Korea monthly shipbuilding magazine

KORSHIP

Shipbuilding · Offshore · Oil & Gas · Offshore wind

Vol.103

2018. 1

Kormarine
Official Magazine
코마린
전시회 공식 매체

Feature Story

BRIGHT OUTLOOK FOR SHIPBUILDING INDUSTRY IN 2018

- FULL-FLEDGED REBOUND OF ORDER PLACEMENT IN SHIPBUILDING MARKET

Application

FORESHIP DESIGNS REFINED BY REAL-WORLD EXPERIENCE

Issue

ME-GI/ME-LGI Dual-Fuel Engines Hit 100,000 Operating Hours

Roxtec non-weld metal pipe seal now certified

GE 'LM500' 해상 가스터빈 공급

(Source: Samsung Heavy Industries Co., Ltd.)

ADOS
EST. 1900

115년 전통의 독일가스 전문업체

Continuous measurement of gases

ADOS GTR 210

Application :
Chemical industry, Manufacture of paints and varnishes, Plastics processing plants, Sewage works, Biogas plants, Gas-fired boiler systems, Liquid gas storage houses, Laboratories, Oxygen concentration, measurements, Refineries, Cold storage houses, (ammonia monitoring), Paint spraying booths, Gas tankers, Container ships, Offshore plattforms, Applications in aggressive environments

(주)인터피엔
INTERPEEN

서울시 구로구 디지털로 26길 111 JnK디지털타워 210호
전화 : 02)6124-5750~2 팩스: 02)6124-5753
URL: www.interpeen.co.kr
E-mail: msbang@interpeen.co.kr

월간 KORSHIP 발행

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.

발 행 사: 프로콘 (Procon) / 월간 KORSHIP
발 행 일: 2016년 7월 20일
연 락 처: (02) 2168-8896~8899
팩　　스: (02) 6442-2168
홈페이지: http://www.korship.co.kr

&. 2016년 개정판 조선해양 총람 구매와 관련해 기타 자세한 사항은 전화문의(02-2168-8896) 또는 본사 홈페이지(www.korship.co.kr)를 참조해 주십시오.

procon KORSHIP

Measurement made easy

The Integrated WirelessHART Solution from ABB

무선 계측 네트워크는 계측기 설치 비용을 최대 60%까지 절감할 수 있으며, 어플리케이션 적용에서도 플랜트 운영을 최적화 시킬 수 있습니다. ABB의 무선 플랫폼은 사용자들이 주요 공정에 접속하고, 플랜트 데이터를 무선으로 받아 최첨단 기술로 조절할 수 있습니다. ABB는 Foundation Fieldbus의 효율적인 설계로 IoT 서비스를 이끌어 가며, 혁신적이며 규격화된 엔지니어링 기술을 제공하고 있습니다.

ABB 코리아
Tel. 02-6288-9087
Fax. 02-6288-9096
E-mail: marketing.inst@kr.abb.com

BOOST PRODUCTIVITY BY 30 PERCENT

Intergraph Smart™ 3D

Gain a competitive edge and accelerate projects with Intergraph Smart 3D, the first and only next-generation 3D plant design solution for the process, power, and marine industries. Smart 3D delivers at least 30 percent more productivity than any other system available today.

Smart 3D now offers powerful rules and relationships that automatre repetitive tasks, enforce design standards, ensure design integrity, and protect design consistency. Benefit from enhanced support for mega-projects thanks to global worksharing, model data reuse, and safety-centric rules.

INTERGRAPH KOREA OFFICE
서울특별시 종로구 청계천로 41 영풍빌딩 9층 우)03188
김효진 차장 TEL)+82 2 3489 0337
https://hexagonppm.com/

HEXAGON
PPM

New Year Greeting

With your continued support and encouragement, this year marks the 10th anniversary of the Monthly Korship. The Monthly Korship, which is Korea's only magazine specializing in the shipbuilding and offshore industry, has made steady strides, speaking for domestic shipbuilding industry, over the past ten years.
Year 2018 will be an important turning point for domestic shipbuilding and offshore industries. This year, the Monthly Korship will continue to do our best to provide in-depth information and marketing support more swiftly in our endeavor to become a partner who supports the advancement of shipbuilding and offshore industry. We wish all the best of luck in your endeavors in 2018.

In the morning of the New Year 2018
All employees of the Monthly KORSHIP

신년인사

여러분들의 아낌없는 격려로 월간 KORSHIP이 올해로 10주년을 맞게 되었습니다.
국내 유일의 조선해양 전문지인 KORSHIP은 10년이라는 짧지 않은 시간 동안
국내 조선업계를 대변하며 꾸준히 성장해왔습니다.
2018년은 국내 조선해양 산업에 있어 전환점이 되는 중요한 시기로 보여집니다.
월간 KORSHIP은 올해에도 신속하고 심층적인 정보 제공과 마케팅 지원으로
조선해양 산업의 발전을 지원하는 협력자로서의 역할을 더욱 충실히 이행하도록 하겠습니다.
2018년 조선인 모두 건승하는 한 해가 되길 기원합니다.

2018년 새해 아침
월간 KORSHIP 직원 일동

KORSHIP
Shipbuilding
Offshore
Oil & Gas
Offshore wind

Contents

Advertisers Index

최고의 나노기술 아크릴계 수성 나노페인트

나노팜

아크릴계 수성 도료에서는 실현할 수 없었던 꿈!
(완전 수성 일체형 아크릴 에멀젼 페인트)

친환경 나노팜 방오도료
Anti-Pollution

해양 부유물 부착을 방지하여 선박의 운항효율을 증대시킬 뿐만 아니라 선박의 연료 소모량을 줄임으로써 이산화탄소 배출량을 감축하는 탁월한 효과가 있습니다.

나노팜 도료만의 탁월한 장점

- **친환경 수용성 도료**(유기, 유해물질 불포함)
- **강한 접착력**(콘크리트, 목재, 금속, 염화불소, 수지, 섬유 등)
- **다양한 용도**(방오, 방청, 선저방조, 내후성, 내열, 차열)
- **취급이 용이한 "완전수성 액상"**(솔, 롤러, 건등 시공 가능)
- 알루미늄, 스텐, 구리 등에도 사용가능

취급도료 | 수성 방수 도료 | 수성 차열 도료 | 수성 단열 도료 | 수성 절연 도료 | 수성 내열 도료 | 특수 발열 시트 |

제조원 ナノファーム株式会社
長野県駒ヶ根市赤穂11476番地23
【お問い合わせ】電話 0265-98-0621 FAX 0265-98-0622
メールinfo@nano-farm.co.jp
【ホームページ】http://www.nano-farm.co.jp/

한국총판 H2C (주)에이치투 H2 CORPORATION | 서울 서초구 서초대로 48길 89-4 UH빌딩 501호 TEL. 02. **501-1589** / FAX. 02. 501-2554

대리점 HB 한벤하이테크 HAN BEN HIGH TECH | 서울시 마포구 모래내로1길 3 한두빌딩 307호 TEL. 02. **303-0816** / FAX. 02. 303-0814

Mission Statement

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

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

Technology

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

Special Focus

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

Company & Comments

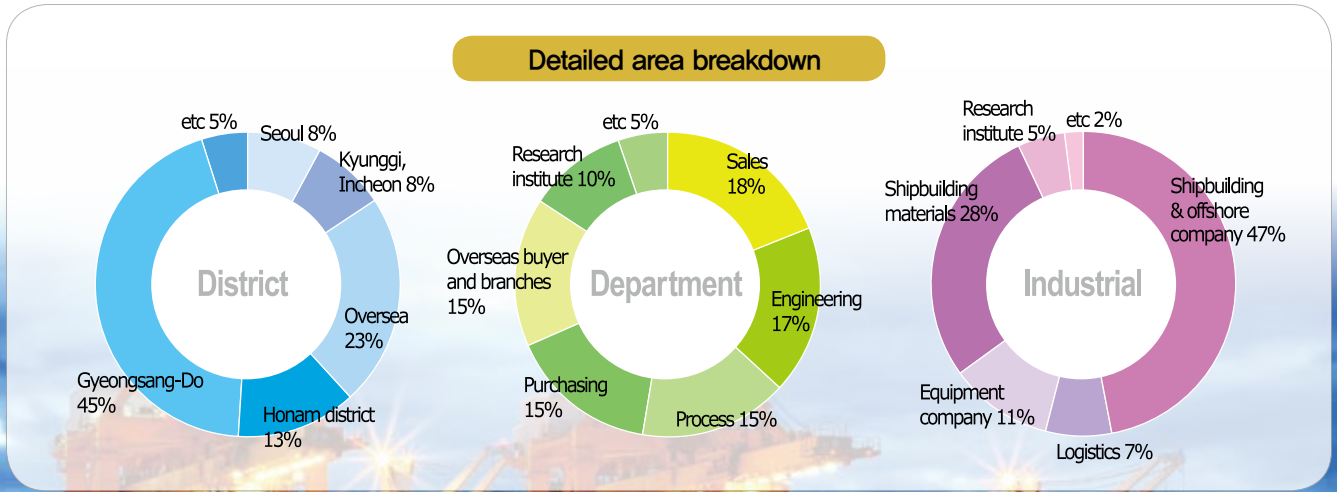
Introduce latest tendency and related news of industry through company interview.

Product

New shipbuilding & offshore industry products overview

Business News

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



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

쿠웨이트 KOC 벤더 등록

BFS Incorporation.
17, Geomdan-ro 114 beon-gil, Seo-gu,
Incheon, Korea
T.+82-32-329-9142 F.+82-32-329-9148
Web : www.bfsvalve.com
Master Mail : bfsvalve@bfsvalve.com

DNV GL: Energy transition changes the shape, but not the importance of shipping to the global economy

DNV GL published the Maritime Forecast to 2050 which analyses the impact of the changing global energy system on the shipping industry through to 2050. The report explores how the expected shifts in energy production and demand, GDP growth, industrial production and regional manufacturing might change the maritime industry, and the impact on individual ship segments.

"Big and rapid changes are happening in the way the world uses and produces energy," said Remi Eriksen, Group President and CEO of DNV GL. "Our Energy Transition Outlook (ETO) shows that by mid-century, the energy supply mix is likely to split equally between fossil and renewables. Advances in energy efficiency will also see the world's demand for energy flattening after 2030. These trends will impact all players in the maritime sector."

The Maritime Forecast projects that heading to 2030, shipping will continue to enjoy robust growth. From 2030 to 2050, demand continues to increase, but less rapidly – with the growth primarily in non-energy commodities, such as the container trade and non-coal bulk. In addition to the changing energy production and export patterns, shipping's fuel mix will become much more diverse. In 2050, oil will remain the main fuel option for trading vessels, but natural gas will step up to become the second-most widely used fuel, and new low carbon alternatives will proliferate.

"In the Maritime Forecast we can see the trends of today become the paradigms of tomorrow," said Knut Ørbeck-Nilssen. "Shipping will continue its drive for greater efficiency by reducing costs, improving utilization, lowering fuel consumption, increasing vessel size, and deploying new technologies. The current wave of digitalization transforming the industry will also have a profound impact – advancing design and operation and creating new business models."

DNV GL has published a suite of reports on the Energy Transition Outlook website, which are available to download free of charge. The main ETO report covers the transition of the entire energy mix to 2050. In addition to the Maritime Forecast, two other sector-specific supplements, based on DNV GL's deep expertise in the oil and gas, and power & renewables industries, accompany the main outlook.

DNV GL: 에너지 전환으로 해운업의 형태는 바뀌어도, 세계 경제에서 중요성은 바뀌지 않아

DNV GL이 2050년까지 해양 예측(Maritime Forecast to 2050) 보고서를 발표했다. 이 보고서는 2050년까지 변화하는 세계 에너지 시스템이 해운업에 미치는 영향을 분석한다. 보고서에서는 에너지 생산과 수요의 변동, GDP 성장, 산업 생산 및 지역 제조로 인해 해양 산업이 어떻게 변화할 것인지, 그리고 개별 선박 부문에는 어떤 영향이 발생할 것인지를 탐색했다.

