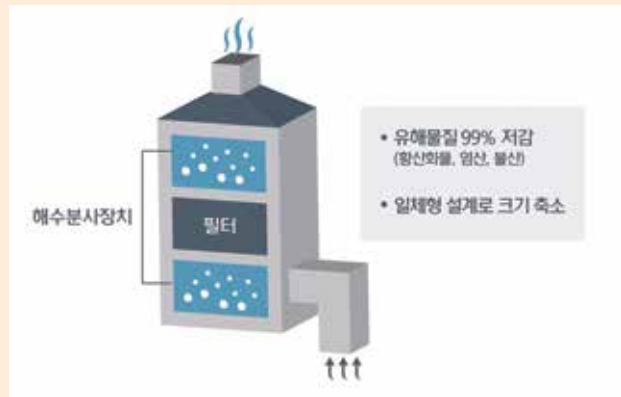
## 현대중공업, 친환경 선박 기술로 활로 찾는다

현대중공업은 최근 '배기가스 세정설비(Scrubber)'에 대한 실증 평가를 성공리에 마쳤다고 지난 1월 3일 밝혔다. 이 설비는 선박 엔진의 배기가스를 물로 세척해 황산화물과 염산, 불산 등의 유해물질을 최대 99%까지 제거하는 친환경 장치다.

국제해사기구(IMO)는 2020년부터 황산화물 배출량을 현행 3.5%에서 0.5%로 제한하는 '선박 대기오염 방지 규칙(Marpol Annex VI)'을 시행하는데, 이를 충족하기 위해서는 배기가스 세정설비를 장착하거나 LNG 등 친환경 연료를 써야 한다.

현대중공업이 개발한 세정설비는 현재 시장을 독점하고 있는 유럽 업체들의 제품과 동일 수준의 성능을 가지면서도 일체형 설계를 통해 크기를 약 35% 줄인 것이 특징이다. 현대중공업은 환경 규제로 시장 수요가 크게 늘 것으로 예상되는 배기가스 세정설비 시장을 공략하기 위해 2016년 5월 개발에 착수해 19개월 만에 최종 실증 평가까지 마쳤다.

현대중공업은 배기가스 세정설비와 함께 대표적인 엔진 친환경 설비인 '질소산화물 저감장치(SCR, Selective Catalytic Reduction)'에 대해서도 독보적인 기술력을 갖추고 있다. 지난 2012년 중형엔진용 저감장치를 개발한데 이어, 2016년 대형엔진용도 개발해 세계에서 유일하게 모든 중대형 선박의 질소산화물 저감장치를 생산할 수 있으며, 현재까지 500여기를 수주하는 성과를 거뒀다. 이와 함께 현대중공업은 LNG를 연료로 사용해 황산화물과 질소산화물 등 오염물질 배출량을 대폭 줄일 수 있는 LNG추진선을 잇달아 개발하며 친환경 선박 시장을 선도하고 있다.



현대중공업이 자체 개발한 선박용 '배기가스 세정설비' 개념도

현대중공업 관계자는 "질소산화물 저감장치에 이어 배기가스 세정설비까지 개발함으로써 큰 폭의 성장이 예상되는 친환경 엔진 설비 시장을 선점할 수 있게 됐다"며 "친환경 설비에 대한 R&D를 지속적으로 확대해 나갈 것"이라고 말했다.

## 머스크-IBM, 블록체인 합작법인회사 설립 추진

A.P. 몰러-머스크(A.P. Moller Maersk)와 IBM은 블록체인 기술을 활용, 국제 무역의 효율성과 안전성을 강화할 합작법인회사(조인트벤처, JV)를 설립할 계획이라고 밝혔다. 이번 합작법인은 글로벌 해운 생태계 전반에 적용할 수 있는 국제무역 디지털 플랫폼을 공동 개발, 제공해 화물의 국경 및 무역 구간 운송에 보다 단순화된 절차와 함께 투명성을 제고할 전망이다.

양사는 해당 플랫폼에 블록체인과 더불어 IBM 서비스가 제공하는 인공지능(AI), 사물인터넷(IoT), 애널리틱스 등 클라우드 기반 기술을 활용, 디지털 솔루션을 통해 국경 간 화물의 이동 및 추적이 가능하도록 지원할 예정이다. 이 같은 신규 기술들은 제조사, 해운사, 포워딩 업체, 항만터미널 운영사, 화주 및 세관 등 관련 업계와 기관들을 넘어 고객들에게

까지 광범위한 혜택을 제공할 예정이다. 신규 합작법인의 이사회 의장직을 수행하게 될 빈센트 클릭(Vincent Clerc) 머스크 라인 최고상업책임자(CCO)는 "이번 신규 합작법인은 머스크의 세계 무역 디지털화 선도 전략에 있어 매우 중요한 이정표"라며 "개방·중립적인 디지털 플랫폼은 안전하면서도 간편한 방법으로 정보교환이 가능해 막대한 성장 가능성을 지니고 있으며, 공급체인에 관련된 모든 산업에 혜택을 제공할 것"이라고 말했다.



덧붙여 그는 "머스크가 보유한 무역 전문성에 IBM이 제공할 블록체인 및 기업 기술 역량이 합쳐져 장차 세계 무역에 의미 있는 변화를 이끌어 낼 것으로 자신한다"고 밝혔다.



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# Global shipbuilding market on solid path to recovery

- Korean shipyards sharpening their competitive edge to win new orders



*Global newbuilding orders stood at 23.20 million CGT with 890 vessels last year, according to the data published by Clarkson. In 2018, the figure is expected to reach 23.22 million CGT, an increase by almost 80% from the level set in 2016. That still remains below the level recorded before 2015. Global newbuilding orders are expected to recover to 37.80 million CGT, the 20-year average, only after 2020.*

*Korean shipyards are expected to face a hardship this year. Among others, the decline in order backlog which arises from the order drought last year is likely to have the most serious impact. Usually, it takes about 2 years before a vessel is built. Even after*

*an order is received, preparatory works continue for several months. By the nature of shipbuilding industry, flat new order intake leads to lack of works for the forthcoming 1 to 2 years.*

*Global order backlog edged upward to 77.48 million CGT in December 2017, compared to the level recorded in late November (76.18 million CGT), but is not sufficient to resolve the lack of order backlog as a consequence of decline in new orders over the last few years. Although the order backlog of Korean shipyards increased slightly to 16.25 million CGT, the residual backlogs are equivalent to only 1 year of works which makes additional orders urgent.*



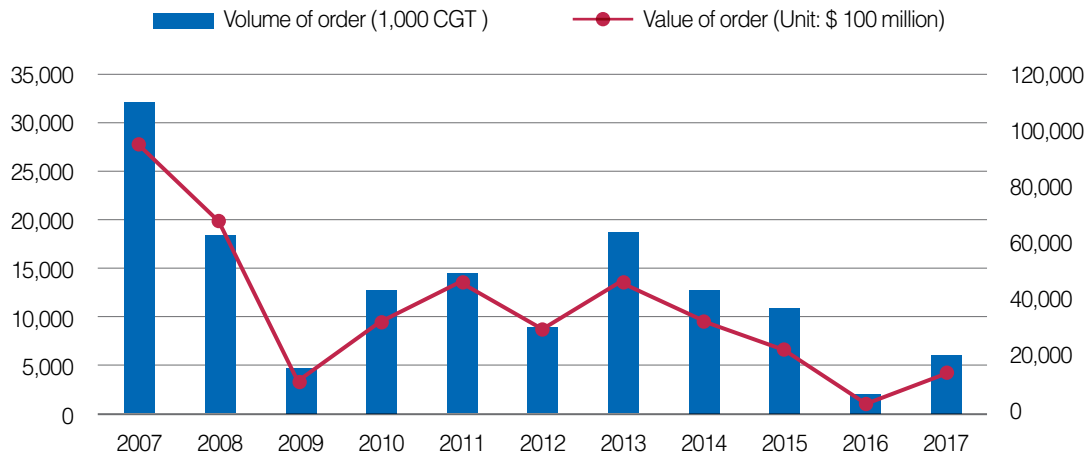


Figure 1. Quantity and value of newbuilding orders at Korean shipyards (Source: Clarkson)

The quantity and value of global newbuilding orders increased by 67.0% (19.51 million CGT) and 54.0% (USD 53.4 billion), respectively, year-on-year for the period between January and November last year. The Clarkson newbuilding price index hit 125 points at the end of December last year.

In the same period, quantity of new orders at Korean shipyards stood at 5.74 million CGT, an increase by 265.5% compared to the same period of the previous year while the value of new orders at Korean shipyards rose 334.8% year-on-year to USD 14.26 billion.

The prospect for a rebound in global new orders has been bolstered by positive factors such as a turnaround in global shipping market conditions, favorable investment conditions with low newbuilding prices. However, some experts take a pessimistic view in light of the wait-and-see attitude towards Sox regulations and uncertainty over international oil prices.

The shipbuilding industry expects that the newbuilding order placement will increase by about 27% from the previous year. Nonetheless, the anxiety is unlikely to be dissipated in the shipbuilding market over the decline in shipbuilding volumes and exports in the face of diminishing order backlogs that have remained persistent over the last few years.

However, there is a mounting expectation for rebound in new orders for eco-friendly vessels, gas carriers, ultra-large containerships, etc., which are the flagship products of Korean

shipyards.

Particularly, the shipbuilding order placements by ship owners are expected to gather pace from this year in the midst of the increase in new orders for eco-friendly vessels and rise in the volumes of containerships scrapped over several years. Specifically, the growth in the export cargo traffic of the United States has raised expectations for large-scale shipbuilding orders, particularly, in the LNG carrier segment. As the oil prices bottomed out in the first half of last year, there has been an air of expectancy that new order placement for offshore plants will increase. In addition, conditions are turning favorable for order placement by global oil giants, including the BP, as the offshore project development costs have been reduced due to streamlined production facilities in the development of the blocks. Clarkson Research predicted that new order volumes for offshore plants would reach as high as USD 16 billion this year on the back of higher oil prices and lower development costs.

### Diversification of vessels in orderbooks

The growth in new orders at Korean shipyards was very steep last year, compared to that in global new orders. However, new order intake remained only 56% of the volumes of vessel built last year. According to the data published by Clarkson, Korean shipyards' orderbooks dominated excessively by tankers in 2016 began to be diversified in



2017 in terms of the types vessels ordered.

Tankers, such as oil tankers and product carriers (PCs), the flagship products, still comprise as high as 47% of all vessels on the orderbooks in the midst of sustained low oil price. However, the proportion of tankers fell below 55% recorded last year. Volumes of new orders for oil tankers jumped 218% from 2016, while those of new orders for product carriers soared 117% from 2016. Volumes of new orders for LNG carriers, which comprise the second largest proportion of all vessels on orderbook, skyrocketed 115% from 2016. The share of LNG carriers in all vessels ordered fell from 28% to 16%. In containership segment where order was dried up completely in 2016, about 20 units were ordered last year, including 15 units of ultra-large containerships and 6 units of

small-sized containerships last year, which accounted for approximately 18% of all vessels ordered.

Particularly, the proportion of bulk carriers increased to about 14%, the first double-digit figure after 2013, when the very large ore carrier (VLOC), a kind of bulk carrier, was ordered by Brazilian company Vale S.A. to carry iron ore from Brazil over the long-term.

### Persistent decline in order backlog

Last year, new orders at Korea shipyards more than doubled from the previous year's level. However, that represents no more than half of annual new order intake (11,551,706 CGT) registered from 1996 to 2016. Korean shipyards are still struggling. Usually, it takes about 2 years before a vessel is

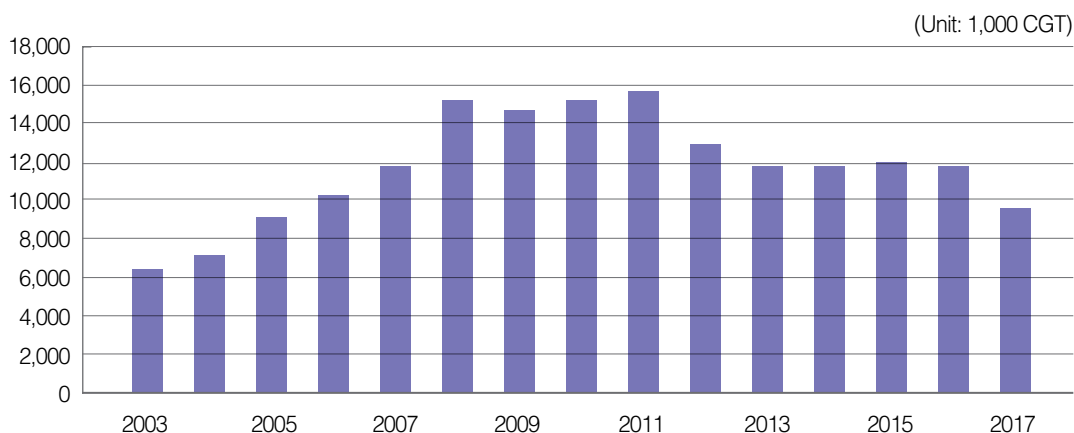


Figure 2. Trends of volumes of vessels built by Korean shipyards (Source: Clarkson)

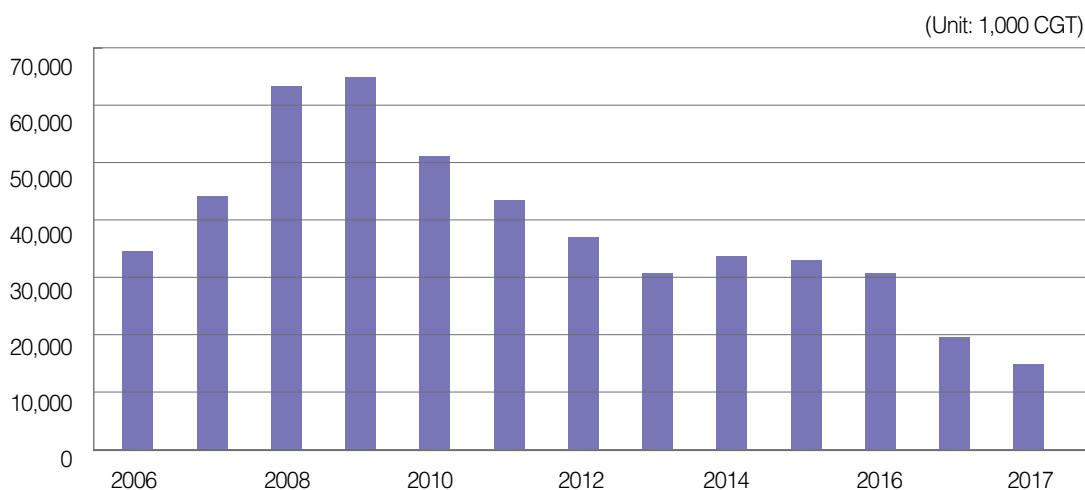


Figure 3. Trends of order backlogs of Korean shipyards (Source: Clarkson)



built. Even after an order is received, preparatory works continue for several months. By the nature of shipbuilding industry, flat new order intake leads to lack of works for the forthcoming 1 to 2 years. That is exactly the situation facing the shipyards.