DNV GL 그룹 레미 에릭센(Remi Eriksen) CEO는 "세계가 에너지를 사용하고 생산하는 방식에 크고 빠른 변화가 일어나고 있다"며 "자사의 에너지 전환 전망(Energy Transition Outlook, ETO)에 따르면, 2050년까지 에너지 공급 믹스는 화석에너지와 재생에너지가 같은 비율로 양분화될 전망이다"라고 밝혔다. 이어 "에너지 효율성이 높아지면서 2030년 이후에는 세계 에너지 수요 곡선이 평평해질 것으로 예상된다"면서 "이와 같은 경향은 해양 부문의 모든 기업에 영향을 미칠 것"이라고 말했다.

해양 예측 보고서는 2030년까지 해운업이 지난 수십 년과 비슷하게 견고한 성장세를 이어갈 것으로 전망했다. 2030~2050년에는 수요가 꾸준히 증가하지만, 그 증가 속도가 약간 꺾일 것으로 보인다. 성장세는 주로 컨테이너 무역과 비석탄 벌크(non-coal bulk) 같은 비에너지 화물에서 나타날 전망이다. 에너지 생산과 수출 패턴이 변화함에 따라, 해운업의 연료 믹스는 역시 훨씬 더 다양해질 것이다. 2050년까지 상선의 주된 연료는 여전히 석유지만, 천연 가스가 두 번째로 널리 사용되는 연료로 부상하고, 새로운 저탄소 대체 에너지도 확산될 것으로 예상된다.

DNV GL 해양사업부 크누트 오벡 닐센(Knut Ørbeck-Nilssen) CEO는 "해양 예측 보고서를 보면, 오늘의 경향이 내일의 패러다임이 되는 것을 알 수 있다"며 "해운업은 비용을 줄이고, 활용도를 높이며, 연료 소비를 낮추고, 선박 크기를 늘리며, 신기술을 채택함으로써 효율성을 높이기 위한 여세를 계속 몰아갈 예정"이라고 말했다. 덧붙여 그는 "현재 해운업을 변화시키고 있는 디지털화의 물결 역시 큰 영향을 미칠 것"이라면서 "설계와 운영을 발전시키고, 새로운 사업 모델을 구축할 것으로 예상된다"라고 설명했다.

DNV GL은 에너지 전환 전망(Energy Transition Outlook)에 관한 일련의 보고서를 발표해왔다. 이들 보고서는 웹사이트에서 무료로 다운로드 받을 수 있다. ETO 보고서는 2050년까지 전체 에너지 믹스의 전환을 다룬다. 해양 예측 보고서 외에도, DNV GL의 심층적인 전문지식을 기반으로 작성된 석유와 가스 및 전력과 재생 에너지 산업에 관한 부문별 구체적인 두 가지 보고서도 추가로 포함되어 있다.

APM the 15th edition of ASIA PACIFIC MARITIME
Shipbuilding & Marine • Workboat • Offshore

2018년 3월 14-16일
마리나 베이 샌즈 | 싱가포르
Hall A, B, C, D, E & F | www.apmaritime.com

당신을 아시아 조선해양, 선박, 해상 커뮤니티와 연결해 드립니다

27년의 역사를 가진 APM은 산업 전문가들이 인정하는 아시아의 주요 전시회입니다.

당신이 있어야 할 곳 - 기회의 바다에서 당신의 전략을 펼쳐보세요

APM에서 전략이 당신을 모든 곳에 데려다 줄 것입니다

2016 전시 개최 결과

- **6** 21,000sqm 이상에 다다르는 전시관 6개
- 60개국 **1,500명** 이상의 전시자
- **14회** 동안의 검증된 기록 (1990년 이래로)
- **14,954** 아시아 방문자
- **17** 공식 국가관
- **62** 명의 저명한 연사

APM2018참가문의처
T: +65 6780 4586
E: apm.sales@reedexpo.com.sg

주최: Reed Exhibitions®
광고: aif Approved International Fair
후원: MPA SINGAPORE, SINGAPORE EXHIBITION & CONVENTION BUREAU
개최: SG SINGAPORE Passion Made Possible
골드 스폰서: WEICHAI

/asiapacificmaritime | /company/asiapacificmaritime

General Dynamics NASSCO Begins Construction on Matson Containership

General Dynamics NASSCO has started construction on a Kanaloa-class containership for Matson Navigation Company, Inc., as part of a two-ship contract.

The 870-foot-long, 3,500 TEU containership design provides the capability to transport containers, automobiles and rolling stock, including trailers. Using proven design standards, the design incorporates liquefied natural gas-capable main and auxiliary engines, which are compliant with Tier III emission requirements. The design accommodates future installation of a LNG fuel gas system.

"We're honored to advance the Matson fleet with two large, modern vessels reflecting the highest standards of design and energy efficiency," said Kevin Graney, president of General Dynamics NASSCO. "The construction we began today, and the contracted work for several additional U.S. Navy ships, require additional manpower at our San Diego shipyard. NASSCO will soon begin hiring to continue our reputation of delivering high quality ships on schedule."

"These Jones Act-qualified, Kanaloa Class vessels are designed specifically for our Hawaii service, and we're thrilled to partner with NASSCO on their development," said Ron Forest, president of Matson. "The start of construction today has only heightened our excitement to watch these vessels come to life, and we look forward to seeing them serving our customers in the Hawaii trade."

Representatives from NASSCO and Matson gathered in San Diego for a brief ceremony to cut the first pieces of steel, signifying the start of construction for the first of two vessels for Matson. Construction of the first ship is scheduled to be complete in 2019. A second Kanaloa-class containership for Matson will begin construction in 2018 with delivery in 2020.

NASSCO partnered with Daewoo Ship Engineering Company to provide Matson with state-of-the-art ship design and shipbuilding technologies. For more than a decade, this partnership has produced premium ships for five separate Jones Act owners.

NASSCO serves as the only major shipyard on the West Coast of the United States designing, constructing and repairing ships for the U.S. Navy and commercial customers. In the past decade, NASSCO has delivered more than 30 cutting-edge, ocean-going ships, including the world's first LNG-powered containerships.

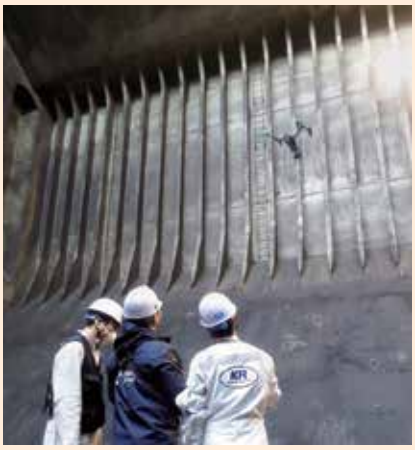
KR launches survey services using drones

Korean Register (KR) has announced that it is now conducting inspection services using drones, responding to the industry-wide trend to use more unmanned technology. The new service which has been successfully trialled and now launched, follows extensive collaboration and research conducted with the University of Gyeongnam Geochang.

The drone inspection will save KR's customers time and money and will enhance the safety of the organisation's workforce. The Inspection is conducted onboard, in and around ships and many of the inspected areas are high risk and difficult to access safely.

The inspections will be carried out using drones (U.A.V. unmanned aerial vehicle) and underwater drones (R.O.V. remotely operated vehicle) and will be an important part of the decision-making and assessment process for KR's surveyors, complimenting their traditional surveying skills.

After researching the possibilities and technology available, KR successfully completed a series of tests utilising camera-equipped drones for ship inspections, and at the same time established a registration process for service suppliers, including the University of Gyeongnam Geochang. The

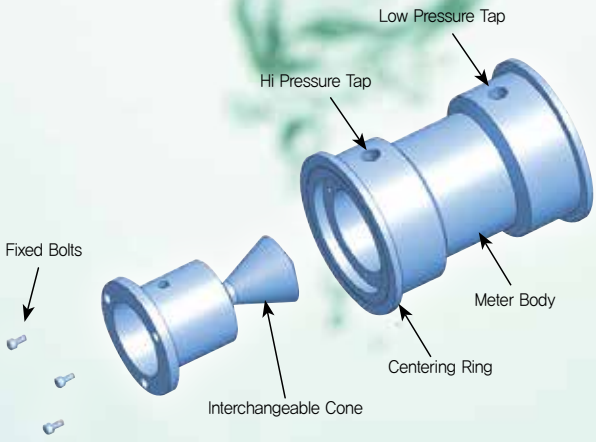


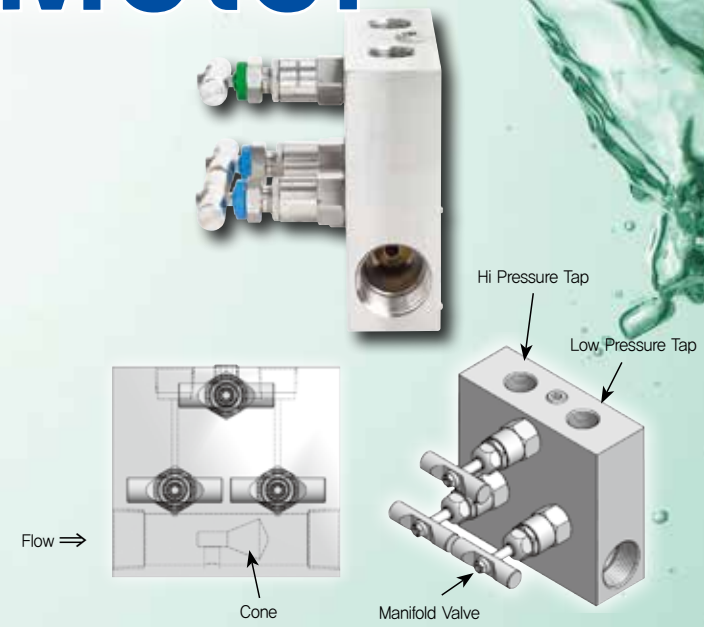
two organisations now plan to work together on future technological developments.

(주)하이트롤과 함께하는 Oil & Gas Companies

Cameron ExxonMobil Chevron TOTAL bp

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 교정시스템**에 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 뭉치의 충격으로 인한 Cone의 변형에 쉽게 교체 사용할 수 있는 특징을 가지고 있다. 또한, Wafer형태로 설치가 용이하고 모든 구성품이 정밀 기계가공되어 측정정확도가 우수하며, 용접부가 없어 압력부의 건전성이 확보 되었다.

(특 허 : 제 10-0915088호)

IVCM

IVCM은 차압식 유량계의 필연적 구성품인Manifold Valve를 Meter body와 일체형으로 제작하여 공정시 발생할수 있는 연결부의Leak를 최소화 하고, 설치시 공사 비용 및 시간을 줄이는 장점을 가진다.

(특 허 : 제 10-0915089호)

HITROL **HITROL CO., LTD.**

FCC **FCC CO., LTD.**
FLOW CALIBRATION CENTER

유체 유량(ISO 17025) 국제 교정기관

(주)하이트롤 본사 · 공장 · 연구소
경기도 파주시 조리읍 팔학골길 141
TEL : (031) 950-9700 FAX : (031) 943-0878/5600
http:// www.hitrol.com E-mail : hitrol@hitrol.com

(주)에프씨씨
TEL : (031) 950-9752 FAX : (031) 950-9796
E-mail : fcc@hitrol.com

"We are delighted to announce that we can now offer full ship inspection services with camera-equipped drones, employing the very latest technology. This development will be a significant advantage for our customers', saving their time and capital resources as well as increasing efficiency and safety at the worksite, which I hope, will in turn improve competitiveness across the shipping industry", said Lee Jeong-kie, Chairman and CEO of KR. "This is just the latest development in KR's continuous efforts to identify and develop new practical ways to meet our clients' needs, and to enhance their businesses prosperity."

Moving forward, KR plans to provide services using a variety of different drones to expand its inspection service areas. To offer high quality and more diverse services to more clients, KR will carry out further research and development into the relevant technology, while vetting and registering more secure service suppliers around the world, particularly in China and across Asia.