Order backlogs of Korean shipyards have plunged from 2016. As of December 2017, Korean shipyards have a combined order backlog of 15.79 million CGT which represents a decrease by 23.0% from the end of 2016. Primary contributor to the diminishing order backlog is the still sluggish new order intake that remains no more than 60% of the volumes of vessels built despite significant rebound in 2017. Current order backlogs are equivalent to about 1.3 years of works. Cumulative volumes of vessels built from January to November 2017 stood at 10.24 million CG, a decrease by 12.7% from the previous year's level. As the volumes of vessels built continue its downward trend, the decline in order backlogs is expected to slow down. Meanwhile, ship exports increased sharply last year, compared to the previous year's level, amid delivery of offshore plants despite the decrease in the volumes of vessels built. Order backlogs of domestic small and medium-sized shipyards plummeted. STX Offshore & Shipbuilding (STXOS) has seen its order backlogs sliding from 20 vessels in late 2016 to 9 units currently.

Sungdong Shipbuilding & Marine Engineering (SSME) also saw a fall in its order backlog plunging to 5 vessels from 28 units during the same period. If those companies fail to win additional orders, their order backlogs are likely to be dried up next year. However, the creditors indicated that they would make decision after consultation in the beginning of the next year. Those uncertainties overshadow the prospect of additional orders at those two companies.

### Greater competitiveness vital for winning new orders

Korea's three shipbuilding heavyweights need to strengthen their competitiveness based on cost reduction so as to maintain order backlogs at stable level. Currently, the newbuilding prices of VLCCs (Very Large Crude Carriers), LNG carriers, ultra-large containership, etc., the flagship products of Korean shipyards, have fallen below the levels set in 2015. According to Clarkson, newbuilding prices of VLCC stood at USD 81 million in late November 2017 which represents a decrease by 4.7% from 2016 while newbuilding prices of LNG carriers slid roughly 8% from the previous year's level to USD 182 million apiece. In the meantime, newbuilding prices for ultra-large containership with a capacity of over 13,000 TEU dipped about 1% from the previous year's level to USD



108 million apiece.

This year, Korean shipyards are expected to face difficulty in sharpening their competitive edge amid the rise in the prices of steel plates and foreign exchange rate which determine the manufacturing costs of vessels. Steel plate refers to thick plate with a thickness of over 6mm, which is used in the construction of vessels and accounts for 10-20% of aggregate manufacturing costs.

Steel and shipbuilding industries reached an agreement to raise the prices of steel plate in November last year. Steel industry is expected to demand another hike of steel plate prices in the first half of 2018 for reason of rising costs of iron ores.

### **New orders for high value-added vessels hold the key**


There is a widespread opinion that Korea's three shipbuilding heavyweights will experience a severe hardship this year in the face of diminishing order backlogs, retrenchment, risks, rising costs of shipbuilding materials such as steel plates. According to the shipbuilding industry, the three domestic shipbuilding heavyweights have already announced a gloomy outlook for hundreds of billions of deficits for the fourth quarter of the previous year.

Meanwhile, some shipbuilding experts indicate that it is premature to take pessimistic view on Korean shipbuilding industry. Although Korean shipyards were overtaken by Chinese rivals from the mid 2000s in global market share,

Korean shipyards have never been dethroned in terms of average CGT (Compensated Gross Tonnage) per unit of vessels since 1996. This suggests that Korean shipyards are making vessels which are high-priced and technologically advanced. In other words, Korean shipyards have stronger competitiveness in the construction of high value-added vessels.

Chinese shipyards have captured the largest share in global market, but most of vessels on their orderbooks are relatively easy to build. Currently, bulk carriers account for 30% of order backlogs of Chinese shipyards. By contrast, bulk carriers comprises only 6% of order backlogs of Korean shipyards which have filled their orderbooks mostly with technologically advanced vessels such as tankers (46%), LNG carriers (22%), etc. Furthermore, Chinese shipyards are outperformed by Korean shipyards in terms of the ability to deliver vessels in timely manner and build vessels with about 5-10% lower fuel efficiency compared to those built by Korean shipyards.

Korean shipyards are technologically about 4-5 years ahead of Chinese shipyards. In that regard, there is a consensus that Korean shipyards need to develop eco-friendly and ICT convergence technologies to widen technological gap and regain its status as global shipbuilding powerhouse.

In addition, shipbuilding pundits point out that Korean shipyards need to speed up expansion into service sectors such as repair/remodeling of vessels, maintenance of offshore plants, design engineering of plants, etc. 

# FROM THE BRIDGE TO THE BILGE



## Shipbuilding부터 Offshore 시스템까지 모든 조선산업분야에 적용가능한 WAGO의 오토메이션 시스템

- 브릿지에서 기관실까지 모두 포함하는 "Compass" 인증 (BSH)
- 알람 모니터링 시스템, 밸러스트 탱크 및 Cargo 매니지먼트
- 캐빈 오토메이션, 에너지 공급 및 추진 제어
- 이더넷 커뮤니케이션을 위한 Media redundancy

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# WAGO

# Korea's three shipbuilding heavyweights increased annual new order targets for 2018

The three domestic shipbuilding heavyweights set annual new order targets of approximately USD 25 billion for 2018, reflecting recent turnaround in global new orders.

According to shipbuilding industry, the three domestic shipbuilding heavyweights, such as Hyundai Heavy Industries (HHI), Samsung Heavy Industries (SHI), and Daewoo Shipbuilding & Marine Engineering (DSME), have strived to thicken orderbooks and ramp up competitiveness in an attempt to speed up business normalization. The three domestic shipbuilding heavyweights adjusted their respective annual new order targets upward from the previous year's level amid increased expectations for a rebound in shipbuilding market.

Last year, they followed through on the large-scale restructuring, asset disposal, and reorganization of non-shipbuilding units, laying a cornerstone for stronger competitiveness and more stable business management. As a result, they could place greater focus on key business sectors and exceed their new order targets.

For 2018, HHI set an annual new order target of USD 13.2 billion, an increase by 76% from USD 7.5 billion targeted last year. HHI exceeded its annual target of USD 10 billion in 2017. Value of new orders at HHI declined from USD 21.2 billion in 2013 to USD 12.4 billion in 2015 and plunged to USD 5.9 billion in 2016. HHI President Kang Hwan-goo



said, "We will face unprecedentedly serious challenges this year. This year's slogan, 'Hyundai Spirit, Break through the Crisis', reflects our indomitable resolution to overcome crisis."

SHI set an annual new order target of USD 7.7 billion for 2018, an increase by about 18% from the previous year's target of USD 6.5 billion. Last year, the value of new orders at SHI stood at USD 6.9 billion, exceeding its annual new order target. SHI President Nam Joon-woo said in the New Year address, "We have been empowered by the company with a legacy dating back 43 years and its employees to

bring the business back to normal and pave the way for another giant leap forward." He went on saying, "We have to use every possible means to strengthen our cost competitiveness vital for thickening the orderbooks in our efforts to overcome crisis."

DSME, which recorded USD 3 billion in new orders last year, doubled its annual new order target from the previous year's USD 2 billion to USD 5 billion. DSME President Jung Sung-rip stressed the streamlined management focusing on new growth engines, revenue and quality to overcome challenges this year, saying, "It won't be

easy to keep the balance in the black in light of the business environment this year”.


The upward adjustment of more than 30% in new order targets set by the three domestic shipbuilding heavyweights was driven by the positive signs that new orders for newbuild vessels are very likely to rebound from this year amid stabilization of international oil prices, increased volumes of vessels scrapped, environmental regulations, etc.

Meanwhile, the international oil price is expected to remain stable in the range of USD 60 this year in the wake of the extension of the agreement on reduc-

tion of oil output by OPEC (Petroleum Exporting Countries). As a result, the demand for offshore plants or drillship, et., is expected to increase. In addition, the IMO(International Maritime Organization) regulation that imposes lower global cap on sulphur emissions from ships, taking effect in 2020, is expected to accelerate commercialization of LNG-fuelled vessels. Particularly, the three domestic shipbuilding giants which have excellent technologies for LNG-fuelled vessels are expected to show strong performance in this segment.

According to Clarkson, Chinese shipyards won new orders amounting to

9.19 billion CGT (426 vessels) last year, dethroning Korean shipyards that registered 6.45 million CGT (176 vessels). Value of new orders at Chinese shipyards and Korean shipyards stood at USD 15.5 billion and USD 15.3 billion, respectively, which shows a narrow gap. Value of new orders at Japanese shipyards amounted to no more than USD 3.2 billion.

For variation in new order intake, Korean shipyards saw their combined new orders increased by 198.6% year-on-year in 2016, the largest increase, followed by Chinese shipyards (86.0%) and Japanese shipyards (13.7%). 

### ABS Awards AIP for Innovative Very Large Ethane Carrier Concept

ABS granted Approval in Principle (AIP) for a new very large ethane carrier (VLEC) concept developed by Hudong-Zhonghua Shipbuilding (Group) Co., Ltd.

“As demand for different types of liquefied gases increases, concepts like this will expand the infrastructure and enable more efficient transportation to get products to market,” said ABS Vice President for Global Gas Solutions Patrick Janssens. “Awarding Hudong-Zhonghua Shipbuilding this AIP is another example of ABS’s commitment to promoting concepts that drive safer and more sustainable shipping.” The novel VLEC is equipped with a specialized membrane cargo containment system suited to carry liquid gas cargoes such as ethane and propane.

Designed with a minimum cargo temperature of -94°C, the concept supports a low cargo boil-off rate. Distinct features of the design include multiple cargo re-liquefaction lines to liquefy vapor gas, a powerful cargo handling system that maintains a stable tank pressure and a Selective Catalytic Reduction (SCR) system that supports compliance with MARPOL Tier III and USCG requirements for non-US Flag vessels operating in the U.S.

“We chose ABS because of their extensive experience in gas-related projects and their leading position in very large gas carriers,” said Hudong-Zhonghua Shipbuilding Vice President Jin Yanzi. “We are pleased to receive this approval from ABS which validates our early design work and helps us advance this concept.”

ABS provides industry leadership, offering guidance in liquefied natural gas (LNG) floating structures and systems, gas fuel systems and equipment, gas carriers, and regulatory and statutory requirements. ABS has extensive experience with the full scope of gas-related assets and has been the classification organization of choice for some of the most advanced gas carriers in service.



# Part-Load Optimisation Tuning Method Proves Popular

Part-load optimisation delivers significant fuel savings for MAN auxiliary engines

MAN Diesel & Turbo has announced that its Part-Load Optimisation initiative has rounded 180 orders since its introduction. Part-Load Optimisation is a tuning method that optimises fuel-oil consumption during the part-load operation of four-stroke, small-bore MAN auxiliary engines.

Finn Fjeldhøj – Head of Small-Bore, Four-Stroke Engineering – MAN Diesel & Turbo, said “Part-Load Optimisation works on the principle that fuel consumption is reduced at low and part load at the expense of a higher fuel consumption in the high-load range, without exceeding the IMO NOx limit. We can deliver new engines pre-optimised, or retrofit as necessary. Both Part-Load Optimisation solutions have proved popular with the market to date, as evidenced by this strong demand.”

## Part Load Optimisation

Part-Load Optimisation helps ship-owners to maintain their auxiliary engines in good working order while reducing fuel-oil costs. It is recommended for GenSets that often run at part-loads below 75% MCR (especially the load range from approximately 40 - 65% MCR) and optimises engine performance at 60 - 65% MCR.

It is available for all new Holeby engines and can be retrofitted on all existing engines. The tailor-made ret-

Estimated Fuel-Oil Saving

MAN GenSet	Power range	SFOC reduction
L16/24	450-990 kW	4-5 g/kWh
L21/31	1,000-1,980 kW	4-5 g/kWh
L27/38	1,500-3,150 kW	3-5 g/kWh
L23/30H	650-1,400 kW	4-5 g/kWh


rofit kits cover all components, qualified service fitters and calculations of cost benefit; engine tuning can be executed with a charge-air blow-off valve or waste gate.

Part-Load Optimisation delivers fuel-oil savings of, typically, up to 5 g/kWh depending on engine type and load point, and improves the condition of key engine components due to its superior combustion process. The same, relative fuel-consumption savings also apply when applied in combination with an SCR-system for IMO Tier III compliance.

## References

Since its introduction, Part-Load Optimisation has won favour across a broad spectrum of shipping applications, especially medium- and long-



range tankers, and feeder container vessels. The MAN L23/30H GenSet has proved a popular candidate for Part-Load Optimisation, typically @ 65% MCR using the charge-air blow-off valve tuning method. 



# ABB pioneers microgrid solution for installation on offshore platform

**ABB Ability™ enabled microgrid to support Woodside's efforts to reduce carbon emissions and optimize costs.**

ABB will provide Woodside, Australia's largest independent oil and gas company, with a PowerStore™ Battery storage system that is capable of remote management of operations and service.

The system will be installed on the Goodwyn A platform. This innovative ABB solution will contribute to Woodside's 2020 goal of reducing carbon emissions and will help lower cost of operations and maintenance.

The Goodwyn A offshore production platform is located about 135 km northwest of Karratha in Western Australia and has been operating since 1995. The 55,000 ton production facility is more than 290 meters tall and stands in a water depth of 131 meters.

The platform combines production, re-injection, utilities and accommodation facilities. Dry gas and condensate from surrounding reservoirs is transported via a network of pipelines to Goodwyn A and then sent on-shore to the Karratha Gas Plant for processing. Goodwyn A is designed for up to 30 production wells, including five re-injection wells, and has a daily production capacity of up to 36,000 tons of gas and 11,000 tons of condensate.

ABB's containerized, plug-and-play ABB Ability PowerStore battery stor-



age system will support Goodwyn A's existing gas turbine generators. The battery will replace one of the six existing gas turbine generators and will also reduce the need for using the emergency diesel generator. Short term backup will be provided via the new battery energy storage system incorporated within the microgrid, to provide a 'spinning reserve'. A dedicated ABB Ability Microgrid Plus control system will act as the brain of the solution and it will also be possible to remotely operate the microgrid if the need arises or the platform has to be de-manned for any reason.

"We are pleased to partner with Woodside on pioneering a PowerStore Battery energy solution for offshore oil and gas, which will reduce environ-

mental impact and optimize costs" said Massimo Danieli, head of ABB's Grid Automation business within the company's Power Grids division.

"Microgrids and energy storage are key focus areas of our Next Level strategy and this innovative solution reinforces ABB's position as a partner of choice in enabling a stronger, smarter and greener grid."

ABB is a pioneer in microgrid technology with over 40 such global installations, across a diverse range of applications serving remote communities, islands, utilities and industrial campuses. 15 of these solutions are in Australia. 