한국선급, 드론활용 선박검사 서비스 본격화

한국선급(KR)은 12월 5일 경상남도청 도정 회의실에서 거창대학 산학협력단과 원격선박검사 기술 활용 기획 및 개발을 위한 MoU 체결식을 갖고, 드론을 활용한 원격선박검사 서비스를 개시했다고 밝혔다. 양 기관은 MoU 내용으로 원격검사기술의 활용 기획 및 개발에 대한 상호교류 및 정보교류 실시, 시설 및 기자재 공동 활용, 공동발전을 위한 사업개발 및 추진 등에 대한 사안을 합의했다.

특히 이번 MoU 체결과 함께 거창대학 산학협력단이 국내 최초로 드론을 활용한 원격선박검사 분야에서 한국선급의 기술서비스 전문공급업자로서 인정받게 되었다는 점에서 의미가 크다.

전 세계적으로 화두인 4차 산업혁명 기술이 해사산업계에도 확대되고 있는 가운데 한국선급의 원격검사기술의 도입으로 선박검사의 안전성과 효율성이 향상될 것으로 기대된다. 또한 축구장 몇 배 크기인 선박 한 척을 사람이 직접 검사하고 준비하는데 수반되는 시간과 비용 등이 크게 감소하여 해운업계의 가격경쟁력과 운영의 효율성도 크게 높아질 것이라 예상된다.

한국선급 관계자는 "드론(UAV, Unmaned Aerial Vehicle), 수중드론(ROV, Remotely Operated Vehicle)의 활용은 전통적 방식의 선박검사 한계를 보완해 선급검사원의 중요한 의사결정 도구로서 자리매김할 것"이라며, "이번 전문공급업자 승인으로 고객들에게 한층 더 풍부한 검사서비스를 제공할 수 있게 되었으며, 선박검사에 있어 드론 등 최신 기술을 활용하는데 도움이 될 것"이라고 말했다.

한국선급은 거창대학 산학협력단과의 원격검사에 관한 기술협력을 기반으로 고객에게 고품질의 검사서비스를 제공해 나갈 계획이다. 한편 한국선급 인증원은 이날 체결식과 함께 품질 분야 국제표준인 ISO9001 경영시스템 인증서 수여식을 열고, 거창대학 산학협력단에 인증서를 수여했다.

Emerson Extends Industrial IoT Application Portfolio

Emerson announced an extension of its Plantweb digital ecosystem with the new Plantweb Insight Heat Exchanger app, an affordable, easy-to-use analytics and asset alert predictive intelligence tool, which provides maintenance staffs real-time access to critical heat exchanger diagnostics anytime, anywhere to improve operations in chemical, oil and gas and refining operations.

Providing quick return on investment through reduced slowdowns and shutdowns, Emerson's Plantweb Insight apps leverage Emerson's Pervasive Sensing™ Strategies to help users instantly make sense of plant data and drive overall enterprise profitability. Emerson's Plantweb Insight Heat Exchanger app joins the previously announced apps for pumps, steam traps and pressure gauges.

The Plantweb Insight apps employ prebuilt algorithms based on decades of process experience and industry-vetted analytics to deliver predictive diagnostics, enabling maintenance prioritization. The easy to use interface allows maintenance and operations to take instant action within a browser from any laptop, tablet, smartphone or other device connected to the network.

Plantweb Insight monitors shell and tube heat exchangers to provide real-time status and alerts including fouling, heat duty and heat transfer coefficient. It does not require integration with the plant's existing monitoring and control system. It can operate completely independent of existing or legacy control systems. The app can also leverage existing data points if desired, using OPC UA to collect data stored in the control system, historian or data base if access is available.

Plantweb Insight apps paired with wireless instrumentation lower the cost to entry for customers looking to implement an Industrial IoT strategy. Emerson's Plantweb digital ecosystem is a next-generation Industrial IoT portfolio that extends the power of automation beyond process control to the entire enterprise.

에머슨, IIoT 어플리케이션 포트폴리오 확장

에머슨이 플랜트웹 디지털 에코시스템(Plantweb digital ecosystem)의 확장판으로, 플랜트웹 인사이트 열교환기 앱(Plantweb Insight Heat Exchanger)을 출시했다. 해당 앱은 보다 손쉬운 분석 및 자산경보 예측 인텔리전스 툴로서 유지보수 직원은 언제 어디서나 중요 열교환기 진단에 실시간 접근해 화학, 석유 및 가스, 정유 산업의 운영 성능을 개선할 수 있다.

플랜트웹 인사이트 앱은 에머슨의 퍼베이시브 센싱(Pervasive Sensing™) 전략을 활용해 사용자가 신속하게 플랜트 데이터를 파악하고 전반적인 기업 수익성을 높일 수 있도록 지원한다. 에머슨의 플랜트웹 인사이트 열교환기 앱은 펌프, 스팀트랩 및 압력 게이지와 관련된 이전 앱과 통합된다.

플랜트웹 인사이트 앱은 수십 년 간의 프로세스 경험과 산업 내 입증된 분석을 기반으로 사전 구축된 알고리즘을 사용, 예측적 진단 제공은 물론 유지보수의 우선순위를 결정할 수 있도록 해준다. 편리한 인터페이스로 네트워크에 연결된 모든 노트북, 태블릿, 스마트폰 또는 기타 장치 내 브라우저를 통해서 즉각적인 유지보수 및 운영 조치를 취할 수 있다.

플랜트웹 인사이트는 다관형(shell-and-tube) 열교환기를 모니터링해 파울링(fouling), 열부하(heat duty) 및 열전달 계수(heat transfer coefficient)를 포함하는 실시간 상태 및 경보를 제공한다. 플랜트의 기존 모니터링 및 제어 시스템에 통합될 필요가 없으며, 기존 또는 레거시(legacy) 제어 시스템과는 완벽하게 독립적으로 운영 가능하다. 또한 필요할 경우 OPC UA를 사용해 접속 가능한 제어 시스템, 이력 장치 또는 데이터베이스 내 저장된 데이터를 수집하는 등 기존 데이터 포인트를 활용할 수 있다.

플랜트웹 인사이트 앱과 무선 계측을 함께 사용하면 산업사물인터넷(IIoT) 전략을 구현하려는 고객의 진입 비용을 절감할 수 있다. 에머슨의 플랜트웹 디지털 에코시스템은 프로세스 제어 이상의 자동화 기능을 기업 전체로 확대하는 차세대 산업사물인터넷 포트폴리오이다.

Chevron Marine Lubricants Publishes New White Paper - Methanol and Marine Lubricants in a Lower Sulphur, Lower Emissions Future

Chevron Marine Lubricants, a leading lubrication solutions provider for alternatively fueled vessels and one of the largest suppliers of marine lubricants in the world, today has released the first in a series of new white papers focusing on innovations and developments impacting the fast-changing shipping industry.

"Methanol and Marine Lubricants in a Lower Sulphur, Lower Emissions Future" explores the use of methanol bunkers, and how Chevron's Taro® Special cylinder lubricants and DOT.FAST® service play a critical role in the successful operation of M/T Mari Jone and M/T Mari Boyle, two of the world's first ocean-going methanol dual-fuel ships.

The white paper has been produced in consultation with:

- Vancouver, Canada-based Methanex Corporation, whose Waterfront Shipping subsidiary are co-owners and charterers of the vessels.
- Private ship manager and investment group Marinvest Shipping AB, who are also co-owners of the vessels.
- MAN Diesel & Turbo who produced the ME-LGI methanol dual-fuel two stroke engines for M/T Mari Jone and M/T Mari Boyle.

"The reality of a lower sulphur, lower emissions future for shipping is already here. ECA and IMO 2020 regulations mean that in addition to the shifting use trends of traditional marine fuels, shipowners and operators are increasingly turning to the use of alternative marine fuels to meet the challenges of a rapidly changing legislative and operational landscape," said Ian Thurloway, Chevron Marine Lubricants Brand and Marketing Manager.

Chevron is a leader in providing complete and reliable lubrication solutions for the all types of alternatively fueled vessels. Its full range of Taro® cylinder lubricants, from the low 25 BN Taro® Special HT LF to the new 140 BN Taro® Special HT Ultra, provide solutions for the complex operating requirements of today, and tomorrow.

Alongside the use of Chevron's Taro® cylinder lubricants, Chevron's DOT.FAST® service is used to optimise engine lubrication and manage feedrates. DOT.FAST® provides both onboard and onshore analysis of drip oil giving an accurate measurement of total iron wear, including corrosive wear. Combining both a drip oil analyzer for iron wear and a BN tester, it is the best such service in the market today.

Methanol is just one of a range of exciting alternative fuels that, along with LNG, LPG, and ethane among others, are set to play an increasingly important role in the future of shipping.

ABB Turbocharging tops industry efficiency benchmark

ABB Turbocharging has raised the industry benchmark for low-speed turbocharging efficiency to achieve an additional turbocharger efficiency increase of 2% by performing the measurement on an actual engine on an engine testbed.

As a performance yardstick for low-speed turbochargers, the industry applies the turbocharger efficiency benchmark given by MAN Diesel & Turbo, a leading global low-speed engine designer. ABB Turbocharging has now proven an exceptional 2% higher efficiency compared to this industry standard.

The ABB turbocharging efficiency benchmark test took place earlier this year on a Hyundai testbed in Korea. Three ABB latest generation A180-L turbochargers, produced by Hyundai under license, were fitted on an 8G95ME-C9.5 engine and the turbocharging efficiency was measured accordingly. The measurement was performed with state-of-the-art wireless measuring equipment to ensure highest data accuracy.

For marine operators the additional 2% efficiency increase achieved by the ABB A180-L turbochargers would mean annual fuel savings of up to 35,000 USD per vessel, depending on fuel price and load profile. This exceptional efficiency increase was also confirmed and verified by MAN Diesel & Turbo.

Fuel and maintenance costs have the highest impact on lifecycle costs and therefore total cost of ownership (TCO). This efficiency increase in turbocharging and the resulting effect of lower fuel consumption and costs will have a direct positive impact on the overall TCO for application operators.

Arie Smits, Senior General Manager, Product Group Low-Speed at ABB Turbocharging said, "The result of the measurement on an actual engine is a confirmation of our promise and commitment to continue to push for highest efficiencies and value for our customers. Promised, delivered and proven."

Jotun turns to DNV GL's Veracity platform to optimize delivery of maritime coatings

Jotun is using DNV GL's Veracity platform to combine external and proprietary data to optimize the delivery of its maritime coatings at port. Veracity creates an ecosystem where users can safely share data and link it to other quality assured datasets to extract value. In this case Jotun is using the Estimated Time of Arrival (ETA) dataset to ensure it has the right amount of product in the right place.

"Veracity is making paint digital. Jotun have recognized that even products that seem as analogue as paint can benefit from digital solutions and this is an example of how Veracity is not simply a platform for data but also a place for collaboration," said Bjørn Tore Markussen, Managing Director of the Veracity platform unit in DNV GL.

Ships have for some time reported their positions through Automatic Identification System (AIS) transponders but a team from DNV GL have cleaned the data and then developed an algorithm that accurately predicts arrivals at ports. Jotun joined the Veracity pilot program to verify its benefit to the market and it became apparent that an early approximation for vessels future port visits could provide value to Jotun's supply chain. A more comprehensive understanding of the movements of the global fleet allows Jotun to optimize their stock and delivery planning.

Jotun's digitalisation journey started more than 6 years ago with the development of the Hull Performance Solutions (HPS). In HPS, high-frequency sensor data from onboard vessels is used to track and guarantee the performance of the underwater hull coatings, protecting the hull from biofouling and increased friction. Following this suc-

cessful IoT (Internet of Things) experience, Jotun strives continuously to identify areas where data delivers extra value for both the vessel owner or operator and Jotun. The ETA project with DNV GL is one such example where data and advanced analytics create benefits.

Geir Axel Oftedahl, Business Development Director at Jotun said, "A platform like Veracity opens new opportunities for us. Instead of Jotun acting alone or bilaterally with DNV GL, we are able to reach out and tap into the capacities from a range of different partners."

DNV GL is currently developing ETA Enhanced which will build on the current model that will more accurately predict the arrival of vessels by utilizing specific data about various vessels from the asset owners themselves.

현대중공업, LNG 추진선 시장 선점 나선다

현대중공업은 최근 부산 현대글로벌서비스 본사에서 폴라리스쉬핑, SK해운, 대한해운, H-line 해운 등 9개 국내 유수 선사들을 대상으로 자체 개발한 LNG 추진 벌크선에 대한 기술 설명회를 가졌다고 지난 17일 밝혔다.