# Exciting new shuttle tanker concept with Wärtsilä solutions creates optimal economic and environmental performance

A new shuttle tanker concept developed by the world's largest provider of shuttle tanker services; Teekay, in close cooperation with Wärtsilä, will offer a new level of ecological and economic solutions by using Wärtsilä's smart technology in innovative ways.

The concept has been endorsed with orders for four of these 'next generation' vessels for Teekay. The ships will be built at the Samsung Heavy Industries (SHI) yard in South Korea and will feature a very broad assortment of Wärtsilä's latest technology innovations, all of which are central to the concept's overall performance gains. These orders with Wärtsilä, worth in total over 110 MEUR, were booked in December 2017 and January 2018.

The concept offers a new level of economic and ecological performance, and is expected to reduce annual emissions of CO<sub>2</sub> equivalents by more than 40 percent, compared to conventional shuttle tankers. In addition to operating on Liquefied Natural Gas (LNG) as the primary fuel, the dual-fuel engines will also be able to run on a mixture of LNG and recovered Volatile Organic Compounds (VOC)—the gas evaporating from the oil cargo tanks during loading.

By utilising the recovered VOC as fuel rather than venting it to the atmosphere, the harmful emissions will be eliminated and the ships' bunker needs will be sig-



The new shuttle tanker concept creates both economic and environmental benefits for owners.

nificantly reduced. The concept also means that Nitrogen Oxide (NOx) emissions from the engines' exhaust will be reduced by more than 80 percent, Sulphur Oxide (SOx) emissions will be almost entirely eliminated, while particulate emissions will be reduced by more than 95 percent. These environmental benefits are matched by equally important economic advantages, with a significant reduction in fuel consumption compared to conventional solutions.

"Together with Teekay, we have devel-

oped a concept that takes the shuttle tanker sector into a new era, and which is further evidence of Wärtsilä's ability to transform shipping by developing and utilising the very latest technologies. These ships will have tremendous operational flexibility with unmatched manoeuvring capability, and will achieve what all operators are striving for today, namely optimal economic and environmental performance," said Roger Holm, President, Wärtsilä Marine Solutions.

"This new shuttle tanker design will set

new standards for both fuel consumption and CO<sub>2</sub> emissions,” added Terje Rusdal, Project Manager at Teekay.

Wärtsilä solutions are at the heart of this concept. Among the many innovative features is the Wärtsilä Hybrid system, on which the power distribution will be based.


The Hybrid system uses batteries for fuel savings, peak load shaving, and added overall system redundancy. This directly impacts the main machinery, resulting in fewer running hours with correspondingly lower maintenance time and costs.

Wärtsilä's broad scope in enabling this concept also comprises the full electric and automation system, which includes

the Wärtsilä Low Loss Hybrid (LLH) system and batteries, the Wärtsilä LNGPac fuel storage and supply system, the Wärtsilä VOC system for recovering and liquefying the VOC with a storage and supply system, Wärtsilä 34DF dual fuel gas engines, the fuel mixing system with liquid VOC and LNG as the main fuel for the engine, gas turbines to handle the surplus gas, Wärtsilä cargo and ballast pumps and a Wärtsilä inert gas generator. This range of Wärtsilä solutions in a single vessel is indicative of the company's extensive portfolio of products, systems and solutions, which is unmatched in the marine industry.

Also included in Wärtsilä's integrated

solution for this vessel concept is Eniram's Vessel Performance Management system. Eniram, a Wärtsilä company, will provide a data collection platform having the capabilities to optimise the vessel's operations, while also providing the owners with analytics and reporting. The Performance Management system ensures that the full potential of the vessel as well as the fleet, will be utilised.

Shuttle tankers are used for transporting oil from offshore fields to land-based terminals. Their various operational modes present significant challenges in maintaining efficiencies. The new concept has been conceived to overcome such challenges. 

### Ecospeed solves a cruise ship dilemma

Subsea Industries' Ecospeed coating is being presented as a cost-effective, environmentally-safe solution to the problems associated with maintaining cruiseship hulls in a pristine condition.

Cruiseships, particularly when operating in warmer waters, can attract fouling organisms which create a bad impression – not only to passengers and prospective customers but to port operators. From the operator's point of view, fouled hulls increase fuel consumption and thus costs. As hull coatings become worn and damaged, they attract still more fouling, leading to increased time spent in dry dock. Damaged and worn coatings leave hulls and underwater gear susceptible to corrosion, leading to further time spent in dry dock.



Underwater cleaning will help preserve the appearance and performance of these high value ships, but with toxic anti-foulings and foul-release coatings an increasing number of ports will not permit such practices, as they lead to both increased toxins in the water and the risk of introduction of invasive non-native species.

Ecospeed, however, offers a solution to these difficulties. It is durable, smooth, and, above all, non-toxic. Being ultra-strong it prevents corrosion and damage. As it is intended to remain in place rather than wear away, once applied it remains intact for many more years than anti-fouling or foul release coatings. Even underwater gear such as rudders and propellers can be protected – the Ecoshield variant is designed to minimise cavitation damage. If any touch-ups or repairs are needed, these are easily and quickly carried out during routine drydocking.

Importantly, Ecospeed is easily cleaned, and being durable and non-toxic, underwater cleaning can be carried out anywhere with no risk of coating deterioration or increased release of toxins. In fact, the more Ecospeed is cleaned, the smoother it becomes, resulting in significant fuel savings.

Ecospeed's cruise customers are not only experiencing fuel savings and enhancing their public image and environmental credentials – they are able to get their ships out of drydock several days sooner than with similar ships using conventional coatings, resulting in cost savings and increased revenue.



# Navico® Announces Acquisition of Yacht Defined and Investment in HOC Yachts

With this acquisition, Navico continues to solidify its leadership position in vessel integration technologies.

Navico – the world's largest manufacturer of marine electronics and parent company to the Lowrance®, Simrad® and B&G® brands – announced that it has acquired Yacht Defined Sweden AB (Yacht Defined), an international, award-winning, modern and user-friendly technology platform within navigation and digital switching systems.

At the same time, Navico has made an investment into HOC Yachts AB (HOC Yachts), a start-up, high-tech custom boat designer that will be used to showcase and validate Navico and Yacht Defined's developments in marine electronics, digital switching, boat integration and connectivity.

Established in 2016, Yacht Defined offers boaters an intuitive user interface for driving, living aboard and owning a boat. Acting as a central technology hub, the platform provides deep-system integration that delivers navigation display data optimization, remote control of onboard systems and entertainment, and vessel-wide over-the-air system updates, to name a few.

The Yacht Defined system has been developed to deliver boaters the best possible user experience, making boating as intuitive as driving a car. It's also one of the first systems developed specifically with the boat builder

channel in mind, eliminating many of the compromises required when creating products for other sales channels.

A designer of day cruisers and tenders, HOC Yachts was founded in 2014. Focused on

elevating the user experience by producing boats that offer extraordinary unparalleled ease of operation, HOC prides itself on innovative design, using the highest quality components, and implementing groundbreaking technology, such as the Yacht Defined system and the innovative Petestep™ hull technology, to deliver a truly new and innovative boating experience.

HOC Yachts' day cruisers and tenders have already received significant attention and praise in the media after their international launch at the Cannes Yachting Festival and Monaco Boat Show in the summer of 2017.

"We are pleased to welcome Yacht Defined and HOC Yachts to the Navico family," said Leif Ottosson, Navico CEO. "Both of these companies are leading the system integration revolution with dedication to pervasive vessel connectivity and communication technologies, and ushering in a



new age of unparalleled user experience. We look forward to merging their combined know-how with our Naviop digital control and monitoring systems, across our Lowrance, Simrad and B&G product offerings, to bring exciting new solutions to all aspects of the marine electronics marketplace."

"For Yacht Defined and HOC Yachts, we believe Navico is the best industrial partner for the continued development of both our companies and validates that we have been successful in our efforts to drive innovation for the boating community," said Håkan Lindström, co-founder of HOC Yachts.

"We look forward to fully starting commercialization and collaboration efforts with Navico to continue developing new solutions for boaters," added Vilhelm Djurberg, co-founder and CEO of HOC Yachts. 

# Inmarsat adapts Fleet Xpress for offshore support vessels

Move signals intention to provide high-speed broadband services to the energy sector

Inmarsat has launched a new set of Fleet Xpress plans designed specifically to meet the technical and commercial requirements of offshore support vessels (OSVs).

The new plan exploits the technical capabilities inherent to Fleet Xpress, such as high-speed connections and guaranteed performance, to offer vessel operators levels of flexibility that are naturally suited to the demanding requirements of a high-end sector such as offshore support.

It recognises that connectivity needs onboard OSVs change frequently and that swings in data usage are likely to be more pronounced than for conventional cargo ships by accommodating free upgrades and downgrades in service levels during the 36-month contract period.

When on-hire, the appetite for bandwidth from OSVs can be immense. Projects often generate considerable volumes of data that need sending back to shore for analysis, with third-party contractors onboard and an intense working environment. Furthermore, OSV operators also traditionally are generous with crew welfare.

Supported by a 1m antenna, Fleet Xpress for OSVs delivers committed information rates of up to 3Mbps for uploads and 6Mbps for downloads with a standard antenna, climbing to 5Mbps and 10Mbps respectively with an enhanced antenna. When off-hire, a more economic 128kbps/128Kbps

link may be sufficient to keep core operational data exchange ticking over.

This elasticity means that OSV operators can utilise the full potential of Fleet Xpress for the duration of a project and then switch to a narrower 'standby' link between projects, also avoiding early termination costs. A network service device (NSD) manages bandwidth and regulates the flow of data traffic between the vessel and shore. The offer also includes provision for owners to suspend services for up to 180 days, subject to equivalent contract term extension.

"The global footprint of Fleet Xpress means OSVs can count on reliable connectivity wherever in the world they are deployed," said Eric Griffin, VP Maritime, Offshore Energy and Fisheries, Inmarsat. "Unlike conventional VSAT installations, Fleet Xpress is designed for seamless global mobility and automated satellite and beam switching, supported by the added resilience of unlimited FleetBroadband back-up. Inmarsat satellites are supported by redundant land-based infrastructure to ensure network availability, as defined in the service level agreements that form part of a subscription."



In addition, the new set of OSV plans can be used in conjunction with new hardware from existing terminal manufacturers that will provide a dual antenna solution to minimise outages caused by line of sight blockages, a common occurrence for OSV vessels due to their proximity to rigs and operating in high seas. This will be managed by a single antenna control unit that will handle the service and seamless switching between antennas.

"The connectivity requirements of offshore support vessels place unique demands on satellite operators. Successful and timely completion of a contract is increasingly dependent on a highly resilient, high-capacity data link. The technology behind Fleet Xpress has the capacity to meet these demands and our new plan sets a precedent in joining the dots between the technical requirements and commercial realities of OSV operation and highlights how Fleet Xpress can be used in the energy sector," said Griffin. 




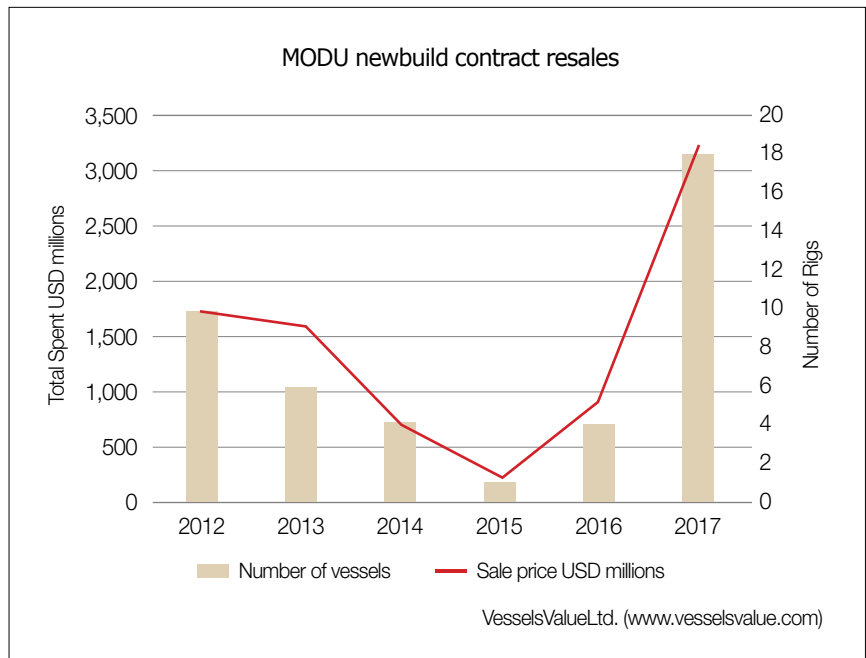
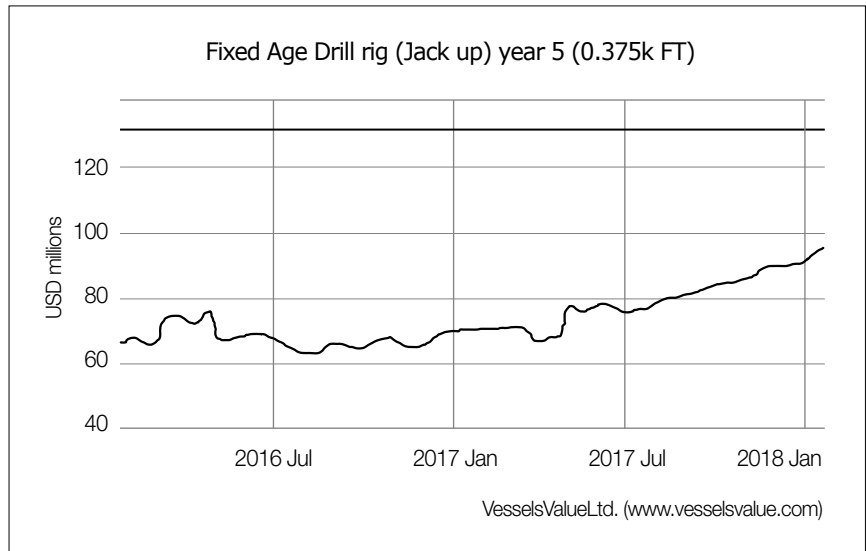
# Shipbuilding Market Resource

## Jack Up Values Increase 36% in One Year

Rising oil prices have drawn more eyes to the offshore markets. There are signs of green shoots after a period of depressed sentiment that started in late 2014, pushing asset values downwards through 2016. VesselsValue's Fixed Age Values for a 5 year old Jack Up Rig has increased 36% from Jan 2017, when a vessel was worth \$69.9 million, to \$95.14 million today.

E&P spending should start to increase now that oil prices have shown a sustained period of strength, increasing demand for offshore equipment. Much of the spending will be directed to onshore exploration, but a portion will be directed at easily accessible offshore projects. This should benefit jackup rigs first before a market rebound for deepwater assets (Drillships and Semi-Subs).