이번에 소개된 LNG 추진선형은 18만톤급 및 25만톤급 대형 벌크선 디자인으로, 기존 선박보다 황산화물(SOx)과 질소산화물(NOx), 이산화탄소(CO_2) 배출을 각각 99%, 85%, 25% 이상씩 줄여, 국제해사기구(IMO)의 강화된 환경규제 기준을 모두 충족시킬 수 있다.

최근 국제해사기구(IMO)의 환경규제 강화에 따라, 기존 LNG 운반선 일부에 적용되던 LNG 추진설비를 유조선, 컨테이너선, 벌크선에도 적용하고자 하는 선주들의 요구가 늘고 있다. 실제 최근 공개된 'SMM 해사 산업 보고서(SMM Maritime Industry Report)'에 따르면, 글로벌 선주사 10곳 중 4곳 정도(44%)는 신규 발주시 LNG 추진선을 고려하고 있는 것으로 나타났다.

이러한 시장 변화에 대응해 현대중공업그룹은 다수의 LNG 추진선을 수주하며 친환경 선박 시장을 주도해 나가고 있다. 현대미포조선은 지난해 5만톤급 LNG 추진 벌크선 1척을 수주했으며, 현대삼호중공업도 올해 세계 최초 LNG 추진 대형유조선 6척을 수주한 바 있다.

현대중공업 관계자는 "이번 기술설명회를 통해 LNG 추진선박에 대한 선주들의 높은 관심을 확인할 수 있었다"며, "친환경 기술을 바탕으로 향후 LNG 추진선 시장을 선도해 나갈 것"이라고 밝혔다.

대우조선해양, 세계 최고 수준의 LNG 기술력 증명

대우조선해양은 자체 개발한 간접 열교환식 재기화 장치와 LNG 화물창인 '솔리더스(SOLIDUS)' 그리고 '맥티브(MCTIB)' 시연회를 옥포조선소 내 에너지시스템 실험센터에서 성공적으로 개최했다고 지난 12월 18일 밝혔다.

이번 시연회에는 글로벌 해운업계 및 에너지 관련사, 영국 Lloyd 등 해외 선급의 주요인사 80여명이 참석해 대우조선해양의 신기술에 높은 관심을 보였다. 특히, 실제 LNG를 사용해 성능을 입증한 재기화 장치와 실물크기 모형으로 제작해 공개한 솔리더스와 맥티브는 시연회에 참석한 고객들의 찬사를 받았다.

이날 시연된 재기화장치는 대우조선해양이 자체 개발한 간접 열교환 방식의 기화기가 적용되었으며, 그간 축적한 다양한 LNG 시험결과를 바탕으로 개발된 것으로 이 기술이 적용되면 초기투자비와 운영비를 절감할 수 있을 것으로 기대된다. 실제 이 재기화장치는 옥포조선소에서 건조 중인 LNG-FSRU에 탑재되어 2019년 발주사에 인도될 예정이다.

또 지난 10월 대우조선해양이 해양수산부의 일부 지원과 함께 독자적으로 개발한 LNG 화물창 솔리더스는 이중 금속 방벽을 적용해 안전성을 극대화한 차세대 멤브레인형 화물창으로, 독일의 화학회사인 BASF와 협력을 통해 개발된 친환경·고성능의 단열재가 적용됐다. 솔리더스는 그간 업계에서 한계치라고 여기던 화물창의 일일 LNG 증발률을 0.07%에서 0.049%대로 획기적으로 낮출 수 있을 것으로 기대된다. 이 차이는 17만㎥급 LNG

운반선을 25년간 운행한다고 가정했을 때 총 125억원 상당의 액화천연가스를 절약할 수 있는 규모다.
이로써 대우조선해양은 기존 개발한 재액화 장치를 이용해 액화천연가스의 능동 증발량을 제어한데 이어 솔리더스를 통해 수동 증발량까지 제어할 수 있게 돼 LNG 화물창 분야에서 세계 최고수준의 기술력을 보유하게 됐다.
한편, 이날 함께 소개된 '맥티브(MCTIB, High Manganese steel Cargo Tank Independent Type-B)'는 고망간강을 적용한 LNG 저장탱크로 기존 제품보다 안전성이 우수하며, 외부 충격에 강하고 공간을 최적화할 수 있다. 또한, 제작 비용 역시 절반 수준으로 줄어 원가 경쟁력에도 기여할 수 있다.
대우조선해양 관계자는 "대우조선해양이 각고의 노력으로 자체 개발한 LNG 재기화 장치와 솔리더스, 맥티브를 주요 고객을 상대로 한번에 시연할 수 있게 되어 기쁘다"며 "세계 최고 수준의 LNG 기술력을 중심으로 경영정상화에 노력하겠다"고 말했다.

한국가스공사, 중국 CNPC와 천연가스 사업 협력 MOU 체결

한국가스공사는 지난 12월 15일 중국 베이징에서 중국석유천연가스공사(China National Petroleum Corporation, CNPC)와 천연가스 사업 협력을 위한 양해각서(MOU)를 체결했다. 현재 양사는 모잠비크 Area 4 광구 자원개발 및 LNG 액화사업과 캐나다 LNG 액화사업에 공동 참여하고 있으며, 이번 문재인 대통령의 중국 방문을 계기로 양국 천연가스 사업 협력 강화를 위해 MOU를 체결하게 됐다.
이번 MOU 체결로 양사는 천연가스 수급 안정을 위한 트레이딩, LNG 저장탱크 건설, LNG 터미널 시운전 및 교육훈련 등에 협력하며, 특히 그 동안 LNG 도입시 지속돼 온 이른바 '아시아 프리미엄' 지불 관행 개선 및 동북아 천연가스 시장 형성을 위해 함께 노력할 계획이다.
이에 앞서 가스공사는 중국석유화공집단공사(Sinopec Group) 및 베이징가스(Beijing Gas)와 해외 자원개발 분야 기술 협력 강화를, 중국해양석유총공사(China National Offshore Oil Company, CNOOC)와 LNG 트레이딩 분야 협력 강화를 각각 논의했다. 또한 중국 정부가 대기환경 개선을 위해 추진하고 있는 석탄에서 가스로의 연료 전환정책(Coal to Gas Switching)과 관련해 동절기 가스 수급 불안정 해소를 위한 협력 강화방안도 함께 협의했다.
한편 CNPC는 중국 최대 석유·천연가스 회사로 원유 및 천연가스 탐사·개발, 정유, 석유화학, 천연가스 배관 건설·운영, 엔지니어링 및 건설 등에 이르기까지 폭넓은 사업영역을 가진 세계적 에너지 기업이며, 2017년 포춘지가 선정한 글로벌 500대 기업 중 4위를 차지했다.

(왼쪽 부터) 한국가스공사 안완기 사장 직무대리, CNPC 장젠화 사장

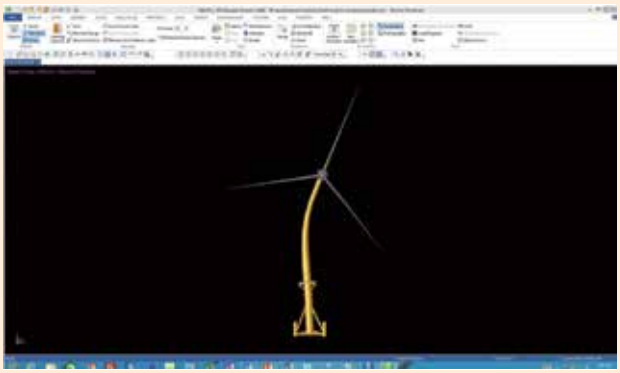
KCC, 선박용 방청도료 등 '세계일류상품' 9년 연속 선정

KCC가 올해도 선박 방청·방오도료 등 3개 제품이 대한무역투자진흥공사(KOTRA)가 주관하는 '세계일류상품'에 선정됐다. 이번에 선정된 제품은 2009 년부터 9년간 연속으로 선정된 선박용 방청도료(Korepox EH2350)와 진공차단기용 세라믹(VI: Vacuum Interrupter) 2개 품목, 2011년 첫 선정된 이후 8년 연속 선정된 선박용 방오도료(Seacare A/F795) 등 총 3개 품목이다.
세계일류상품은 국내 수출산업을 주도할 대표 상품을 육성하기 위해 부여하는 공식 인증으로, 세계시장 점유율 5위 이내이면서 5% 이상인 제품 중 세계시장 규모가 연간 5,000만 달러 이상이거나 수출 규모가 연간 500만 달러 이상인 상품에 수여한다. KCC 의 선박용 방청도료, 방오도료와 진공차단기용 세라믹은 뛰어난 품질과 성능으로 세계 각국으로 수출되는 대표적인 글로벌 제품으로, 이들 분야에서 독자적인 기술력을 토대로 꾸준히 세계시장에서 높은 점유율을 유지하고 있다.
9년 연속 세계일류상품으로 선정된 선박용 방청 도료 'Korepox EH2350'은 내염수성과 내마모성이 매우 뛰어난 제품으로, 극심한 해양 부식 환경 속에서 선박의 해수 탱크, 파이프 등 철 구조물을 보호해 녹이 생기는 것을 막아준다. 또한 7년 연속 선정된 오염 방지 기능이 뛰어난 방오도료 'Seacare A/F795'는 장기간 운항하는 선박의 선체에 붙어 서식하는 해중 생물체로부터 선박을 보호하고 선박의 운항 효율을 증가시켜 연료를 절감시킬 수

있는 제품이다.
진공차단기용 세라믹 'VI(Vacuum Interrupter)'는 전류의 정상부하 개폐 및 전류사고가 발생했을 때 회로를 분리하는 진공 차단기에 사용되는 세라믹 소재로, KCC가 국내에서 유일하게 생산하고 있으며 글로벌 시장에서 유수의 업체들과 경쟁하고 있다.
KCC 관계자는 "우리는 2009년부터 꾸준히 세계일류상품에 선정되며 선박용 방청·방오 도료, 진공차단기용 세라믹 분야에서 세계 정상급 제품임을 인정받고 있다"며 "앞으로도 다양한 분야에서 글로벌 탑(Global Top) 제품의 개발 글로벌 시장 점유율 향상을 위해 기존 제품의 고부가가치화를 실현함은 물론, 꾸준한 R&D 투자와 기술력 개발을 통해 더 많은 제품이 세계일류상품에 선정될 수 있도록 노력해 나갈 것"이라고 말했다.

벤틀리, 풍력 터빈 구조물 해석 툴 최적화

벤틀리시스템즈(Bentley Systems)가 벤틀리 시나리오 서비스의 확장 기능인 SACS Wind Turbine Analysis 해양 구조 해석 툴의 일반 액세스를 발표했다. 이 새로운 클라우드 서비스를 통해 바람 및 파도 하중을 받는 터빈 구조물을 더 신속하고 탄탄하게 해석할 수 있게 됐다. 클라우드에서 고성능 병렬 컴퓨팅을 활용해 몇 시간이 아니라 몇 분 안에 풍력 터빈 구조 해석을 수행할 수 있다. 극적으로 개선된 작업 시간 덕에 엔지니어는 더 다양한 잠재적 솔루션을 고찰하여 이상적인 최적의 설계를 찾을 수 있다.
일반적인 풍력 터빈 프로젝트에서 엔지니어는 일정 기간 동안 실제 수행할 수 있는 설계 반복 횟수, 이상적 모델의 복잡성, 파도, 바람, 기계적 하중 조건의 개수와 범위를 절충해야 한다. Bentley SACS Wind Turbine Analysis를 사용하면 최적화를 절충하거나 하중 조건의 개수를 줄이지 않고 종합 설계를 수행하는데 걸렸던 시간 동안 여러 설계 대안을 검토할 수 있다. 또한 필요한 클라우드 컴퓨팅 용량을 선택할 수 있는 새로운 단계별 성능 기능도 함께 제공된다. 하중 사례 개수, 모델 복잡성, 원하는 해석 완료 시간과 가장 가까운 단계를 선택해 보다 효과적으로 해석 비용을 관리할 수 있다.