The increase in oil prices is driving speculative interest in the market for Jackup rigs, and has helped boost the values of these units. While no new MODU newbuilding orders have been placed since July 2015, the resale market for Jack Up Newbuilds has increased over 2017. 18 newbuild rig contracts were resold, compared to a total of 25 resold in the 5 years previous. The majority (86%) of these resales since 2012 have been Jack Up rigs, with only a handful Semi-sub rigs or Drillships. 



# 한국 대형 조선3사 올해 수주 목표 상황

조선3사가 최근 글로벌 수주 회복세를 반영해 올해 수주목표를 약 250억 달러로 정했다.

조선업계에 따르면 현대중공업, 삼성중공업, 대우조선해양 등 한국 대형 조선3사는 올해 일감 확보 및 원가경쟁력 강화 등으로 경영 정상화에 속도를 내고 있다. 이들 3사는 올해 수주목표를 작년보다 높게 잡았다. 이는 조선 경기 회복에 대한 기대감이 커지고 있기 때문이다.

조선3사는 지난해 대규모 구조조정과 자산 매각, 비조선 부분 등을 정리함으로써 수주 경쟁력 강화 및 경영 안정화를 마련하는데 성공할 수 있었다. 이를 통해 핵심 사업부문에 집중할 수 있게 되었고, 수주 목표를 초과 달성하는 성과를 거뒀다.

조선사별로 보면, 현대중공업은 2018년 수주 목표를 132억 달러로 잡았다. 이는 지난해 75억 달러보다 76% 증가한 규모다. 현대중공업은 2017년에 수주액 100억 달러를 넘기며 목표를 초과 달성했다. 현대중공업의 수주액은 2013년 212억 달러에서 2015년 124억 달러로 감소했으며 다음해인 2016년에는 59억 달러로 줄어들었다.

현대중공업 강환구 사장은 “올해는 지금까지 우리가 한 번도 겪어본 적 없는 엄중한 상황에 직면하게 될 것으로 보인다”며 “위기 극복의 굳은 각오를 담아 올해 경영 슬로건을 ‘현대정신, 위기돌파’로 정했다”고 말했다.

삼성중공업은 2018년 수주 목표를 지난해 목표액인 65억 달러보다 약 18% 늘어난 77억 달러로 정했다. 삼성중공업의 2017년 수주액은 69억 달러로 목표액을 넘어선 바 있다. 삼성중공업 남준우 사장은 신년사를



통해 “43년 역사의 회사와 임직원들로부터 경영을 정상화시키고 재기의 발판을 마련하라는 준엄한 사명을 받았다”면서 “위기 극복을 위한 일감 확보를 위해서는 모든 방법을 동원해 원가 경쟁력을 높여야 한다”고 강조했다.

지난해 30억 달러를 수주한 대우조선해양은 2017년 수주 목표였던 20억 달러에서 50억 달러로 2배 이상 늘려 잡았다. 대우조선해양 정성립 사장은 올해 경영환경에 대해 “흑자기조를 계속 유지하기 쉽지 않다”고 진단하고, 이를 극복하기 위한 방안으로 신성장동력 및 수익과 품질 중심의 내실경영 등을 강조했다.

조선3사가 지난해 대비 수주 목표를 30% 이상 높게 잡은 데에는 몇 가지 이유가 있다. 국제 유가의 안정화와 폐선량 증가, 환경 규제 등 올해부터 신조 발주세가 회복될 가능성이 높게 점쳐지고 있기 때문이다.

국제 유가의 경우, 석유수출기구(OPEC)의 원유감산협의 연장 등으로 올해 60달러 선을 안정적으로 유지할 것으로 예상되고 있다. 따라서 해양플랜트나 드립십 등의 수요가 늘어날 전망이다. 또한 2020년 시행되는 IMO의 선박 배출가스 규제 강화로 인해 LNG 추진선박의 상용화가 본격적화될 것으로 예견되고 있다. 특히 LNG 추진선박의 경우, 조선3사의 기술 경쟁력이 높아 수주 시장에서의 선전이 예상된다.

한편 클락슨에 따르면, 지난해 중국은 919만CGT(426척)를 수주해 645만CGT(176척)를 기록한 한국을 따돌리고 1위를 차지했다. 수주 금액은 중국이 155억 달러, 한국이 153억 달러로 큰 차이를 보이지 않았다. 일본은 32억 달러에 불과했다. 2016년과 비교한 수주량 증가폭은 한국이 198.6%로 가장 컸고, 중국(86.0%), 일본(13.7%)이 뒤를 이었다. ⚓



# 바르질라 새로운 셔틀탱커 컨셉 기술 지원

세계 최대 셔틀탱커 운영업체인 티케이(Teekay)가 바르질라와 긴밀한 협력하에 개발한 새로운 셔틀탱커 컨셉에서 바르질라의 혁신적인 스마트 기술이 적용됐으며, 새로운 차원의 환경친화적이며 경제적인 솔루션들이 제공된다.

최근 티케이가 발주한 차세대 선박 4척에는 바르질라의 새로운 솔루션이 탑재되며, 이 선박들은 삼성중공업에서 건조될 예정이다. 이들 선박의 컨셉은 전반적인 성능 향상에 중점을 둔 바르질라의 다양한 최신 기술들이 망라되어 있다. 바르질라는 2017년 12월과 2018년 1월에 삼성중공업으로부터 총 1억 1,000만 유로를 상회하는 금액의 수주를 받았다.

이 컨셉은 새로운 수준의 경제적이고 친환경적인 성과를 제공하고, 기존 셔틀 탱커와 비교해 연간 CO<sub>2</sub> 배출량이 40% 이상 감소될 것으로 보고 있다. 액화 천연 가스(LNG)를 주 연료로 사용하는 것 외에도, 이중 연료 엔진은 LNG와 하역하는 동안 오일 카고 탱크(cargo tank)에서 증발하는 휘발성 유기 화합물(VOC)의 혼합물에서도 운전할 수 있다.

특히 이 컨셉은 회수된 VOC를 대기 중으로 배출하기보다는 연료로 활용함으로써, 유해한 배출물을 제거하고 선박의 병커 수요를 크게 줄일 수 있다는 점이다. 또한 엔진 배기 가스의 질소 산화물(Nox) 배출량이 80% 이상 감소시킬 수 있고, 황산화물(SOx) 배출량은 완전히 제거되며, 미립자 배출량은 95% 이상 감소시킨다. 기존 솔루션에 비해 연료 소비량이 크게 감소함으로써, 이러한 환경적인 이득은 경제적인 이점과 동등한 혜택을 제공한다.

바르질라 해양선박사업부 로저 홀름(Roger

Holm) 사장은 “티케이와 함께 우리는 셔틀 탱커 부문의 새 시대를 여는 컨셉을 개발했으며, 바르질라가 개발한 가장 최신 기술이 적용됨으로써 해운운송 시장에서의 혁신적인 솔

루션임을 증명하는데 한발 더 나아갔다. 이 선박들은 탁월한 기동성으로 선박 운전 중에 엄청난 유연성을 발휘할 것이며, 최적의 경제성과 친환경적인 성과를 달성할 것”이라고 말했다.

티케이 테리에 루스달(Terje Rusdal) 프로젝트 매니저는 “이 새로운 셔틀 탱커 설계는 연료 소비 및 CO<sub>2</sub> 배출 모두에 대한 새로운 표준을 제시할 것”이라고 설명했다.

바르질라 솔루션은 이 컨셉의 핵심이다. 수많은 혁신적인 기능 중에서 전력 배분 기반이 될 바르질라의 Hybrid 시스템이 있다. 이 하이브리드 시스템은 연료 절감, 피크로드 세이빙 및 전체 시스템의 유연성을 위해 배터리를 사용한다. 이는 주 기계 장비에 직접적인 영향을 미치는데, 가동 시간이 단축 되고 유지 보수 시간 및 비용을 상대적으로 낮춘다.

이 컨셉은 바르질라 전기 및 자동화 설비 시스템으로 구체적으로 실현될 수 있는데, 그 구성품들은 LH(Low Loss Hybrid) 시스



템 및 배터리, LNGPac 연료 저장 및 공급 시스템, 휘발성 유기화합물을 저장 및 공급 시스템에서 회수하고 액화하기 위한 VOC 회수 장비 시스템, 바르질라 34DF01중 연료 엔진 엔진의 주 연료인 LNG와 액체 VOC를 처리하는 연료 혼합 시스템, 잉여 가스를 처리하는 가스 터빈, 카고 및 발라스트 펌프, 불활성 가스 시스템(inert gas generator) 등이다.

단일 선박에 들어가는 바르질라 솔루션의 범위는 해양 산업에서 타의 추종을 불허하는 광범위한 제품, 시스템과 솔루션의 포트폴리오로 나열할 수 있다. 또한 새로운 셔틀탱커 컨셉에는 바르질라의 통합 솔루션에 포함되는 Eniram사의 선박 통합관리 시스템이 있다. 바르질라 자회사인 Eniram사는 선박 운전을 최적화할 수 있도록 데이터 수집 플랫폼을 제공하고, 선주들을 위한 분석 및 보고 기능도 제공한다. 선단뿐만 아니라 선박이 갖는 모든 성능을 활용할 수 있도록 한다. ⚓



“코닉스가 만들면 다릅니다.”

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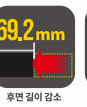
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# Sif backs TM steel from Dillinger: Weldable, tough, dependable

The challenges faced by the offshore industry are typified by extreme working locations subject to arctic temperatures and enormous mechanical and dynamic loads. The demands made on the design and materials selected for drilling rigs and wind turbines are also correspondingly high. Sif Group B.V., of the Netherlands, is one of the most important fabricators of steel tubular elements ("cans") for the construction of oil and gas platforms and the foundations of offshore wind farms. The company has - from conviction - for decades used heavy plates sourced from Dillinger. This also applies, for example, to the jacket structure for the Edvard Grieg oil and gas platform and to the monopiles for the 150 wind turbines that make up Gemini, one of the world's largest offshore wind farms. For these projects alone, Sif used more than 100,000 tonnes of Dillinger steel, primarily thermomechanically (TM) rolled plates.

*Dillinger Group ([www.dillinger.de](http://www.dillinger.de))*

Sif has more than 450 employees at its home site in Roermond and in Rotterdam, and is capable of producing up to 300,000 tonnes of tubular steel annually for use in offshore foundations. The company, set up in 1948 and converted to a joint-stock corporation in 2016, is a leader in welding technology and productivity, having completed more than 1,700 offshore foundations, in the form of deliveries of tubular elements for jacket fabricators or offshore wind projects, in the seventy years of its existence. Sales in 2016 totalled 400 million euros.

At the parent site in Roermond, tubular shell sections are produced around the clock using highly automated processes in twelve fabrication buildings housing five production lines. These sections are then joined together to make XL monopiles (large-calibre tubular elements) with diameters of up to eleven metres and up to 2,000 tonnes finished weight. Pipes with diameters of up to 3.5 metres are typically used for the steel structures, known as jackets, required in the oil and gas industry. The legs for the jackets are connected by

means of a sophisticated network of struts, via so-called bracings, i.e., thinner tubular elements and tube nodes. Stabilising sleeves at the lower intersections of the truss structure are used to drive three to four piles into the seabed like nails for anchoring in each case.

In the case of the Edvard Grieg drilling rig, this foundation structure supports a platform - also known in offshore jargon as a "topside module" - equipped with highly complex technology, living quarters for 100 persons and a helideck, and weighing in at 22,500 tonnes.

## **TM plates for greater fabrication efficiency**

Offshore facilities like these are exposed to high static and dynamic loads generated by water, wind, waves and low temperatures. In some locations, such structures are required to reliably withstand waves of over 25 metres in height and gale-force winds gusting at up to 160 kilometres per hour or more. In the North Sea, or even further north, in particular, temperatures can reach 10°C or below, demand-

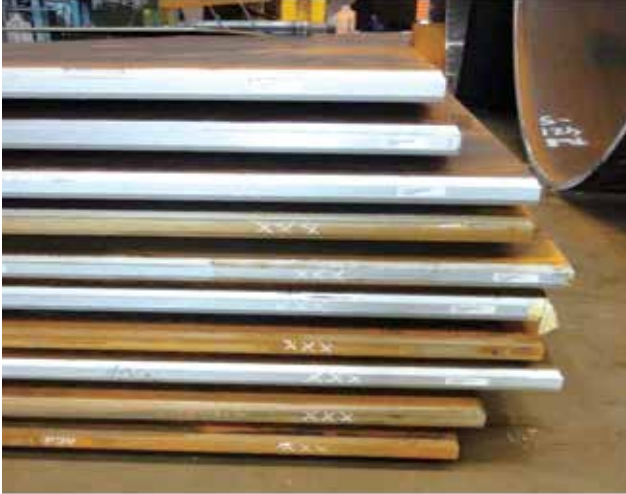


Figure 1-2. Dillinger supplies Sif with heavy plates weighing up to 32 tons and with thicknesses of up to 500 millimeters, some with milled edges already attached.

ing dependable material toughness properties at test temperatures of 40°C or even lower.

The requirements made on the grades of steel used for the construction of jackets, topsides and monopiles are correspondingly high. Only absolutely excellent mechanical properties appropriate to the application, consisting of yield strength, tensile strength and toughness, can give such structures the necessary stability and safety.

In addition, the availability of large plate formats, with excellent dimensional and flatness tolerances and weldability properties which have already been verified in a welding-qualification inspection at the manufacturer's plant, are definitive preconditions for cost-efficient production for fabricators such as Sif. The offshore industry uses two differing groups of standards, which are selected on the basis of construction conditions.

The differentiation criterion is, above all, the precise origin of the Charpy V-notch impact test specimen, which is taken either at one quarter (the EN 10025, series of standards on hot-rolled structural steels for offshore use) or at half plate thickness (the classical EN 10225 series, dealing with "Weldable structural steels for fixed offshore structures"). The origin of the samples from zones of differing solidification morphologies makes it possible to achieve differing maximum thicknesses, depending on the group of standards.

Dillinger meets these offshore industry requirements with thermomechanically rolled heavy plates of up to 35 tonnes in weight, which can be supplied with maximum degrees of



Figure 3. Rolling machines form the Dillinger plates into half-shells.

deformation in thicknesses of up to 150 millimetres in the case of structural grades and of up to 110 millimetres for classical offshore grades. The delivery range also includes normalised and quenched + tempered (QT) steels, in some cases in even greater thicknesses. This performance profile assures safety at all points.

These plates, with their specifically tailored properties, large formats and high item weights, also assure optimum preconditions for efficient production and constantly dependable fabricated structures at Sif. This Dutch steel fabricator mainly puts its trust in thermomechanically rolled steels supplied by Dillinger. These combine high savings potentials on fabrica-



Figure 4. The formed plates are welded together internally and externally by a longitudinal weld.



Figure 5. After each welding process, the shell sections, which are up to 11 meters in diameter, are calibrated in a ring roller.



Figure 6. The shell sections are waiting for the next processing step.

tion time and costs with excellent mechanical and technological properties.

For William Lafleur, head of Welding Technology at Sif, Dillinger plates are therefore the best anyone could wish for in materials for the offshore industry. His department's first step in checking a draft design for a jacket is to verify the technical requirements stated. Sif will then draft, on the basis of the customer's finalised design drawings, its own welding schedules, in which the distribution of the shell sections, the circumferential and longitudinal welds, bracings, and all welding details, such as weld preparation operations, are

shown. The plates are ordered from Dillinger as soon as these workshop drawings have received approval.

"Our good cooperation with Dillinger is extremely important to us", William Lafleur notes. "In many cases, we don't know the precise dimensions, but we reserve tonnage amounts for specific calendar weeks."

Plate length is in all cases the circumference of the planned shell section, and plate width its height. The large dimensions available from Dillinger thus make a decisive contribution to cost-efficient fabrication, since the size of the plates supplied means that the scope of welding work can be reduced significantly compared to the use of smaller plate formats. In close coordination with the experts at Dillinger, Sif supplies specifications for every individual plate, on the basis of graphical product overviews of steel grades, delivery condition, wall thickness, length and maximum weight.

In the case of the sixteen jacket piles ordered for the Edvard Grieg platform, for example, this specification included twenty-four items, with the result that it was necessary to draft specifications for 384 plates for the piles of this rig. Also to be added, for the shell sections of the pile sleeves, were twelve further plates per sleeve, in addition to the material for bracings and for the platform's four main legs. It was also necessary, and not only for this project, to repeatedly shorten even further the in most cases already short delivery times of twelve weeks typical for this industry: in some cases, Dillinger in fact achieved delivery of urgently needed plates within six weeks.



Figure 7. Huge crane systems transport the shell sections to the welding area.



Figure 8. Up to four circumferential welds are made simultaneously by four welding heads, which are controlled by a single system operator.



Figure 9-10. At the Roermond site, the large shell sections are assembled into XL monopiles.

### Four welds simultaneously

The order of component fabrication at Sif always differs greatly, since it always depends on customers' individual requirements. A single leg, with a sleeve, for example, could just as easily be needed first as three sleeves and specific bracings. The first working operation is the making of welding edges on the plates - this can be done at Sif or at Dillinger. Plates for wind turbines are generally ordered from Dillinger ready-prepared for welding, with milled edges and a coat of weldable primer to protect against corrosion.

The milled edges made precisely to the customer's specifications using two large-format milling machines assure the making of significantly better welds at Sif. For William Lafleur, the necessary plate dimensions and quantities also argue in favour of this solution on economic criteria. Sif cold forms plates of Grade S355 of up to 160 millimetres in thickness and 4.20 metres in width into cylinders or half-shells.

The half-shells are then welded together firstly internally, and then externally, using a longitudinal weld, to produce shell sections of a maximum weight of 70 tonnes. Circumferential welds of a diameter of 6.8 m, as needed for the monopiles of the Gemini offshore wind farm, are by no means unusual in this context.

The shell sections are dimensionally and geometrically inspected after every welding operation. Assembly of the completed ring elements takes place in a parallel process: a system operator controls four welding heads, which make four circumferential welds simultaneously. Each welding



Figure 11-12. Sif manufactures XL monopiles from thermomechanically rolled steels from Dillinger in thicknesses of up to 140 millimeters.



head operates with four electrode wires, thus assuring an extremely high deposition rate.

### Pre-qualification - a plus for piles

Dillinger supplied 12,400 tonnes of thermomechanically rolled steel in grades S355G10+N/+M, S420G2+M and S500G2+M for the 134 metre high jacket of the Edvard Grieg platform. Sif used this steel to fabricate sixteen jacket piles, two gripper piles and eighteen pile sleeves. S420G2+M steel was used for the funnel-shaped, 12 metre long sleeves, with wall thicknesses of up to 35 millimetres.

The diameter of these elements expands from 2,736 millimetres at the bottom to 3,292 millimetres at the top. The closing element of the two-piece sleeve, which also performs the function of guiding the piles correctly during fixing, takes the form of a 1.5 metre high so-called catcher plate with external reinforcements on the 30 millimetre thick wall. In addition, Sif applied in each case thirty-one single-layer welded beads - each twelve millimetres in height and 24 millimetres wide - onto the inner side of the sleeves. In the case of the piles, these welds were applied externally with an analogous height but slightly offset horizontally, and thus served as the anchoring system during subsequent "grouting", the filling out of the space between the sleeve and the pile with concrete.

The Edvard Grieg jacket is permanently anchored to the seabed at a depth of around 100 metres by means of the four main legs located at its four corners. The 134 metre long



Figure 13-14. The monopiles or shell sections made of Dillinger steel are transported by ship from Roermond to shipyards or to the Rotterdam factory.



Figure 15. For the Edvard Grieg platform jacket, Dillinger delivered 12,400 tonnes of thermomechanically rolled steel of the grades S355G10+N/+M, S420G2+M and S500G2+M.

legs, with a diameter of 1,800 to 3,300 millimetres and welded together from three sections, have wall thicknesses varying between 60 and 120 millimetres. Extremely high wall thicknesses are needed at the nodes, in particular, and are, in fact, also additionally reinforced. Sif selected Grade S355G10+N for the 120 millimetre thick plates, and thermo-mechanically rolled Grade S420G2+M for all the other plates.

The extremely fine grain structure of TM plates assures the high required mechanical strength and toughness data with simultaneously excellent weldability. Thanks to higher toughness reserves, the structure also assures particular safety and stability even in the heat-affected zone of the welds. The significantly lower CET carbon equivalent at the same time has a positive effect on the weldability properties of these plates. They thus require, despite the high plate thicknesses involved, significantly less preheating, as is also reflected in correspondingly shorter cooling times and thus greater overall cost-efficiency.

For William Lafleur, an important factor, in addition to the high wall thicknesses and yield strengths available in TM plates from Dillinger, is the pre-qualification already performed by the rolling mill, thanks to which he is able to read off the safety reserves of the material directly from the welding report - an additional, time- and money-saving plus which Dillinger also offers on all offshore grades.



Figure 16. The 22,500 ton topside module of the Edvard Grieg platform, which is equipped with highly complex technology, 100-person living quarters and a helicopter deck, is built on a foundation structure made of Dillinger steel.

Whether Charpy V-notch impact testing, CTOD (crack-tip opening displacement) testing, minimal segregation (thanks to the Soft Reduction technology used during continuous casting at Dillinger), or the high degree of deformation from slab to plate assured by the large feed-material thicknesses - on the criterion of safety, these steels easily beat conventional grades.

### Thick plates in large amounts and short times

For this reason, Sif also put its trust in the outstanding quality of Dillinger's TM plates for the monopiles of the Gemini offshore wind farm. This facility is situated at one of the windiest locations off the Dutch coast, around 85 kilometres to the north of Groningen, and occupies an area of 68 square kilometres, with water depths of up to 36 metres.

The 150 wind turbines installed here have rotor diameters of 130 metres and a total output of 600 MW. Sif used a total of 94,500 tonnes of Grade S355ML - with individual plate weights of 32 tonnes - for the monopiles and transition pieces ordered. The length of the piles varies from 66 to 73 metres, with the same diameter, depending on the exact position of the turbines in the overall field, and thus as a function of differences in the seabed or in water depth. The diameter tapers from 6.8 metres for the bottom shell sections to 5.5 metres at the top, on the flange, on which the tower is supported. The piles consist, in total - depending on their



Figure 17. Wind turbines with a rotor diameter of 130 meters were installed on transition pieces made of Dillinger steel.


length - of twenty to twenty-two shell sections with wall thicknesses of up to 85 millimetres and a weight of up to 914 tonnes. Dillinger's capability of supplying such large quantities in short times is indispensable for Sif when working, in particular, on such major projects.

"Dillinger not only has extremely good competence in thick-walled plates, and constant high quality in such large series, but also great capabilities in steels with high yield strengths, which are what we need for our offshore projects", affirms William Lafleur. "We are thus always pleased to choose Dillinger, because the price and the quality are right." He also emphasises yet another benefit resulting from this cooperation: "Dillinger has its own welding laboratory and thus an extremely large range of pre-qualifications. We use these findings for cost and time reasons, in order to economise on our own process tests."

William Lafleur has been at Sif for twenty-seven years, but the two companies were working together even before he joined. Trusting cooperation between equal contact partners



Figure 18. For the 150 monopiles for the Gemini offshore wind farm, Sif relied on the quality of Dillinger's TM plates.

is typical of this decades-long business relationship. "We understand each other", Lafleur continues. "When we place an enquiry, Dillinger knows what we need - in many cases, even without us having to state our requirements in detail." At the same time, he knows from experience that he can always rely on the steel producer, even for urgent needs. "We then get the help we need!" One item takes the foreground, in addition to this mutually trusting cooperation and, for both parties, also technically highly useful interchange, however: "The main reason Sif puts its faith in Dillinger steel is its excellent weldability. That is what makes Dillinger our preferred supplier." 



# 온도/ 습도/ 이슬 · 노점 기체속도/ 가스/ 압력/ 신호 전송기

## 온도/ 습도 신호 전송기



**THM80X**  
합금외함 고정밀형  
온습도전송기



**THS80X**  
정밀형 온습도  
신호전송기



**THS30X**  
경제형 온습도  
신호전송기



**THS307**  
옥외 검용  
온습도 전송기



**THR13/THR03**  
온습도 표시  
신호전송기



**THS13/14**  
선형 신호전송기

## 온도/ 습도/ 노점, 이슬점 측정기



**THS88**  
노점 전송기



**THS07**  
탐촉자형  
온습도 전송기



**THS86/87**  
실내형  
노점표시 전송기



**SD05**  
복합형 신호 표시기



**TP01**  
2선식 머리부착형  
RTD 온도 신호전송기



**TP02**  
레일부착 (케조)형  
온도신호 전송기

## 기체/ 가스 측정기



**FTM84/85**  
고정밀 열선풍속전송기  
(합금외함, 고속용)



**FTS34/35**  
중속 유속  
신호전송기



**FTS14**  
열선풍속  
전송기(저속)



**FTS07**  
열선 풍속 전송기  
(탐촉자형, 경제형)



**AFMT+PMD33**  
평균 흐름률 측정관/  
차입전송기



**THG03**  
실내용 CO2 온습도  
표시 전송기

## 가스/ 압력/ 신호 측정기



**GTH53**  
복합가스 신호전송기



**GS33/34**  
CO2 신호전송기



**GM33/34**  
CO 신호전송기



**L051/52**  
수위감지  
신호전송기



**THM80X**  
다기능 디지털  
신호 표시 감시기



**DPT02**  
레일부착 케조형  
신호변환기



# 자산 수명 연장 목적으로 위험도 평가에 의한 진단기법 채택

OGIQ 서베이는 위험도에 기반한 진단 기법이 제대로 시행되면 비용을 절감할 수 있다는 점을 생산사가 확인했다고 전했다. 이제 기법의 채택률을 높이는 일만 남았다.

## 벤틀리시스템즈

By **안네 마리월터스(Anne-Marie Walters)** 글로벌 마케팅 이사

저렴한 석유 가격은 주유소를 찾는 소비자들에게 위안이 되지만, 해양 석유 생산업체들의 경우는 다르다. 그들은 현재의 경제 환경 내 신규 시설을 건축하기보다 현존하는 플랫폼의 수명을 연장해야 한다는 압박을 받고 있다. 해양 환경 내 기존 자산에서 더 많은 수익을 얻고 그 수명을 연장하는 방법의 결정은 소유업체와 이 업체를 지원하는 엔지니어링 회사에게 긴급한 문제다. 그 결과, 수많은 업체들은 자원을 최적화하고 자산 모니터링에 대한 위험도 평가에 의한 진단기법을 채택하기 위해 논의 중에 있다. OGIOil and Gas IQ)와 벤틀리시스템즈가 최근 실시한 설문 조사는 이러한 추세를 잘 보여준다.

멕시코만과 북해의 수많은 해양 플랫폼들은 이미 40년이 넘었는데, 이는 기대 수명인 25년을 훨씬 넘긴 것이다. 하지만 이런 불황 시기에 새로운 플랫폼을 설치할 만한 업체들은 많지 않다. 따라서 해석 소프트웨어 기술을 기반으로 구조적 무결성을 분석하고 위험을 파악해 자산 수명을 연장할 수 있는 옵션을 모색하고 있다.

그런데 설문 조사 결과에 따르면, 놀랍게도 10년 미만의 자산을 보유한 생산업체들조차도 자산 수명을 연장하는 방법을 모색하고 있다. 새로 건축하기 보다 기존 자산에서 더 많은 것을 얻는 옵션들을 찾고 있는 것이다. 재평가를 위한 가장 중요한 이유가 무엇인지 묻

는 질문에 설문 응답자의 97%가 현장 플랫폼의 수명 연장이라고 답했다. 수명 연장이 곧 가장 중요한 비즈니스로 밝혀진 것이다. 마찬가지로 중요한 재평가의 다른 이유들에는 플랫폼, 해저 타이백(subsea tieback) 및 변화하는 기상 데이터에 더 많은 비중을 두는 신규 생산 장비가 포함된다. 하지만 수명 연장은 생산업체들의 명백한 주요 관심사다.

검사 기준을 준수하는 것은 석유 생산업체들이 직면한 또 다른 도전이다. 생산업체들이 어떤 규정 준수 코드를 사용하고 있는지 묻는 질문에, 북해에서 절반 이상이 ISO 19902를 사용한다고 답했으며, 나머지 절반은 HSE를 사용한다고 답했다. 하지만 가장 흥미로운 수치는 2014년에 나온 비교적 새로운 표준인 RP2SIM을 사용한다는 응답이 19%에 달한다는 점이다. 이 표준은 해양 구조물이나 구조물 군의 지속적인 목적-적합성을 보장하기 위한 지속적인 프로세스로 정의된다. 이 표준은 초기 채택 단계에 있고, 이는 위험도 평가에 의한 진단기법 위험 기법으로 이어질 것으로 예상된다. 신규 코드의 채택률이 거의 20%에 달했다는 것은 생산업체들이 지속적으로 자산을 모니터링하고 수명 연장에 대해 고민하고 있음을 보여준다.

OGIQ 조사에 따르면 생산업체의 34%가 유지관리에 대한 위험 기

반 접근법을 채택하고 있는데, 이는 명백히 초기 채택 단계를 넘어선 것이므로 이 의견을 뒷받침해준다. 생산업체들은 위험도 평가에 의한 진단기법이 제대로 시행되면 비용을 절감할 수 있으며, 검사 일정을 최적화를 위해 실제로 이 접근법이 사용 가능하다는 것을 깨달았다.