Keystone Engineering의 자카리 피누케인(Zachary Finucane) P.E, 프로젝트 관리자는 "벤틀리의 SACS 풍력 터빈 모듈을 통해 해석 프로세스를 간소화하고 설계 주기 시간, 고객 비용, 3,000건이 넘는 시간-영역 시뮬레이션을 수행하는데 필요한 엄청난 양의 데이터를 관리하면서 발생하는 오류의 위험을 줄일 수 있었다"라고 말했다.
벤틀리시스템즈의 라울 카프(Raoul Karp) 해석모델링개발 부사장은 "종합적인 풍력 터빈 해석을 수행하려면 언제나 모델 복잡성, 하중 완전성, 보수적 가정을 적당히 절충해야 했다. 이제 무한대로 클라우드 컴퓨팅 자원을 사용할 수 있다. 사내 데스크톱 솔루션을 사용하는 것보다 훨씬 짧은 시간 내에 모든 하중 조건과 모델 복잡성을 검토할 수 있다"라고 말했다.

현대글로벌서비스, DNV-GL로부터 'ISO 9001' 획득

현대중공업그룹 계열사인 선박 서비스 전문회사 현대글로벌서비스는 국제인증기관인 DNV-GL로부터 'ISO 9001:2015' 인증을 획득했다고 지난 11월 30일 밝혔다. 'ISO 9001'은 국제표준화기구(ISO)에서 제정한 품질경영 시스템 국제인증으로, 품질경영 관련 요구사항을 만족하고 지속적으로 유지·관리되고 있다는 것을 제3자 인증기관이 심사를 통해 인증해주는 제도다.
현대글로벌서비스는 분사 직후인 지난해 말부터 관련 조직을 정비하고, 각 부문별 표준 매뉴얼, 절차서, 지침서 등을 체계적으로 마련하는 등 이번 인증 획득을 위한 절차를 철저히 준비해왔다.
현대글로벌서비스는 'ISO 9001'인증을 획득함으로써 전 세계 선박 서비스 및 친환경 선박 개조 시장에서 선도적 역할과 능동적으로 대처할 수 있는 기틀을 마련하게 됐다. 이를 바탕으로 급변하는 시장 환경 속에서 고객이 신뢰할 수 있는 높은 수준의 서비스를 안정적으로 제공한다는 계획이다.
현대글로벌서비스 관계자는 "이번 'ISO 9001' 인증 획득은 현대글로벌서비스의 품질과 안정성을 인정받은 결과"라며, "앞으로도 고객 만족을 위해 체계적인 서비스를 제공, 선박 애프터마켓 분야에서 세계 최고의 기업이 될 것"이라고 말했다.
한편 현대글로벌서비스는 지난해 12월 현대중공업으로부터 분할, 신설된 선박서비스 전문 회사로, 선박 인도 후 폐선까지 필요한 정비·수리·개조 및 토탈 엔지니어링 서비스 제공, 선박 기자재 공급, 기술지원 등의 사업을 영위하고 있다.

Bright outlook for shipbuilding industry in 2018

- Full-fledged rebound of order placement in shipbuilding market

(Source: Daewoo Shipbuilding & Marine Engineering)

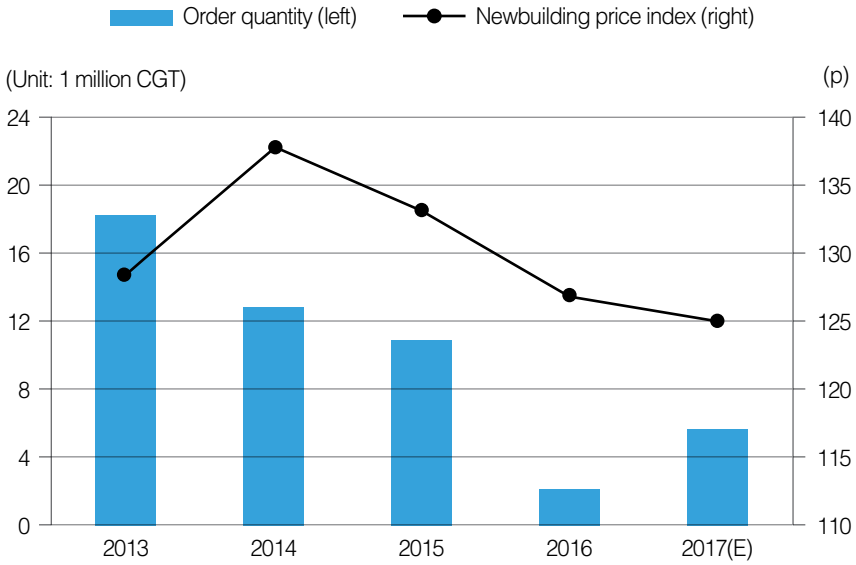


Figure 1. Global shipbuilding order quantity & newbuilding price index (Source: Clarkson)

Shipbuilding industry is expected to turn around in 2018 after prolonged recession. According to shipbuilding industry, cargo traffic volumes have increased slowly on the back of global economic recovery. In addition, upturn in order placement and ship prices are expected to help ease the path to recovery in shipbuilding market.

According to the Report on Newbuilding Market for 2017-2029, published recently by Clarkson, the outlook for order placement for 2017 and 2018 has improved, compared to the preceding 6 month. This suggests that shipbuilding order placement has gathered pace in half a year. The unit cost of ship construction is also expected to improve next year. The stronger demand in shipbuilding market is driven by elimination of supply glut which remained persistent until this year, eased competition among shipyards as a result of restructuring, and forthcoming replacement of aging vessels built after 2003, the period of skyrocketing order placement.

Positive signals from shipbuilding market drive the rosy outlook for this year. According to Clarkson, the volumes of scrapped vessels worldwide stood at 36.4 million DWT last year. That represents an increase by 2.7 million DWT from 2014 (33.7 million DWT). The shipbuilding industry considers that increasing volumes of scrapped vessels signify an upswing in order placement.

Global sulfur cap on marine fuels will be lowered from 3.5% to 0.5%, starting from 2020, as required by the environmental regulations of the IMO (International Maritime Organization). Global shipping companies are likely to install desulfurization equipment on board vessels or place orders for newbuilds to replace aged vessels. That may create a new opportunity for domestic shipyards that have technologies for construction of eco-friendly vessels.

The newbuilding price index is also improving. The newbuilding price index is calculated with the base 100 taken as the average index value as of January 1988. It fell to 121 points, the lowest, last March before rising to 125 points last November.

New order likely to jump 54.3% in 2018

This year, eco-friendly vessels will come to spotlight in global shipbuilding market amid enforcement of stringent environmental regulations set forth by the IMO (International Maritime Organization). Currently, global ship owners have no choice but to install desulfurization equipment or build new ships outfitted with desulfurization equipment in order to cope with ever more stringent environmental regulations.

By vessel type, bulk carrier segment has seen a constant

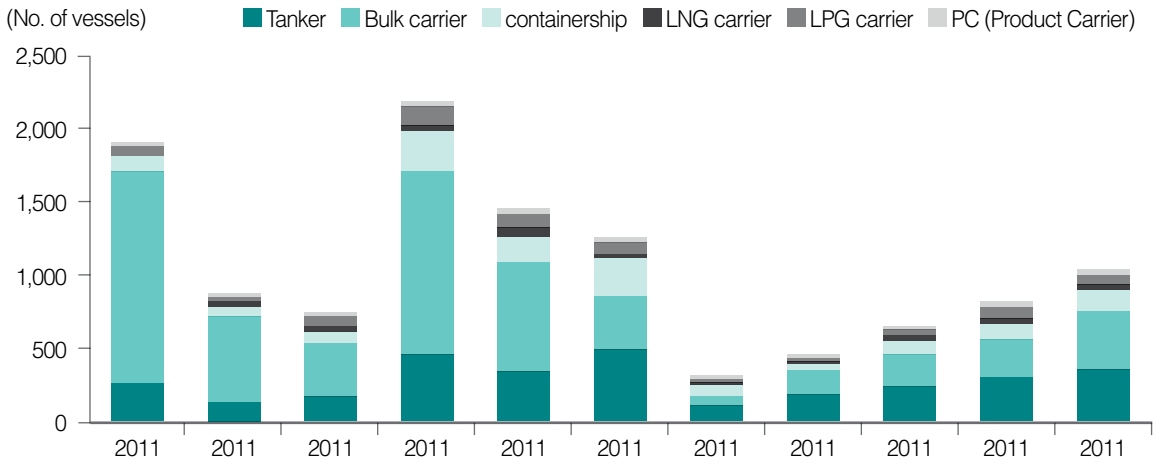


Figure 2. Outlook for global shipbuilding order quantity by vessel type (Source: Clarkson)

rise in BDI (Baltic Dry Index). In fact, the BDI hit 1,137 points in the third quarter of last year, up 54% from 2016, driven primarily by an increase in cargo traffic volumes of iron ore, coal, grain, etc. Prices of iron ore have recovered to their previous levels, buttressed by an increase in China's iron ore imports. As a result, orders for ultra-large bulk carriers are also increasing. The outlook for containership segment is relatively bright. As global economy is recovering, short-term and long-term freight rates of containership are expected to rebound. Tanker segment is expected to see a surging demand in Iran, Iraq, India, etc., while gas carriers have been in greater demand underpinned by rising demand for natural gas amid enforcement of rigorous global environmental regulations.

According to shipbuilding industry, about 600 vessels are expected to be ordered in 2018, an increase by more than 50% from 429 units ordered last year. This year, new orders are expected to be dominated by MR tankers and LPG carriers, the segments with an increasing proportion of aging vessels and lowest order backlog in history worldwide compared to global quantity of vessels and by Capesize class bulk carrier, medium-sized containership, PCTC (Pure Car and Truck Carrier), etc. Meanwhile, newbuilding prices are expected to rise about 15% from the previous year's levels. That reflects the return of new orders to Korean shipyards from Chinese shipyards that have swept low-price contracts and often delayed ship construction. Furthermore, steel price rise is expected to put an upward pressure on contract amount.

• Marine oil with lower sulfur content

Global sulfur cap of 0.5% on marine fuels is slated to take effect from 2020. Regulations that would curb SOx emissions are expected to lead to new demand for newbuild vessels replacing current fleets of pre-owned vessels. Stringent SOx regulation, also applicable to pre-owned vessels, would have a significant impact, compared to existing regulations. As a result, a demand has been created for replacement

Table 1. Comparison of timing for adoption of SOx regulation by region (Source: IMO)

	Limitation of sulfur content in marine fuel	
	SOx SECA	Global
2000	1.5%	4.5%
2010 July	1.0%	
2012		3.5%
2015	0.1%	
2020		0.5%

Table 2. Outlook for global shipbuilding industry in 2018 (Source: Clarkson)

Type	2016	2017(E)	2018(E)
Shipbuilding order quantity (Unit: 1 million CGT)	2.2 (↓ 80.3%)	8.6 (↑ 300.0%)	10.0 (↑ 15.6%)
Newbuilding price index (p)	127 (↓ 6p)	124 (↓ 3p)	128 (↑ 4p)
Size of exports (Unit: USD 100 million)	343 (↓ 14.6%)	387 (↑ 13.0%)	368 (↓ 5.0%)

vessels to meet the requirements of SOx regulations, and one of the solutions may be to use LNG as fuel.

Obviously, that may not be the only way to ensure conformity to requirements of SOx regulations. Scrubber outfitted to existing pre-owned vessels can be an alternative. However, remodeling the vessels with space constraint and low cost-effectiveness may put a huge strain on ship owners. Therefore, it makes economic sense to place order for newbuilds even when vessels with HFO engine plus scrubber system are opted for.

Global order backlog for vessels outfitted dual fuel low-speed propulsion engines (ME-GI, ME-LGI) of MAN Diesel & Turbo stands at approximately 100 units, including optional vessels. Dual fuel engines are currently mounted only on board LNG carriers due to technological constraints, but have found widening applications in the field of ordinary commercial vessels including large-sized containerships.

• Rising demand for replacement vessels

According to shipbuilding industry, roughly 27,000 vessels are currently operating around the globe. New orders are very likely to be placed within the next 5 years to replace pre-owned vessels aged over 15, given that pre-owned vessels traded presently are aged 13 or less on average. Vessels aged 15 or less account for approximately 20% of all vessels.