생산업체들이 엔지니어링 해석을 내부에서 수행하는지 묻는 질문에는 39%가 그렇다고 답했고, 59%는 내부 및 외주 분석을 둘 다 한다고 답했다. 이는 IGQC 독자의 70%를 차지하는 소유업체들이 이 문제에 대처하고 있다는 것을 보여준다. 구조적 무결성 관리는 아웃소싱하기에 쉬운 것처럼 보이지만, 설문 조사에 따르면 외주를 주기에는 너무나 중요한 사안으로 여기고 있다. 이는 자산 관리 및 생산성 향상을 위해 그 업체들의 비즈니스에 있어 핵심적이기 때문이다.


다음으로 어떤 종류의 기술을 생산업체들이 사용하고 있는 지에 대해 보면, 대다수 즉, 거의 80%가 지금도 수동으로 검사를 수행하고 있다. 이 수치를 보면, 모바일 기술을 사용해 수동으로 데이터 수집을 지원할 수 있는 큰 기회가 존재한다. 업계가 보수적이긴 하지만, 비용 합리화를 목표로 신기술을 사용하는 것에 반대하지는 않고 있다. 본질적으로, 응답자 5명 중 4명은 눈 앞에 실질적으로 보이는 게 있어야 한다고 답했다. 그들은 기존 방식을 대체하지 않지만, 기존 정보의 수동 캡처를 지원해주는 기술을 사용하고 있다. 그렇다면, 이제 생산업체가 이 데이터를 어떻게 보유하는 지에 대한 의문점이 생긴다. 최적의 문서 관리 시스템을 사용해 스프레드 시트에 보유하거나, 모든 검사원들이 사용하는 공식화된 정보 저장 및 검색 프로세스를 사용하는 지 궁금하다.

설문 조사 결과에 따르면, 응답자의 거의 50%가 공식화된 프로세스가 아니라 문서 관리 시스템을 사용하고 있다. 따라서, 소유업체가 보다 효율적으로 검사를 수행할 수 있는 여지는 분명히 있다. 이는 또한 검사에서 보다 공식화된 접근법을 사용하는 조사 대상자의 39%가 위험 기반 경로를 훨씬 쉽게 탐색할 수 있음을 의미한다. 이 경우 모든 검사원들이 사용하는 정보를 저장하고 검색할 수 있다. 공식화된 프로세스의 본질적인 목적은 조직 전체에 적절한 통보가 전달되도록 보장해 조직이 효과적으로 기능할 수 있게 하는 것이다. 응답자들은 또한 부서별 고립으로 인한 소통 부족(41 %)이 또 다른 주요 문제라고 말했다.

마지막으로, 이 조사는 모바일 장치, 무인 항공기, 클라우드 기술, 레

이저 스캐닝과 같은 검사를 수행하는 대안적인 방법들을 다루고 있다. 모바일 장치를 사용해 검사 프로세스를 수행하는 것과 관련해 응답자의 32%만이 이 기술을 사용한다고 답했으므로, 이 기술의 채택 및 발전 가능 여지를 여과없이 보여준다. 벤틀리시스템즈의 분석 모델링 담당 부사장인 필 크리스텐슨(Phil Christensen)에 따르면, 종이 문서 기반 워크플로우를 사용하는 사람들은 모바일 장치를 사용하다가 물에 떨어뜨릴까 두렵거나 플랫폼 내에서 장치를 백업하는 방법을 몰라서 모바일 장치 채택을 주저한다. 그러나 32%가 이 기술을 채택했기 때문에, 일부는 분명히 이 어려움을 극복한 것이다.

흥미로운 점은 무인 항공기의 채택 비율은 이미 1/4 이상이며 업계에 빠르게 침투하고 있다는 것이다. 크리스텐슨은 사용자의 비율이 약 10%에 불과할 것이라고 추측했기 때문에 이 수치가 고무적이라며, 클라우드 기술을 사용하는 응답자의 수에 한 번 더 놀랐다. 응답자의 1/4이 클라우드 기술을 채택했다. 산업 사용자들은 얼리 어답터 단계를 이제 막 넘어섰고 사용자가 보안 문제에 대해 보다 편안해지고 있다고 말했다.

크리스텐슨은 일부 벤틀리 사용자가 제품들의 클라우드 전용 솔루션을 요청하고 있다고 덧붙였다. 자율적이고 오픈된 요청은 기업 외부의 데이터 필요성에 대한 솔루션을 요구하며, 이는 석유 생산업체의 사고방식이 바뀌었음을 입증한다. 



안네 마리월터스(Anne-Marie Walters)  
벤틀리시스템즈 글로벌 마케팅 이사

안네 마리월터스는 2004년 글로벌 마케팅 디렉터로 벤틀리시스템즈에 합류, 프로세스와 파워 및 엔터프라이즈 분야의 요구 사항을 해결하는 벤틀리의 솔루션과 제품 마케팅, 포지셔닝을 담당하고 있다.



## SHI secured an order for an 180,000m<sup>3</sup> LNG carrier

Samsung Heavy Industries (SHI) announced on December 28 that it inked a contract worth approximately KRW 210 billion with an overseas LNG shipping company to build an 180,000m<sup>3</sup> LNG carrier. Including the latest for LNG carrier, SHI has won orders worth USD 3.3 billion in LNG field alone, such as 3 LNG carriers, 2 LNG-FSRU (Floating Storage Regasification Unit), and 1 FLNG, proving its strong competitiveness in this segment.

Last year, SHI won a contract for Coral FLNG project valued at USD 2.5 billion, the largest single project. SHI is expected to achieve optimal profitability as it has verified various risks, such as costs and contract structure, thoroughly from the incipient stage of the bid for the Project. In addition, SHI completed development of regasification system, a key facility of LNG-FSRU, in September last year while clinching an order for LNG-FSRU outfitted with this regasification system, which proves technological prowess of SHI.

An official from SHI said, "An average of about 30 LNG carriers is expected to be ordered each year until 2030, driven by the rising demand for LNG, an eco-friendly energy source. We will continue to cement our leadership in the market for LNG carrier, a high value-added vessel, in 2018 by fully leveraging our technologies and experience that we have amassed from construction of 110 LNG carriers and riding the momentum of robust strong performance that we have shown in LNG sector."

Last year, SHI secured orders for 28 vessels worth USD 6.9 billion, including 8 oil tankers, 7 shuttle tankers, 6 containerships, 5 LNG carriers (including 2 LNG-FSRUs), 1 FPU (Floating Production Unit), and 1 FLNG (Floating LNG) unit.

### 삼성중공업, 180,000m<sup>3</sup>급 LNG선 1척 수주

삼성중공업은 해외 LNG선사로부터 18만m<sup>3</sup>급 LNG선 1척을 약 2,100억원에 수주하기로 합의했다고 지난 12월 28일 밝혔다. 이번에 수주한 LNG선을 포함해 삼성중



공업은 2017년 한해 LNG선 3척, LNG-FSRU 2척, FLNG 1척 등 LNG 분야에서만 33억 달러를 수주하며, 이 분야에서의 시장 경쟁력이 입증됐다.

지난해 단일 프로젝트 기준 최대 규모였던 25억 달러 규모의 코랄(Coral) FLNG를 수주한 삼성중공업은 코랄 FLNG 프로젝트 입찰 초기부터 원가와 계약구조 등 각종 리스크를 철저히 검증함으로써 적정 수익성 확보가 기대된다. 또한, 지난해 9월 LNG-FSRU의 핵심설비인 재기화시스템 개발과 함께 이 설비가 장착한 LNG-FSRU를 수주해 기술력을 입증 받았다. 삼성중공업 관계자는 "친환경 에너지인 LNG 수요 증가에 힘입어 2030년까지 연평균 30척 규모의 LNG선 발주가 기대된다"면서 "지금까지 110척에 달하는 LNG선을 건조하면서 축적한 기술과 경험, 올해 LNG 분야에서 거둔 다양한 성과를 바탕으로 내년에도 고부가가치 제품인 LNG선 시장을 선도해 나갈 것"이라고 말했다.

한편 삼성중공업은 지난해 유조선 8척, 셔틀탱커 7척, 컨테이너선 6척, LNG선 5척(LNG-FSRU 2척 포함), 부유식 원유 생산설비(FPU) 1척, 부유식 LNG 생산설비(FLNG) 1척 등 총 28척, 69억 달러의 수주 실적을 달성했다.

## Roxtec EMC transits selected for new LNG carriers

Hudong-Zhonghua Shipbuilding Group and power system provider ABB specified Roxtec EMC sealing solutions for the new-build of four LNG carriers.

State-owned Hudong-Zhonghua in Shanghai, China, builds the LNG carriers Pan Asia, Pan America, Pan Europe and Pan Africa for the

Queensland Curtis LNG project in Australia. Each vessel will transport 174,000 m<sup>3</sup> of liquefied natural gas to different countries.

Roxtec cable transits are used for the electric propulsion system and the reliquefaction system. The

seals combine protection against fire, smoke, gas, water, dust, dirt, vibration and the risk of explosion with elimination of electromagnetic interference, EMI.

Today, vessels have more sophisticated equipment in narrow spaces, which increases the risk of EMI generation. By using strong EMC solutions, it is still possible to ensure reliable operation.

Hudong-Zhonghua and ABB chose the Roxtec EMC sealing system. It is designed to withstand offshore conditions and certified by all major classification societies.

“We had a great time working with Roxtec. When we had an installa-

tion problem or special sealing requirements, we got very quick response. Roxtec provided us not only with good quality products, but also with excellent service!” said Mr Ling Xiaoming, head of electric workshop of the PULNG team at Hudong-Zhonghua.

Roxtec transits are openable and have optional spare capacity to simplify upgrades throughout the lifetime of a vessel. The shipbuilders decided to prepare for 30 percent more cables.

## Alfa Laval PureBallast 3.1 tops customer choice for large-flow BWTS



Alfa Laval PureBallast 3.1 for large-flow ballast water treatment systems

Among owners of tankers and other large vessels, the number who choose UV ballast water treatment over electrochlorination continues to grow. To date, Alfa Laval has won orders for Alfa Laval PureBallast 3.1 totalling almost 90 systems in the range of 1000 m<sup>3</sup>/h or more.

Led by PureBallast 3.1, UV ballast water treatment systems (BWTS) are challenging the notion that electrochlorination is the default for large ballast water flows. Today's UV systems compete easily in terms of footprint and energy efficiency, even at flows of 1000 m<sup>3</sup>/h or above.

This adds to their long-standing operational advantages, which include a chemical-free process that poses no corrosion risk.

The shift towards UV is evident in a string of recent orders won by PureBallast 3.1 in the large-flow range. Among them is an order from Nakilat, a Qatar-listed shipping and maritime company with the world's largest LNG fleet, who will retrofit two PureBallast 3.1 systems of 2000 m<sup>3</sup>/h. A further system of this size, configured for Ex demands, will be retrofitted by European oil tanker management company DS Tankers.

“PureBallast 3.1 was selected not only for its small footprint and simple installation, but also for its ease of use,” said Anders Lindmark, Head of Alfa Laval PureBallast. “No chemicals are needed to treat the ballast water or to neutralize residuals, which means there will be no chemical handling on the part of the crews. And just as importantly, there will be no risk of corrosion in the system components or ballast water tanks. Those things make a difference for any vessel, large or small.”



# Rolls-Royce and Mitsui O.S.K. lines to work together to develop intelligent awareness



Rolls-Royce has signed a deal with Japanese multi-modal transport company Mitsui O.S.K. Lines (MOL), to collaborate in the development of its intelligent awareness system.

The collaboration will be on board 165 metre passenger ferry SUNFLOWER, which is owned and operated by Mitsui O.S.K. Lines' subsidiary company. Ferry SUNFLOWER operates on a 222-nautical mile route between Kobe and Oita via the Akashi Kaikyo, Bisan Seto and Kurushima Straits.

Rolls-Royce Intelligent awareness systems will make vessels safer, easier and more efficient to operate by providing crew with an enhanced understanding of their vessel's surroundings. This will be achieved by fusing data from a range of sensors with information from existing ship systems; such as Automatic Identification System (AIS) and radar. Data from other sources, including global databases, will also have a role.

Kenta Arai, Director at Mitsui O.S.K. Lines, said "Ferry SUNFLOWER operates in some of the most congested waters in the world and will provide an opportunity to test rigorously Rolls-Royce's intelligent awareness system. We also expect it to provide our crews with a more informed view of a vessel's surroundings in an accessible and user friendly way. This can give our crews an enhanced decision support tool, increasing their safety and that of our vessels. This is a significant challenge to front-line technology leading to our ultimate goal of autonomous sailing."

Asbjørn Skaro, Rolls-Royce, Director Digital & Systems – Marine, said "We are exploring and testing how to combine sensor technologies effectively and affordably. Pilot projects such as this allow us to see how they can be best adapted to the needs of the customer and their crews so that our product effectively meets the needs of both."

"Successful pilots and product development programmes are also an important step towards the further development of remote and autonomous vessels and meeting our goal of having a remote controlled ship in commercial use by the end of the decade."

Rolls-Royce expects to be able to undertake an Approval of Concept and have its intelligent awareness product commercially available in 2018.



## Waiting For Reader's Article

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According to Clarkson, global cumulative orders increased 7.83 million CGT year-on-year (YoY) to 19.51 million CGT with 725 vessels for the period spanning from January to November this year.

By country, China claimed top spot with 7.13 million CGT (324 vessels) in terms of cumulative new orders, trailed by Korea with 5.74 million CGT (152 vessels) and Japan with 1.82 million CGT (83 vessels). Meanwhile, China has an order backlog of 27.05 million CGT, the largest, trailed by Japan with 15.83 million CGT and Korea with 15.80 million CGT. In late November, global order backlog amounted to 74.83 million CGT, a decrease by 100,000 CGT from the preceding month. Newbuilding price index hit 125 points in November, which represents an increase by 1 point from the preceding month and a steady increase from 121 points last March.

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) and others based on the order backlog data. ⚓

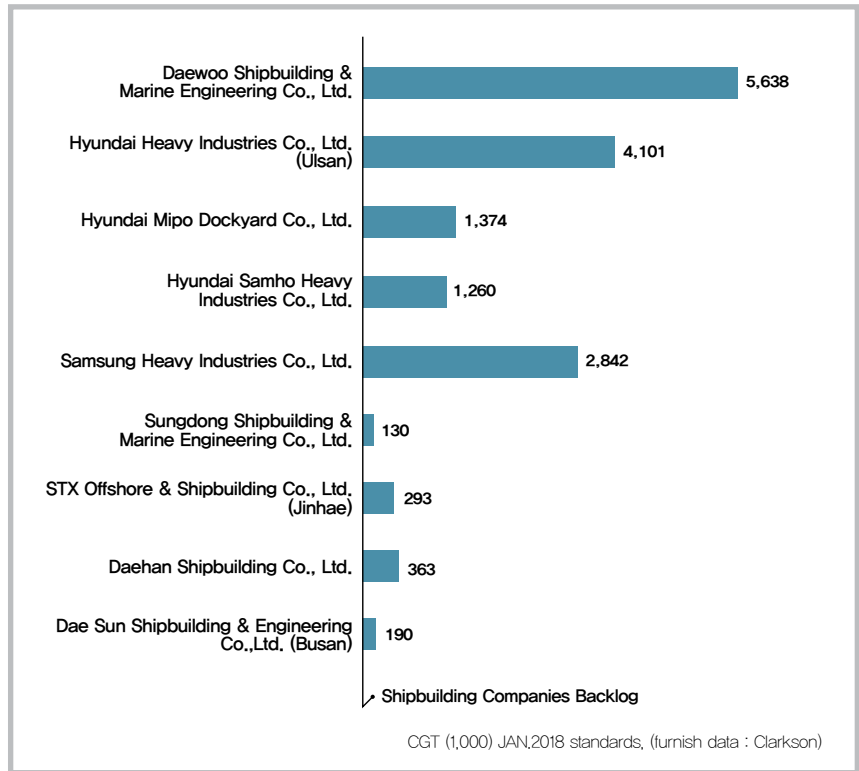


Photo: Samsung Heavy Industries Co., Ltd.



# Korea Shipbuilding Orders

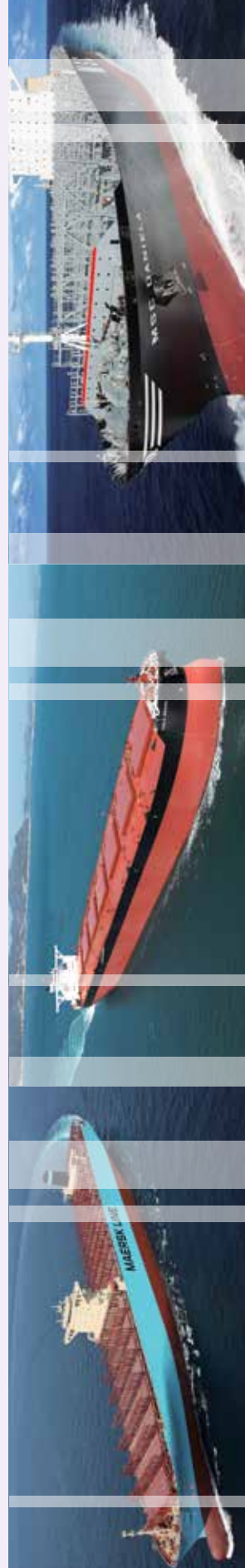
## Korea Shipbuilding Orders awarded to domestic shipyards in 2015~2018

Data	Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard
Jan	174,000m³ LNG carriers	2 vessels	USD 400 million	Korea Line Corporation, Korea	The end of 2017	Daewoo Shipbuilding & Marine Engineering
	174,000m³ LNG carriers	2 vessels	USD 400 million	Hyundai LNG Shipping, Korea	The end of 2017	Daewoo Shipbuilding & Marine Engineering
	19,200 TEU container ships	3 vessels	USD 450 million	Scorpio Group, Monaco	-	Samsung Heavy Industries
	LNG carriers	2 vessels	USD 416 million	SK shipping, Korea	The end of 2017	Samsung Heavy Industries
	319,000 DWT VLCCs	2 vessels	USD 198 million	Maran Tankers Management, Greece	-	Daewoo Shipbuilding & Marine Engineering
Feb	158,000 tons oil tankers	5 units (2 optional vessels)	USD 330 million	-	2017s	Sungdong Shipbuilding & Marine Engineering
	174,000m³ LNG carriers	1 vessel	USD 200 million	-	-	Daewoo Shipbuilding & Marine Engineering
	74,000 DWT oil products carriers	2 units (1 optional vessels)	USD 46 million	Valles Steamship, Hong Kong	-	STX Offshore & Shipbuilding
	300,000 DWT VLCCs	2 vessels	USD 192 million	Metrostar Management, Greece	The end of 2016	Hyundai Heavy Industries
	1,800 TEU container ships	4 units (2 optional vessels)	-	Cosmotech Management S.A, Greece	-	Dae Sun Shipbuilding & Engineering
Mar	180,000m³ LNG carriers	1 vessel	-	Mitsui O.S.K Lines, Japan	2018s	Daewoo Shipbuilding & Marine Engineering
	38,000m³ liquefied petroleum gas and ammonia carriers	2 vessels	-	Asian ship owner	-	Hanjin Heavy Industries & Construction
	20,100TEU container ships	4 vessels	USD 619.57 million	Mitsui O.S.K Lines, Japan	2017, August	Samsung Heavy Industries
	LR1 tankers	2 vessels	KRW 320 billion	BW, Singapore	2016 ~ 2017	STX Offshore & Shipbuilding
	319,000 DWT VLCCs	2 vessels	USD 198 million	Maran Tankers Management, Greece	The end of 2016	Daewoo Shipbuilding & Marine Engineering
Apr	20,600 TEU container ships	3 vessels	-	CMA CGM, France	The end of 2017	(HHIC)-Phil's Subic Shipyard
	21,100 TEU container ships	6 vessels	USD 950 million	OOCL, Hong Kong	The end of 2017	Samsung Heavy Industries
	10,500 TEU container ships	5 vessels	-	Hapag-Lloyd, Germany	-	Hyundai Samho Heavy Industries
	Pure Car/truck Carriers	2 vessels	USD 130 million	Norwegian Car Carriers, Norway	The end of 2016	Hyundai Samho Heavy Industries
	11,000 TEU container ships	6 vessels	-	Asian and European ship owners	2016 ~ 2017	HHIC-Phil's Subic Shipyard
May	156,000 tons oil tankers	2 vessels	-	Maran Tankers Management, Greece	-	Daewoo Shipbuilding & Marine Engineering
	5,200 ton training vessel	1 vessel	-	-	-	Hanjin Heavy Industries & Construction
	74,000 tons LR1 tankers	8 units (4 optional vessels)	USD 375 million	Marshall Islands-based ship owners	The end of 2016	STX Offshore & Shipbuilding
	300,000 DWT VLCCs	10 units (5 optional vessels)	USD 1 billion	The National Shipping Company of Saudi Arabia	2017s	Hyundai Samho Heavy Industries
	19,630 TEU container ships	11 vessels	USD 1.1 billion	Maersk Line A/S, Denmark	2018s	Daewoo Shipbuilding & Marine Engineering
Jun	Tankers	2 vessels	-	Arcadia Shipmanagement, Greece	-	Hyundai Heavy Industries
	300,000 DWT VLCCs	6 units (4 optional vessels)	USD 540 million	John Fredriksen	-	STX Offshore & Shipbuilding
	174,000 CBM LNG carriers	3 units (1 optional vessels)	-	Teekay LNG Partners, Canada	First quarter of 2019	Hyundai Samho Heavy Industries
	155,000 DWT tankers	3 vessels	USD 330 million	-	2018, February	Samsung Heavy Industries
	84,000m³ VLCCs	4 vessels	USD 320 million	China Peace, China	-	Daewoo Shipbuilding & Marine Engineering
Jul	173,400m³ LNG Carriers	1 vessel	USD 195 million	Chandris, Greece	The end of 2018	Daewoo Shipbuilding & Marine Engineering
	14,000 TEU container ships	9 vessels	USD 1.1 billion	Maersk Line A/S, Denmark	2017	Hyundai Heavy Industries
	Product Carriers	4 vessels	USD 144 million	Scorpio Tankers, U.S.A	The first of 2017	Hyundai Mipo Dockyard
	84,000m³ LPG Carriers	2 vessels	-	Asia ship owner	2017s	Daewoo Shipbuilding & Marine Engineering
	74,000 tons LR1 tankers	4 units (2 optional vessels)	-	Greece ship owner	The second half of 2017	STX Offshore & Shipbuilding
Aug	173,400m³ LNG Carriers	2 vessels	USD 400 million	BW Group, Singapore	The first half of 2019	Daewoo Shipbuilding & Marine Engineering
	84,000m³ LPG carriers	2 vessels	-	Asia ship owner	2017s	Daewoo Shipbuilding & Marine Engineering
	319,000 tons VLCCs	2 vessels	-	Maran Tankers Management, Greece	2017s	Daewoo Shipbuilding & Marine Engineering
	114,000 tons products carriers	2 vessels	-	Sea Tankers Group	2017, September	Daehan Shipbuilding
	158,000 DWT oil products carriers	2 vessels	-	Ditas Shipping, Turkey	2018s	Hyundai Heavy Industries
Sep	40,000 DWT products carriers	2 vessels	-	Greece ship owner	-	Hyundai Mipo Dockyard
	159,000 DWT oil tankers	2 vessels	-	AMPTC, Kuwait	2018s	Hyundai Heavy Industries
	75,000 tons product carriers	4 vessels	USD 170 million	Tsakos, Greece	The first of 2018	Sungdong Shipbuilding & Marine Engineering
	180,000m³ LNG carriers	2 vessels	USD 400 million	SK E&S, Korea	The first of 2019	Hyundai Heavy Industries
	50,000 tons bulk carrier	1 vessels	-	Iishin Marine Transport, Korea	The end of 2017	Hyundai Mipo Dockyard
Oct	31,000 tons Car ferry	1 vessels	-	Weidong Ferry	The end of 2018	Hyundai Mipo Dockyard



Jul	31,000 tons Car ferry	1 vessels	-	Weidong Ferry	The end of 2018	Hyundai Mipo Dockyard
Sep	180,000m <sup>3</sup> LNG carriers	2 vessels	USD 367 million	Europe ship owner	-	Samsung Heavy Industries
	2,600 ton convoy	1 vessel	USD 297 million	Korean Navy	The end of 2020	Daewoo Shipbuilding & Marine Engineering
	2,600 ton frigates	2 vessels	USD 324 million	Department of National Defense, Philippines	2020s	Hyundai Heavy Industries
Oct	Patrol killer medium	3 vessels	USD 173 million	Korean DAPA	2019s	Hanjin Heavy Industries & Construction
	157,000 DWT oil tankers	2 vessels	USD 220 million	Viken, Norway	-	Samsung Heavy Industries
	113,000 DWT oil tankers	2 vessels	USD 170 million	Nordic American Tankers Limited, Norway	-	Samsung Heavy Industries
	14,500 TEU container ships	4 vessels	USD 700 million	IRISL, Iran	2th quarter 2018	Hyundai Heavy Industries
Dec	49,000 tons products carriers	6 vessels				Hyundai Mipo Dockyard
	LNG Bunkering Vessel	1 vessel	-	Bernhard Schulte, Germany	The end of 2018	Hyundai Mipo Dockyard
Jan	114,000 tons product carriers	2 vessels	-	SFL, France	3th quarter of 2019	Daehan Shipbuilding
	50,000 tons oil tankers	1 vessel	-	Fukujin Kisen, Japan	-	Hyundai Mipo Dockyard
	RO-RO Ship	2 vessels	USD 117.8 million	CLdN, Luxembourg	The first of 2017	Hyundai Mipo Dockyard
Feb	50,000 DWT product carriers	1 vessel	-	Greece ship owner	-	Hyundai Mipo Dockyard
	300,000 DWT VLCCs	2 vessels	-	Enesel, Greece	The end of 2018	Hyundai Heavy Industries
Mar	173,400m <sup>3</sup> LNG carriers	2 vessels	-	Europe ship owner	The end of 2019	Daewoo Shipbuilding & Marine Engineering
	114,000 tons oil tankers	4 vessels	USD 240 million	Sovcomflot, Russia	3th quarter of 2018	Hyundai Samho Heavy Industries
	21,000m <sup>3</sup> LPG carriers	2 vessels	-	Solvang ASA, Norway	2019s	Hyundai Samho Heavy Industries
Apr	VLCCs	1 vessel	-	Neda Maritime, Greece	2019s	Hyundai Samho Heavy Industries
	318,000 tons VLCCs	3 vessels	USD 250 million	Maran Tankers Management, Greece	2018s	Daewoo Shipbuilding & Marine Engineering
May	300,000 DWT VLCCs	2 vessels	-	Sentek Marine, Singapore	The first of 2019	Hyundai Samho Heavy Industries
	VLCCs	4 vessels	-	Oceania ship owner	The first of 2019	Samsung Heavy Industries
	11,200 DWT product oil & chemical tanker	3 vessels	-	Korea ship owner	The end of 2018	STX Offshore & Shipbuilding
	7,500m <sup>3</sup> LNG carriers	2 vessels	USD 100 million	Korea Line, Korea	The end of 2019	Samsung Heavy Industries
Jun	114,000 DWT oil tankers	2 vessels	-	Metrostar Management, Greece	The end of 2018	Daehan Shipbuilding
	RO-RO Ship	2 vessels	USD 117.8 million	CLdN, Luxembourg	The end of 2019	Hyundai Mipo Dockyard
Jul	318,000 tons VLCCs	4 vessels	-	Maran Tankers Management, Greece	-	Daewoo Shipbuilding & Marine Engineering
Aug	84,000m <sup>3</sup> LPG carriers	2 vessels	-	Vitol	The first of 2019	Hyundai Heavy Industries
Sep	300,000 tons VLCCs	5 vessels	USD 420 million	Hyundai Merchant Marine, Korea	The first of 2019	Daewoo Shipbuilding & Marine Engineering
	81,000 DWT bulk carriers	4 vessels	USD 120 million	Bahri, Saudi Arabia	The first of 2020	Hyundai Mipo Dockyard
	325,000 tons VLCCs	10 vessels	USD 800 million	Polaris Shipping, Korea	The first of 2021	Hyundai Heavy Industries
Oct	325,000 tons VLCCs	5 vessels	USD 400 million	Polaris Shipping, Korea	The first of 2021	Hyundai Heavy Industries
	LNG carriers	1 vessel	-	Greece, Maran Gas Maritime	-	Daewoo Shipbuilding & Marine Engineering
	300,000 DWT VLCCs	1 vessel	-	Greece, Enesel	-	Hyundai Heavy Industries
Dec	300,000 DWT VLCCs	1 vessel	-	Korea, Hyundai Glovis	-	Hyundai Heavy Industries
	VLCCs	1 vessel	-	Greece, Aeolos	-	Daewoo Shipbuilding & Marine Engineering
2018	180,000m <sup>3</sup> LNG carriers	1 vessel	USD 190 million	-	-	Samsung Heavy Industries
Jan	174,000m <sup>3</sup> LNG carriers	1 vessels	-	Russia, Sovcomflot	2020s	Hyundai Samho Heavy Industries

\*Note : Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until Jan 15, 2018)