In light of that, about 12,000 vessels are expected to be in demand for the next 5 years. About 10,000 vessels are expected to be ordered in the period ahead, except for 2,000 units already booked. Particularly, half of those vessels are medium-sized vessels. The medium-sized vessel segment has seen an increasing proportion of aging vessels and a decline in order backlog. As a result, medium-sized vessel segment is expected to drive demand for newbuild vessels replacing old ones.

• More LNG cargo traffic and greater investment in offshore plants

There has been a mounting expectation for gas carrier order placement amid an increase in LNG cargo traffic this year. The United States gave a green light to start exporting LNG to China last year and is building an LNG export terminal slated for completion by 2020. The export terminal has a capacity of 74.5 MTPA (Million Tonne Per Annum).

As oil prices have bottomed out in the first half of last year, expectations are mounting that orders for offshore plants will pick up. Global oil giants, including BP, have seen improving conditions for order placement amid diminishing costs of offshore project development as a result of reduction of facilities needed for developing blocks and decrease in manufacturing costs. As oil prices rise and development costs drop, Clarkson Research estimates that orders for offshore plants will almost double from USD 9 billion this year to USD 16 billion next year.

Gradual rebound in order placement

The newbuilding market is expected to see a slight increase in order placement in 2018, compared to the previous year amid elimination of significant part of ship supply glut that plagued the market until last year and retrenchment of shipbuilding industry which resulted in eased competition. Market pundits predict that newbuilding prices are likely to increase from the previous year's level, but remain below that of boom year before the outbreak of global financial crisis. In the mean time, ship exports are expected to dip slightly this year due to the fall in shipbuilding order intake between 2016 and 2017.

GE delivers 'LM500' marine gas turbines

GE LM500 Engines Power the Republic of Korea Navy's Newest CHAMSURI II-Class PKX-B Patrol Boat

GE announced that its LM500 marine gas turbines now power the Republic of Korea's (ROK) first PKX-B patrol boat. The ROK Navy took delivery of this new surface combatant on October 30; the 220-ton PKX-B Chamsuri II class ship was built by the Hanjin Heavy Industries shipyard, and can attain speeds over 40 knots.

The ROK Navy plans to acquire 16 PKX-B ships which are powered by two LM500 gas turbines and two diesels engines in a combined diesel and gas turbine (CODAG) configuration. The PKX-B will complement the larger, 500-ton PKX-A Gumdoksuri class patrol boats to provide maritime protection and defense in and along the ROK's seaways. Both the PKX-A and PKX-B ships are powered by GE's LM500 marine gas turbines. The PKX-A Gumdoksuri class is an 18 ship program; the first patrol boat entered service in 2008.

"Thanks to our longstanding relationships in Korea, we were able to ensure an integrated PKX-B hull design featuring our compact LM500 marine gas turbines. It was beneficial to work directly with key component manufacturers in a complete system design analysis of the PKX-B to optimize all components and performance - from the gas turbine inlet to the water jet," said Brien Bolsinger, Vice President of Marine Operations at GE.

The PKX-B propulsion system includes improvements over its PKX-A predecessor. While both are powered by LM500 marine gas turbines, the starter is now electric and other changes were made to the packaging and integration to improve performance, reduce weight, simplify designs, save space and lower costs:

GE maintains an integrated approach from build to delivery of the propulsion system to the ROK Navy, ensuring end-customer satisfaction; this is accomplished through Hanwha Techwin, a GE marine system partner. To date, Hanwha Techwin has provided 36 LM500 gas turbine propulsion modules for the PKX program.

As in the PKX-A program, Hanwha Techwin will continue to locally manufacture selected LM500 parts as well as assemble, test and install the completed propulsion modules for each PKX-B ship. GE provides technical support and oversight of Hanwha Techwin's LM500 master test cell operation, and supports the program during each phase of assembly, building, testing and installation. The GE-Hanwha partnership keeps GE engaged with key stakeholders while enabling timely customer and product support.

The LM500 is derived from GE's TF34/CF34 turbofan aircraft engines, and has 90% commonality with the CF34 engine that powers the popular CRJ 100/200 regional jet with more than 14 million hours of operation. The simple cycle LM500 is a two-shaft gas turbine, rated at 4.6 MW (ISO), consisting of a gas generator, a free power turbine and cold end drive capabilities.

GE's marine gas turbine business is part of GE Aviation and is headquartered in Cincinnati, Ohio. GE is one of the world's leading manufacturers of marine propulsion products, systems and solutions including aeroderivative gas turbines ranging from 6,000 to 70,275 shaft horsepower/4.5 to 52 megawatts. These gas turbines reliably operate the world over in some of the most arduous conditions in temperatures ranging from -40 to 120 degrees F/-40 to 48 degrees C.

ME-GI/ME-LGI Dual-Fuel Engines Hit 100,000 Operating Hours

Teekay praises dual-fuel technology and collaboration with MAN Diesel & Turbo

MAN Diesel & Turbo has announced that its low-speed ME-GI (Gas Injection) and ME-LGI (Liquid Gas Injection) dual-fuel engines have registered a cumulative total of 100,000 operating hours.

Teekay Gas, a daughter company of the Teekay Corporation, is the ship-owner that has ordered the largest number of ME-GI engines, and currently has a total of eight such units aboard four of its vessels, with further ME-GI orders imminent. The Teekay ME-GI engines have operated 80% of the time on LNG.

Teekay was an early adopter of the ME-GI concept and originally began looking into dual-fuel technology through its Vancouver-based strategic development department in November 2012.

Graham Cattley, Projects Technical Manager, Teekay Gas said "The biggest benefit really is the economics of the vessel; it's got a very low fuel consumption compared to rival propulsion designs and it also meets emissions regulations when we're burning gas as well as fuel oil. With the ME-GI, we also avoid the problem of methane slip, so we are very well placed for any future emission regulations."

Teekay's experience has been that the ME-GI operates just as well on gas as it does on fuel oil and the company hasn't encountered any major differences between the fuels when in heavy weather, nor experienced any issues with different gas qualities, combustion, or knocking.

Teekay has received from MAN Diesel & Turbo since inception and commented on the subsequent amount of innovation and changes to the engine, which has continued to evolve since coming into service. As an example of this, Cattley cited MAN Diesel & Turbo engineers retuning of the ME-GI's fuel boosters and the resultant reduction in pilot-fuel consumption of at least one metric ton per day.

Cattley concluded "It's been a very exciting time with the ME-GI and there's been a lot of knowledge learnt as well. You've got to take a risk to be a leader in the market and we wanted the vessels with the best fuel consumption. We felt the ME-GI was the right choice at the time."

Teekay recently entered into a long-term EMC (Engine Management Concept) agreement with MAN PrimeServ – MAN Diesel & Turbo's after-sales division – that covers the maintenance of the ME-GI engines aboard the 'Oak Spirit', 'Creole Spirit' and 'Torben Spirit', sisters from Teekay's 173,400m^3 LNG carrier series. The agreement covers the provision of spare-parts, maintenance management and the servicing of each vessel's 2×5G70ME-GI (Gas Injection) dual-fuel main engines.

Meanwhile MAN Diesel & Turbo's successful ME-GI (Gas Injection) engine,

with over 200 engines ordered, has set a new industrial standard for two-stroke propulsion engines aboard LNG carriers and container vessels. The ME-GI engine provides ship-owners and operators with a peerless solution within environmentally friendly and high-efficiency, two-stroke technology.

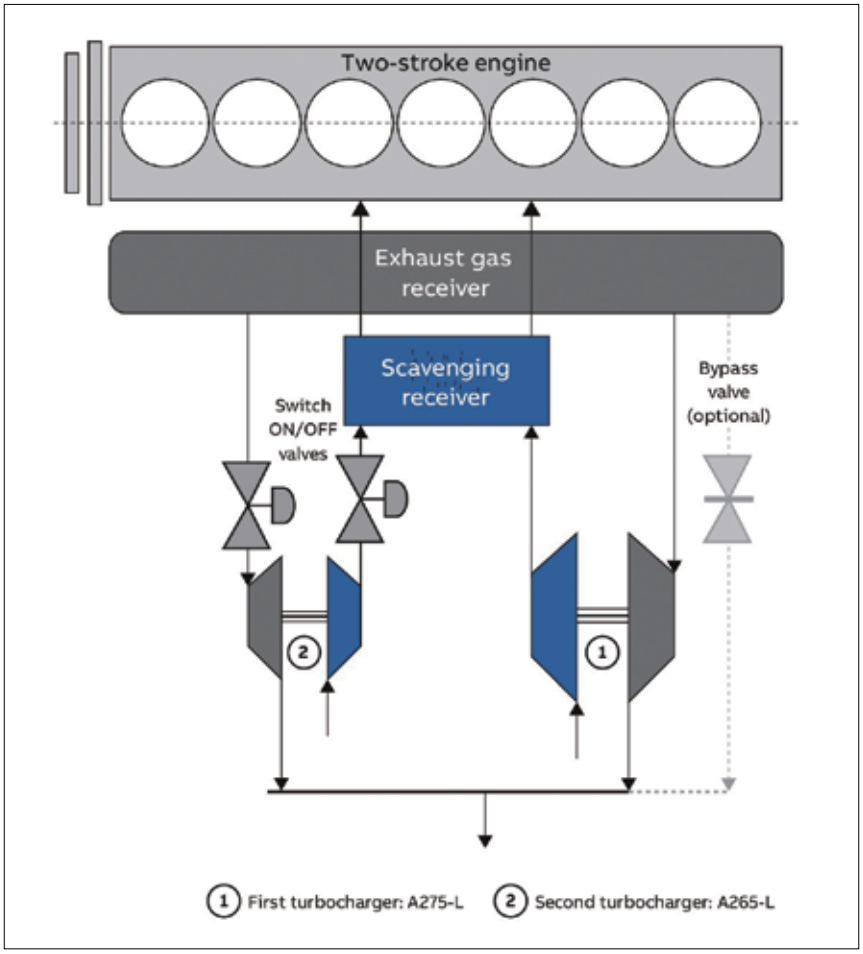
With the ME-GI engine, two-stroke development has taken a step further by combining the unique properties of multi-fuel combustion and the well-known reliability of Man Diesel & Turbo's ME-engine. The Diesel principle provides the ME-GI engine with high operational stability and efficiency, including during load changes and fuel change-over, while defining properties such as a stable change-over from fuel to gas with no fuel-penalties are maintained. The negligible methane slip of the ME-GI engine makes it the most environmentally friendly, two-stroke technology available.

ABB launches sequential turbocharging system

Greater flexibility and lower fuel consumption for vessels with two-stroke main propulsion.

ABB Turbocharging announced its latest technology development, the Flexible integrated Turbocharging System for Two-Stroke Engines (FiTS2) at Marintec China, December 2017.

The new sequential turbocharging system allows maximum fuel savings for two-stroke engines at part and low load, and at the same time maintains the flexibility to go to full engine output immediately. This offers significant long-term economic benefits for vessel operators and charterers with potential for fuel savings of up to three percent, depending on load profile.



System set-up of FiTS2 - The FiTS2 intelligent turbocharger system consists of two or more turbochargers of difference specification or size.

Fuel and emissions reduction

FiTS2 is the result of ABB's continued commitment to reduce fuel consumption and emissions. It has been developed in close collaboration with low-speed two-stroke engine designer, Winterthur Gas & Diesel Ltd. (WinGD), which has developed a special tuning for FiTS2.

The new technology enables two-stroke engine builders to offer more flexibility, increasing the potential for higher efficiency and lower operating costs for their customers. NOx emissions from engines fitted with FiTS2 will also remain within IMO Tier II limits.

Additional abatement technologies like SCR or EGR can be used to comply with IMO Tier III NOx emissions and will not greatly affect the system while still delivering fuel saving benefits.

Adapting to operator needs

Past high fuel prices and low vessel demand led to an increase in 'slow steaming' for very large cargo ships, resulting at times in operation outside of original design parameters and therefore causing increased maintenance and repair costs.

Typical fuel bills for such vessels have been cited by McKinsey & Co as "the

largest cost item for shipping lines" and "often exceeding 40 percent of all costs" despite current lower oil prices.