# Offshore Plant Orders

## Offshore plant orders awarded to domestic shipyards in 2011-2017

Data	Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard	
2011	Jul	Drillship	2 vessels	USD 1.1225 billion	Maersk, Denmark	July 2014	Samsung Heavy Industries
	Aug	LNG-FSRU	1 vessel	USD 280 million	Excellerate Energy, U.S.A	First quarter of 2014	Daewoo Shipbuilding & Marine Engineering
		Semi-submersible Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Second half of 2014	Daewoo Shipbuilding & Marine Engineering
	Sep	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	-	Toms 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	of 2013 to the 1st quarter of 2014
		Pipe Laying Support Vessel	2 units	USD 500 million	Odebrecht, Brazil	August of 2014	Daewoo Shipbuilding & Marine Engineering
	Nov	Offshore facilities (Gas platform and various facilities)	-	USD 900 million	Major multinational oil companies	2nd half of 2014	Hyundai Heavy Industries
CPF (Central Processing Facility)		-	KRW 2.6 trillion	INPEX, Australia	4th quarter of 2015	Samsung Heavy Industries	
Jan	Semi-submersible rig	1 unit	USD 620 million	Odfeil, Norway	by mid 2014	Daewoo Shipbuilding & Marine Engineering	
Feb	LNG-FSRU	-	-	Hoegh, Norway	-	Hyundai Heavy Industries	
Mar	Offshore Platform	1 unit	USD 560 million	DONG E&P AS, Danish	April 2015	Daewoo Shipbuilding & Marine Engineering	
	FFSO	1 unit	USD 2.0 billion	INPEX, Australia	April 2016	Daewoo Shipbuilding & Marine Engineering	
Apr	Drillship	1 vessel	USD 645 million	Enscopl	Third quarter 2014	Samsung Heavy Industries	
	Semi-submersible Drilling Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Mid 2015	Daewoo Shipbuilding & Marine Engineering	
May	Drillship	1 vessel	USD 600 million	Seadrill, Norway	Second half of 2014	Samsung Heavy Industries	
	Drillship	1 vessel	USD 655 million	Diamond Offshore Drilling Limited., U.S.A	4th quarter of 2014	Hyundai Heavy Industries	
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	Enscopl	-	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	-	Excellerate, 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	
Nov	LNG-FSRU	1 vessel	USD 270 million	Hoegh LNG, Norway	First half of 2015	Hyundai Heavy Industries	
	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	
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	FFSO	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	

Year	Month	Project Name	Units	Value	Country	Quarter	Industry
2014	Jun	Ultra-deepwater Drillship	1 unit	USD 515 million	Enesco, 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
		Drillship	1 unit	USD 550 million	-	Dec of 2015	Samsung Heavy Industries
	Sep	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	
	LNG-FSRU	1 unit	-	BW Maritime, Singapore	Early 2016	Samsung Heavy Industries	
	LNG-FSRU	1 unit	-	Mitsui OSK Line, Japan	The middle of 2016	Daewoo Shipbuilding & Marine Engineering	
	LNG-FPSO	1 unit	USD 1.45 billion	Petroleum Nasional Berhad, Malaysia	2018	Samsung Heavy Industries	
Apr	Drillship	2 vessels	USD 1.29 billion	Oceania	First half of 2017	Samsung Heavy Industries	
Jul	Central Processing Platform	2 units	USD 700 million	Hess E&P Malaysia, Malaysia	The end of 2016	Hyundai Heavy Industries	
	Fixed offshore platform	4 units	USD 1.94 billion	ADMA-OPCO, UAE	The end of 2019	Hyundai Heavy Industries	
	Fixed Offshore Platform & Submarine Cable	4 units	USD 1.9 billion	ADMA-OPCO	Second half of 2019	Hyundai Heavy Industries	
Nov	Offshore Platform	1 unit	USD 700 Million	Royal Dutch Shell	-	Samsung Heavy Industries	
	FPU	1 unit	-	-	-	-	-
2015	Jun	Offshore Platform	2 unit	USD 1.06 billion	Statoil, Norway	The end of 2018	Samsung Heavy Industries
	Jul	FLNG	3 unit	USD 4.7 billion	Royal Dutch-Shell	-	Samsung Heavy Industries
2016	Dec	LNG-FSRU	1 unit	USD 587 million	Maran Gas Maritime, Greece	First half of 2020	Daewoo Shipbuilding & Marine Engineering
	FPU	1 unit	USD 1.27 billion	British Petroleum, United Kingdom	Augst of 2020	Samsung Heavy Industries	
	Jan	FSRU	1 unit	USD 230 million	Høegh LNG, Norway	May of 2019	Samsung Heavy Industries
	FSRU	1 unit	USD 230 million	Høegh LNG, Norway	4th quarter of 2018	Hyundai Heavy Industries	
2017	Feb	FSRU	1 unit	-	Turkey	-	Hyundai Heavy Industries
	Jun	FLNG	1 unit	USD 2.50 billion	ENI, Italy	-	Samsung Heavy Industries
	Aug	FSRU	1 unit	USD 230 million	Swan Energy, India	First half of 2020	Hyundai Heavy Industries
	Oct	LNG-FSRU	1 unit	KRW 250 billion	Marubeni-Sojitz-Pertamina Consortium	-	Samsung Heavy Industries
	Dec	LNG-FSRU	1 unit	-	Maran Gas Maritime, Greece	-	Daewoo Shipbuilding & Marine Engineering

\*Note : Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until Jan 15, 2018)





# Korea with excellent technologies in special-purpose vessel segment

- Solid leadership in the market with a focus on high value-added vessels such as submarines and ice-breaking vessels

Special-purpose vessels, such as submarines and ice-breaking vessels, have been thrust into limelight amid rapid decline in global new orders. Korean shipyards are focusing on high value-added special-purpose vessels as key drivers for revenue growth amid fierce competition to win new orders that have been plunging worldwide.

Daewoo Shipbuilding & Marine Engineering (DSME) has already built and delivered the submarines and warships ordered from Norway, Indonesia, etc. Hyundai Heavy Industries (HHI) also received orders from the Defense Acquisition Program Administration (DAPA) and the Korea Coast Guard for warships, patrol vessels, etc. Samsung Heavy Industries (SHI) has shown strong performance in ice-breaking oil tanker segment, rather than defense industry.









# RIMS approval from Lloyd's Register

*Rims BV*

Drone and robotics specialist RIMS (Robotics In Maintenance Strategies) have received their fourth Classification Certificate as Recognized External Specialists, from Lloyd's Register for the use of Remote Inspection Techniques (drones) during surveys of enclosed spaces. The Lloyd's certification adds to RIMS' CV of class approvals achieved during 2017.

The practical audit was successfully executed on a large deep-water construction vessel. Prior to the demonstration, drawings of the tanks were reviewed to establish a flight plan and to indicate specific points of interest. During the demonstration the drone was able to be successfully manoeuvred around the tank according to the flight plan, and was able to react to the instructions of the attending surveyor in real time.

David Knukkel, CEO of RIMS commented on the recent certification awarded to RIMS, "We are honoured to receive the approval, as these audits are not easy. Class are setting a high standard, not only to ensure safe operations during the flight of the drones but more importantly to achieve accurate survey results. Due to the importance of these surveys, we consider each flight as an examination and it is up to us to maintain the high standard demonstrated in class audits."

The certification means that shipowners and managers now have the option to avoid the use of costly access equipment such as scaffolding and cherry pickers during surveys, and instead to use RIMS' remote live on-screen object inspection, which offers substantial benefits; reduction in the time to carry out a survey, minimising of risk, as well as cost savings.

"We were first to gain approval from BV, ABS, RINA and now also receiving the approval from Lloyds Register, means that the acceptance and use of drone technology finally breaks through in the Maritime Industry and drones become a common tool to execute safe and cost-efficient inspections of ships and MOU constructions." added Knukkel.



New  
Product

-TEL: +31-(0)-6-290-22-439  
-http://www.rims-bv.com



# New Simrad® NSO evo3 navigation systems

*Simrad Yachting*



Simrad Yachting – a leader in the design and manufacture of world-class marine navigation, autopilot, radar, communications and fishfinding systems – has announced the new NSO evo3 navigation system, the premier integrated display solution for larger cruising and sportfishing boats.

The new NSO evo3 design simplifies installation, while preserving the power and flexibility that make the NSO series the perfect solution for customising a system for larger cruising and sportfishing vessels. Connect NSO evo3 to Simrad premium network modules and add GPS, autopilot, keypad controllers and other accessories to create the ideal vessel-wide system.

NSO evo3 includes a true, high-definition display (1920 x 1080) that puts you in total control of your on-board electronics through an easy-to-use touchscreen interface. The bright, multi-touch display features unbeatable clarity and can be viewed from any angle, even when wearing polarised sunglasses, and supports up to a six-panel, split-screen layout.

The display is powered by a high-performance iMX6 quad-core processor that takes responsiveness to a new level with quicker chart redraws, the fastest updates and instant

response to every tap of the touchscreen. NSO evo3 can easily power current Simrad system technology like Halo™ Radar, the S5100 CHIRP Sounder module, ForwardScan™ forward-looking sonar and StructureScan® 3D sonar imaging, with power to spare for any future high-performance innovations.

The NSO evo3 can connect to smartphones, tablets and internet hotspots with integrated wireless connectivity, features advanced networking - including HDMI input/output, OP50 support, plus direct connection and control of audio, autopilot and NMEA 2000® and J1939 engines.

NSO evo3 displays can be purchased as part of a system kit, which comes with everything needed to build a glass helm system, including a GPS antenna, chart card reader, NMEA 2000® Starter Kit and OP50 Remote Controller. The OP50 provides keypad control of up to six separate displays, perfect for a multi-display helm layout.

-TEL: +855-361-1564  
-<http://www.simrad-yachting.com>

# EDS-518E 및 EDS-G205-1GTXSFP DIN-레일 스위치 해양 인증 획득

Moxa



Moxa는 자사의 EDS-518E 및 EDS-G205 DIN-레일 이더넷 스위치가 DNVGL, LR, ABS 및 NKK를 포함한 해양 인증을 획득했다고 발표했다. 이번 인증 획득으로 Moxa의 제품은 산업용에 적합한 내구성을 갖추었음을 입증했고, 고객들은 해양 응용 분야에서도 Moxa의 스위치를 다양하게 사용할 수 있다.

Moxa는 이번 해양 포트폴리오에 새로운 기능을 추가함에 따라, 높은 대역폭과 포트 밀도 및 사이버 보안 등과 같은 해양 산업의 요구 사항을 충족했다. Moxa의 EDS-G205-1GTXSFP 전 포트 기가비트 비관리형 스위치는 높은 대역폭이 필요한 응용 분야에서 경제적인 솔루션이다. EDS-518E 14+4G-포트 기가비트 스위치는 높은 대역폭뿐만 아니라, MAC 주소 필터링, RADIUS 인증, IEC-62443 표준을 참조하는 강화된 기타 보안 기능을 제공한다.

Moxa의 네트워킹 제품 관리자인 잭 린(Jack Lin)은 “해양 산업에서의 궁극적인 목표는 안전과 효율성이다. 이제는 자산 관리, 최적화된 의사 결정 지원, 원격 작동, 심지어는 자율 선박 운영을 포함하는 솔루션이 요구된다. 이러한 이유로 Moxa가 해양 산업에 종사하는 고객에게 업계의 요구를 충족시키는 산업용 네트워킹 전문 기술을 제공하게 되어 기쁘다”고 말했다.

Moxa는 업계의 최신 요구 사항을 충족시킨다는 목표를 바탕으로, 수년 전부터 해양 인증 관련 포트폴리오를 확대해왔다. 현재 Moxa의 해양 인증 산업용 이더넷 제품에는 EDS-G205-1GTXSFP, EDS-G500E 및 EDS-510E/518E 시리즈 DIN-레일 스위치, KS-6726A/6728A 시리즈 랙 장착 스위치, EDR-G902 산업용 보안 라우터가 포함되어 있다.

-TEL: +886-2-8919-1230  
-http://www.moxa.com

# 생산성 향상 위한 장비 안전 포트폴리오

로크웰 오토메이션



직접 배선되거나 부가되는 보호장비는 장비 설계 시간을 늘리고 운영 생산성을 감소시킬 수 있다. 이러한 문제를 해결하기 위해 로크웰 오토메이션이 장비 안전 포트폴리오를 강화했다.

강화된 장비 안전 포트폴리오에는 Allen-Bradley GuardLogix 5580 컨트롤러, Compact GuardLogix 5380 컨트롤러, Compact 5000 안전 I/O가 추가됐으며, Allen-Bradley Kinetix 5700 서보 드라이브를 통해 새로운 고급 안전 기능을 제공한다. 모든 장치들은 EtherNet/IP 상에서 통신하도록 설계되었으며 장비 안전 표준에 따른 테스트를 거쳐 규제 준수를 용이하게 만들어 준다.

GuardLogix 5580과 Compact GuardLogix 5380 컨트롤러는 최신 Logix 5000 시리즈 컨트롤러들에 안전을 도입해 통합 아키텍처 (Integrated Architecture) 포트폴리오를 확장해준다. 이 컨트롤러들은 더 빠른 시스템 성능을 제공하고 SIL 2/PLd 안전 요건 이상을 충족하는 다양한 새로운 옵션을 제공한다. 이를 통해 필요 이상의 정격을 갖춘 컨트롤러를 사용하는 것이 아니라, 요구되는 안전 정격에 맞게 장비의 규모를 조정할 수가 있기 때문에, 장비 설계자들은 아키텍처를 간소화하고 제어 새시 면적을 감소시킬 수 있게 된다.

Kinetix 5700 서보 드라이브에는 5개의 안전 정지 기능과 3개의 안전

속도 모니터링 기능이 새롭게 추가되어 보다 스마트하고 생산적인 장비 구축이 가능해졌다. 이 기능들은 장비가 지속적으로 가동되며 안전하게 모니터링 될 수 있도록 해준다. 또한 장비가 가동되는 동안 작업자가 유지보수나 간단한 서비스 작업을 수행할 수 있도록 해준다.

이제 Compact 5000 I/O 제품군에서도 안전 모듈이 제공된다. 이 모듈은 Compact GuardLogix 5380 컨트롤러를 위해 로컬 및 원격 안전 I/O의 역할을 수행하고, ControlLogix 5580 컨트롤러를 위해서는 원격 안전 I/O의 역할을 수행한다.

로크웰 오토메이션은 엔지니어들과 협력해 설계, 안전 및 생산 요구에 적합한 장비 안전 시스템을 구축할 수 있다. 또한 안전 평가, 설계 서비스, 설치, 검증, 교육 서비스 등 안전 수명주기의 모든 단계에서 광범위한 지원을 제공하고 있다.

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Registration No. : Youngdungpo Ra 00220

Published on Feb. 5, 2018

Publisher Yoseob Choi

Editor-in-Chief Chunghoon Lee

Senior Editor Chanyoung Choi

Designer Hyunju Seo

Marketing Manager  
Sungsu Park  
Kijong Seo  
Jongki Hong

Printed by Hyung-Je Art Printing

Printed (CTP) by Hyung-Je Art Printing

Published by PROCON

Address: Room. 708 ACE Techno Tower, 12,  
Dangsan-ro 2-gil, Yeongdeungpo-gu,  
Seoul, Korea (Postcode: 07299)

Tel : +82-2-2168-8898

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

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

E-mail : korshippeditor@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)	

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