As the market also continues to see the financial impact of overcapacities, FiTS2 is aimed at addressing the sustained cost versus operational flexibility challenge. FiTS2 will enable two-stroke engines to operate more efficiently at lower loads, while still enabling rapid return to full engine power without compromise on original design-point efficiencies. As a result, significantly higher savings can be achieved with FiTS2.

"From an operator's or charterer's perspective, FiTS2 efficiency benefits will enable major cost reductions. Considering for example a typical current fuel bill of 3 to 4 MUSD per year for very large crude oil carriers, FiTS2 has potential to provide fuel cost savings of up to 100,000 USD per year, compared with levels typically achievable using conventional turbocharging systems. Big savings are also possible for other vessel types, e.g. for container vessels and can amount to 1 MUSD or more over 10 years. The payback of initial costs can be less than two years, making the FiTS2 solution very attractive," said Joachim Bremer, Head of Product Line Low-Speed, ABB Turbocharging.

FiTS2 benefits at a glance;

- High fuel savings at part and low load
- Full flexibility over the whole load range
- Additional savings due to lower switch-off point for the auexiliary blowers
- Pay-back time well under three years
- Contributing to greenhouse gas reduction

Unique design enables cost optimization

To optimize engine efficiency via improved turbocharging in low and part load, the engine runs in lower loads with only one turbocharger in operation, whereas at higher loads (typically above 50 to 60 percent engine load) two turbochargers operate simultaneously. The same principle is applied for very large engines – with FiTS2 they will run with two turbochargers in lower loads and with all three turbochargers for higher load operation. The specially designed cut-off valves for the FiTS2 system are flow-optimized and integrated with the turbocharger casings, ensuring a compact and lean design. Furthermore, the valves can be operated rapidly and automatically under load, without interrupting operation of the engine up to full load.

Cut out of one turbocharger for lower engine loads leads to higher scavenging air pressure, increasing the compression ratio and firing pressure optimized by special tuning of FiTS2. The result is enhanced engine efficiency and lower specific fuel consumption while remaining compliant with emission regulations.

Robust design and very wide compressor maps of ABB's A100-L and A200-L turbocharger series allow switching under load without surging and there are no requirements for additional by-pass valves or pipework, making FiTS2 a uniquely simpler and relatively low-cost solution compared to any alternative.

An additional benefit comes from the possibility to switch off the electrically-powered auxiliary blowers at 25 percent engine load, instead of around 35 percent load. This enables additional savings via reduced power consumption and lower blower maintenance costs due to significantly fewer operating hours.

Dominik Schneiter, Vice President Research & Development at WinGD, said "In our long-lasting strategic cooperation with ABB, WinGD has developed its own engines with features such as optimized two-stroke Miller tuning, high boost pressure ratios, and part load optimized waste gate applications.

With the new FiTS2, ship operators can now further benefit considerably from lower auxiliary power consumption, improved response time, and lower fuel consumption of the main engine, improving the CO_2 footprint of their ships at low and mid-load conditions. In today's changing market conditions such flexibility is a valuable asset to our customers."

MacGregor's innovations cargo systems for shipping market

MSC trusts MacGregor expertise to boost productivity through improved container stowage efficiency on 31 vessels.

MacGregor has received orders to optimise the container carrying capabilities of 31 MSC Mediterranean Shipping Company vessels from six different ship series. The work is designed to optimise ships' cargo system productivity and earning potential. The orders were booked into Cargotec's third and fourth quarter 2017 order intakes and deliveries are planned for completion towards the end of 2018.

"Container vessels are an integral part of the whole transportation value chain, maximising their cargo system flexibility makes optimum use of available cargo space with any given cargo mix. This ensures that the greatest payload can be carried," said Leif Byström, Senior Vice President, Cargo Handling, MacGregor. "Filling empty slots increases revenue for shipowners and operators and reduces emissions per transported cargo unit."

With a fleet of 490 container vessels, privately-owned MSC is a world leader in global container shipping. For many years MSC and MacGregor have enjoyed a long and cooperative relationship and numerous MCS vessels are equipped with MacGregor solutions.

"MacGregor's expertise in cargo systems and its continuous development of new innovations is highly appreciated," said Giuseppe Gargiulo, Head of

Department, New Building, Dry Dock and Conversions, MSC. "Its solutions greatly improve our ability to compete in the current business environment."

"Over the years we have developed a close collaboration and a good understanding of MSC's cargo handling needs," noted Atte Virta, Naval Architect, Cargo Handling, MacGregor. "Through this work, together we have identified new ways to increase MSC's cargo carrying capacity and competitiveness; critical in today's challenging shipping market."

Upgrade work on the vessels will be carried out under a MacGregor Cargo Boost service, part of its PlusPartner concept, which is designed to improve the earning potential of existing containerships. The upgrades include an individual plan for each vessel, with a focus on improving earning potential and efficiency.

"Each cargo system upgrade has been carefully designed with MSC," explained Mr Virta. "The vessel type and their service deployment have been considered in detail. This ensures optimum cargo system flexibility and efficiency, which maximises the vessels' earning potential and return on investment."

MSC and MacGregor have agreed not to disclose the contract value or other contractual details. Work will be carried out on a rolling schedule with all vessels expected to return to service by the end of 2018.

Roxtec non-weld metal pipe seal now certified for use in aluminum structures

Further scope has been added to the Roxtec SPM seal. The non-weld metal pipe sealing solution is now certified for use in aluminum structures.

The Roxtec SPM seal has received a warm welcome from shipyards, designers and engineers as it ensures safety and operational reliability, without any downtime or cost normally associated with welding. It seals and protects to A-Class standards, steel, stainless steel and copper pipe penetrations against fire, gas and water onboard marine vessels and offshore platforms.

Thanks to the new type approval certificate in respect of aluminum structures, it will not only be used in steel decks and bulkheads on large vessels and platforms, but also in yachts, catamarans, high speed ferries, fast patrol vessels and other light-weight aluminum vessels and structures.

With the ability to protect metal pipe sizes up to 222 mm in A-60 fire rated zones and provide further protection against water (1 bar) and gas (0.67 bar), typical application areas where these non-welding benefits will be utilized include lines for chilled and potable water, fire suppression systems and hydraulic fluid and lubrication lines.

Practical protection

The Roxtec SPM seal is beneficial for shipyards who want to avoid the complex and expensive welding process and ensure certified protection where welding is either not allowed, recommended or desired.

The solution also delivers several other advantages, such as enabling users to pass the pipe material of their choice through any metal or aluminum structure without the need to change or interrupt the piping system when trying to overcome the risk of galvanic corrosion.

The Roxtec SPM seal provides installation flexibility. It is installed from only one side of the deck or bulkhead which can vary in thickness from 5 to 15 mm. Due to the in-built tolerance of the solution, it also maintains a tight seal around the pipe even when installed inside any uneven or irregular opening.

Cobham reduces integrated Global Xpress antenna costs

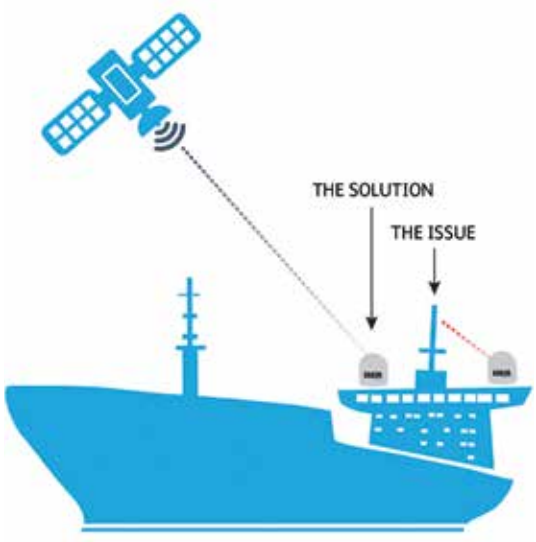
New type approved solution allows service providers to easily connect two SAILOR GX antennas in a single network.

Cobham SATCOM has revealed an innovative new solution that can significantly reduce the cost and simplify the installation and management of Inmarsat Global Xpress (GX) networks using multiple Ka-Band antennas. Multiple antennas are frequently used on board to overcome link losses caused by satellite blocking from the ship structure or other deck equipment.

Compatible with Cobham SATCOM's technology-leading SAILOR 100 GX systems, the solution has already received Inmarsat type approval for use with the Inmarsat GX satellite systems. Supported by the unique single cable solution used on SAILOR antennas, Cobham SATCOM has overcome the need to add a 19" rack unit to operate a multiple antenna system, introducing potential installation savings in the region of US $10,000.

The solution helps to enable higher uptime and quality of service for end-users of SAILOR GX antennas connected to Fleet Xpress. It can integrate two SAILOR 100 GX antennas (ADU) on a single SAILOR GX modem unit (GMU) while ensuring seamless switching between them according to availability of a stable link based on orientation of the vessel, and to SAILOR FleetBroadband for operational continuity also when out of Ka-band coverage.

In addition to the cost benefits, Cobham SATCOM's new solution introduces a simplified way to configure and manage antennas for specific blocking zones on board and therefore ensure service availability should the current operational antenna be blocked by the vessel's superstructure. The solution not only reduces installation costs and enhances the end-user experience by ensuring access to operational and entertainment-based IP applications and voice calling, but also helps to reduce overall lifecycle costs dues to simplified servicing and management.



Antenna Diversity Solution

Cobham SATCOM already offers hardware solutions to support its satellite service provider partners when configuring and installing multiple Ku, Ka and C-band SAILOR and Sea Tel VSAT and TVRO antennas.

"Multiple antenna installations can be complex to plan, install, commission and manage. While we have worked closely with the industry to simplify the process for existing satellite networks and frequencies, the same blocking issues persist for Global Xpress. The SAILOR GX Antenna Diversity Solution meets a specific demand in the market as it is a simple and highly cost-effective way for service providers to optimise Fleet Xpress and secure the most reliable service for the end-users," said Jens Ewerling, Director, Maritime Broadband, Cobham SATCOM.

"Inmarsat welcomes innovations from its long-term hardware partners that aim to simplify the installation and management of Fleet Xpress services, especially in the more challenging operational environments, where reliability and higher quality of service are critical," said Ronald Spithout, President, Inmarsat Maritime. "We congratulate Cobham SATCOM on its Antenna Diversity Solution and are delighted on its type approval."

Bentley wins Advancements in Asset Performance from BP

BP is leveraging its many years of experience using Bentley's AssetWise.

BP Oman has won the prestigious BIM Advancements in Asset Performance of Utilities and Industrial Facilities category in Bentley's Be Inspired Awards program. The announcement was made during Bentley's annual Year in Infrastructure Conference, held in Singapore last month.

The Khazzan Project in Oman is one of BP's seven major projects in 2017, and started its production in September 2017. BP Oman was selected as a finalist from more than 400 nominations of projects around the world, and as the winner out of the three finalists in its category.

BP Oman has created a Central Information Store (CIS) to manage and maintain information needed for operations, including all documents, tags, associated metadata and 3D model visualization. It identified the Bentley solution, as it enables seamless migration of all this information from the project CIS, that is supporting the capital project process, to the operations CIS in an efficient way to support safe and reliable operations. With safety at the heart of all operations, BP ensures it continuously maintains the integrity of operational information.

BP is leveraging its many years of experience using Bentley's AssetWise for engineering content management. The solution is deployed in projects around the world, and BP Oman is the first operating company to deploy AssetWise to support operations. The CIS supports the BP operations in Oman and its support offices, as well as certain third parties with whom they contract work.

The CIS maintains the integrity of BP asset information to provide an accurate, up-to-date, and comprehensive digital baseline for configuration. It shortens approval times when changes are required and ensures the latest information is always available. It also provides a master set of information that supports information sharing across both the project and operations teams.

Dave Campbell, COO and VP Operations, BP Oman, said, "I'm delighted we have received this award, which recognizes the robust and integrated information management solution we have put in place to manage and maintain the integrity of our information, in support of safe and reliable operations, at our new Khazzan facility in Oman."

He added, "We have approximately 60,000 documents and 160,000 tags, so the deployment of AssetWise gives me the assurance we have the right tool in place to manage this scale of information, and provide easy access, 24/7, for my operations team."

Bentley's Process Industry Marketing Director Anne-Marie Walters, said, "BP's Khazzan project stands out for its degree of complexity, scope, and innovation in replacing handover with seamless migration of asset lifecycle information - from the design phase through construction and into operations. Using a Microsoft Azure-based cloud deployment of Bentley's AssetWise, the project team delivered information integrity to support a safe, reliable, and efficient operation throughout the life of their assets."

Andy Hunter, Operations Information Manager for BP Oman, advised: "It was essential to deliver on our mandate of implementing a fully integrated information management solution, that will ensure information integrity, in support of the Khazzan Operations Readiness Plan. The AssetWise deployment was a global first for BP Operations, and needed a 'One Team' approach to ensure successful delivery, which we have achieved, and winning this award is a solid endorsement that the team got it right."

GE 'LM500' 해상 가스터빈 공급

대한민국 해군의 신형 고속정(PKMR) 참수리 211호정에 GE LM500 가스터빈 엔진 탑재

GE는 대한민국 차기고속정 사업(PKX-B)으로 새롭게 건조한 신형 고속정(PKMR)인 '참수리-211'호정에 LM500 해상용 가스터빈을 공급했다고 발표했다. 대한민국 해군은 11월 1일 신형 참수리-211호정을 취역시켰다. 220톤급 신형 고속정은 한진중공업 조선소에서 건조되었으며, 40노트 이상의 속도를 낼 수 있다.

대한민국 해군의 차기고속정 검독수리-B(PKX-B) 사업은 16척 규모이다. 차기고속정은 2대의 LM500 가스터빈과 2대의 디젤 엔진으로 구성된 CODAG(COmbined Diesel And Gas Turbine) 방식으로 동력을 공급받는다. 신형 고속정은 500톤급 PKX-A 검독수리 고속함과 함께 대한민국 해상을 보호하고 방어한다. 차기고속정 사업인 PKX-A와 PKX-B 고속정은 모두 GE의 LM 해상용 가스터빈을 채택했다. PKX-A 검독수리급 고속정은 18척 규모로 진행되며 1번함인 '윤영하함'은 2008년에 실전 배치되었다.

브라이언 볼싱어(Brien Bolsinger) GE 항공 마린 대표는 "한국에서의 장기적인 파트너십을 바탕으로 GE는 소형 LM500 해상용 가스터빈을 탑재한 PKX-B 선체 통합 설계를 완성할 수 있었다. 가스터빈 흡기시스템부터 워터제트에 이르는 모든 부품과 성능을 최적화하기 위해 PKX-B의 전체 시스템 설계 분석에서 한국의 주요 부품 제조업체와 직접 협업하는 것이 도움이 되었다"라고 말했다.

PKX-B 고속정의 추진시스템은 이전 PKX-A 고속정의 추진시스템보다 개선된 성능을 가지고 있다. 두 사업의 고속정은 모두 LM500 해상용 가스터빈으로 구동되지만, PKX-B 고속정의 시동장치(Starter)는 전기식으로 변경 되었으며, 추진시스템 패키징과 통합을 개선하여 성능 향상, 중량 저감, 설계 단순화, 공간 절약 및 비용 절감을 달성했다.

GE는 추진시스템 구축부터 인도까지 통합적인 접근 방식을 유지해 대한민국 해군에 납품하는 등 최종 고객의 만족을 보장한다. 이 모든 과정은 GE마린의 시스템 파트너인 한화테크윈 (Hanwha Techwin)을 통해 진행되었다. 현재 한화테크윈은 PKX 사업에 LM500 가스터빈 추진 모듈 36대를 공급했다.

한화테크윈은 PKX-A 프로그램과 마찬가지로 LM500 가스터빈의 몇몇 부품을 대한민국에서 계속 생산할 뿐만 아니라 완성된 추진 모듈을 각 PKX-B 고속정에 조립, 테스트 및 설치한다. GE는 한화테크윈의 LM500 마스터 테스트 셀 운영뿐만 아니라 조립, 생산, 테스트 및 설치의 각 단계에서 기술적인 지원을 제공한다. GE와 한화테크윈의 파트너십을 통해 GE는 주요 이해 관계자와 긴밀한 협조를 유지하고, 적시에 고객 지원 및 제품 지원을 제공할 수 있다.

LM500가스터빈은 GE의 TF34/CF34 터보팬 항공 엔진에서 파생되었으며 1400만 시간의 운항 시간을 자랑하는 CRJ100/200 제트기에 장착되는 CF34 제트엔진과 90% 이상 기술을 공유한다. 단순 사이클 LM500은 4.6MW (ISO)의 정격출력을 가진 2축 가스터빈으로 발전기, 터빈 및 기어박스 구동 기능을 가지고 있다.

GE 해상용 가스터빈 사업은 GE항공 사업부의 중요한 비즈니스 중 하나로, 관련 본사는 오하이오 주 신시내티에 위치해 있다. GE는 6,000~70,275 축마력(4.5~52MW)을 가진 다양한 항공파생형 가스터빈을 포함해 해양 추진 제품, 시스템 및 솔루션을 공급하는 세계적인 주요 제조업체 중 하나이다. GE의 해상용 가스터빈은 -40~120°F (-40~48°C)의 가혹한 조건에서도 안정적으로 운영된다.

알루미늄 구조용으로 승인을 받은 Roxtec 무용접 금속 파이프 씰

Roxtec SPM 씰의 가용 영역이 추가됐다. 알루미늄 구조에도 사용하도록 승인을 받은 무용접 금속 파이프 씰링 솔루션이다.

Roxtec SPM 씰은 용접이 필요한 경우에 일반적으로 소요되는 경비나 가동 중단 없이 안전과 운영 신뢰성을 보장해 주어 조선소, 설계자 및 엔지니어가 선호하는 제품이다. 해양 선박 및 해안 플랫폼 상의 불, 가스 및 물이 A등급 표준, 강철, 스테인리스 스틸 및 구리 파이프를 관통하지 않도록 보호하고 밀봉한다.

알루미늄 구조물에 대한 새로운 형식 승인 인증으로 인해 대형 선박 및 플랫폼의 강철 갑판과 격벽뿐만 아니라 요트, 쌍동선, 고속 페리, 고속 경비 함정 및 기타 경량의 알루미늄 선박 및 구조물에도 사용할 수 있다.

A-60 방화 등급 구역에서 최대 222mm의 크기의 금속 파이프를 보호할 뿐만 아니라 물(1bar)과 가스(0.67bar)도 보호하는 기능

으로 인해 냉수 및 음용수 파이프, 화재 진압 시스템, 작동유 및 윤활유 파이프가 무용접 이점을 활용할 수 있는 일반적인 분야까지 적용이 가능하다.

실질적인 보호

Roxtec SPM 씰은 복잡하고 비용이 많이 드는 용접 과정을 거치지 않고, 용접이 허용되지 않거나 권장되지 않거나 적합하지 않은 경우에 인증된 보호 기능을 확보하고자 하는 조선소에서 유용하게 사용할 수 있다.

또한 이 솔루션은 아연도금 부식의 위험을 극복하려는 경우 파이프 시스템의 교체나 가동 중지 없이 모든 금속 또는 알루미늄 구조물 등 사용자가 직접 선택한 파이프 자재가 승인을 받을 수 있도록 하는 등의 다양한 이점을 제공한다.

Roxtec SPM 씰은 설치가 유연한데, 이 씰은 5~15mm까지 두께가 다양한 갑판이나 격벽의 한쪽 면에 설치된다. 이 솔루션의 허용 오차로 인해 균일하지 않거나 불규칙한 입구 내부에 설치된 경우에도 파이프 주위를 단단히 씰링하도록 유지된다.

벤틀리, BP로부터 자산 성과 분야 발전 수상

BP는 엔지니어링 컨텐츠 관리를 위해서 수년간 벤틀리의 AssetWise를 적용해왔다.

BP Oman이 벤틀리의 Be Inspired Awards 프로그램에서 '유틸리티 및 산업 시설 자산 성과 분야 BIM 발전' 수상자로 선정되었다. 수상자는 지난 달 싱가포르에서 열린 벤틀리의 연례 Year in Infrastructure 컨퍼런스 중 발표됐다.

오만의 카잔 프로젝트는 BP의 2017년 7대 주요 프로젝트의 하나로 2017년 9월에 생산을 시작했다. BP Oman은 전 세계에서 출품된 400개가 넘는 프로젝트 중에 최종 결선 진출자로 선정되었고 이 분야 최종 결선 진출자 3팀 중 수상자로 선정됐다.

BP Oman은 중앙 정보 저장소(CIS)를 만들어 모든 문서, 태그, 관련 메타데이터, 3D 모델 시각화 자료 등 운영에 필요한 정보를 관리하고 유지했다. CIS를 벤틀리 솔루션으로 구현한 이유는 안전하고 신뢰성 있는 운영을 지원하는 방식으로 프로세스와 단절 없이 마이그레이션할 수 있기 때문이다. 모든 운영 내 안전을 중시하는 BP는 운영 정보의 무결성을 지속적으로 유지한다.

BP는 엔지니어링 컨텐츠 관리에 벤틀리의 AssetWise를 수년간 활용한 경험을 가지고 있다. 솔루션은 전 세계에서 진행되는 프로젝트에 구축됐으며, BP Oman은 운영 지원을 위해 AssetWise를 구축한 최초의 운영 회사다. CIS는 오만의 BP 사업장, 지원 사무소 및 작업을 계약하는 회사를 지원한다.

CIS는 BP 자산 정보의 무결성을 유지하여 정확한 최신 상태의 종합 디지털 베이스라인을 제공한다. 변경 사항이 생길 때는 승인 시간을 단축하고 항상 최신 정보를 이용할 수 있도록 보장한다. 또한 프로젝트 및 운영 팀 간에 정보 공유를 지원하는 마스터 정보 세트를 제공한다.

BP Oman의 데이브 캠벨(Dave Campbell) COO 겸 운영 VP는 "이번 상으로 오만의 신규 카잔 시설에서 안전하고 신뢰성 있는 운영을 지원하면서 정보 무결성을 관리하려는 목적이었다. 지원용으로 구축한 강력한 통합 정보 관리 솔루션이 인정받게 되어 기쁘다"라며, "약 60,000건의 문서와 160,000개의 태그가 존재하는데 AssetWise 구축은 대형 규모의 정보를 관리하고 운영팀에 연중무휴 하루 24시간 편리한 액세스를 제공하기에 적합한 도구라는 확신을 주고 있다"라고 말했다.

벤틀리의 안네-마리 월터스(Anne-Marie Walters) 프로세스 산업 마케팅 이사는 "BP의 카잔 프로젝트는 설계 단계부터 시공을 거쳐 운영에 이르기까지 복잡성, 범위, 인계를 매끈한 자산 생애주기 정보 마이그레이션으로 대체한 혁신이 눈에 띈다. 벤틀리 AssetWise의 Microsoft Azure 기반 클라우드 구축을 사용해 프로젝트 팀은 자산 생애 동안 안전하고 신뢰성 있으며 효율적인 운영을 지원하는 정보 무결성을 실현했다"고 밝혔다.

BP Oman의 앤디 헌터(Andy Hunter) 운영 정보 관리자는 "카잔 운영 준비 태세 계획을 지원하면서 정보 무결성을 보장할, 완전히 통합된 정보 관리 솔루션을 구축하라는 요구를 이행하는 것이 필수적이었다. AssetWise 구축은 세계 BP 사업장 내 첫 사례였고 성공적인 실현을 보장하는 '원팀' 방식이 필요했다. 우리는 목표를 달성했고 이번 수상은 팀의 방식이 옳았다는 확실한 증거다"라고 말했다.

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 겸용
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
삽입형
노점표시 전송기

SD05
복합형 신호 표시기

TP01
2선식 머리부착형
RTD 온도 신호전송기

TP02
레일부착 (궤조)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/
차압전송기

THG03
실내용 CO2 온습도
표시 전송기

가스/ 압력/ 신호 측정기

GTH53
복합가스 신호전송기

GS33/34
CO2 신호전송기

GM33/34
CO 신호전송기

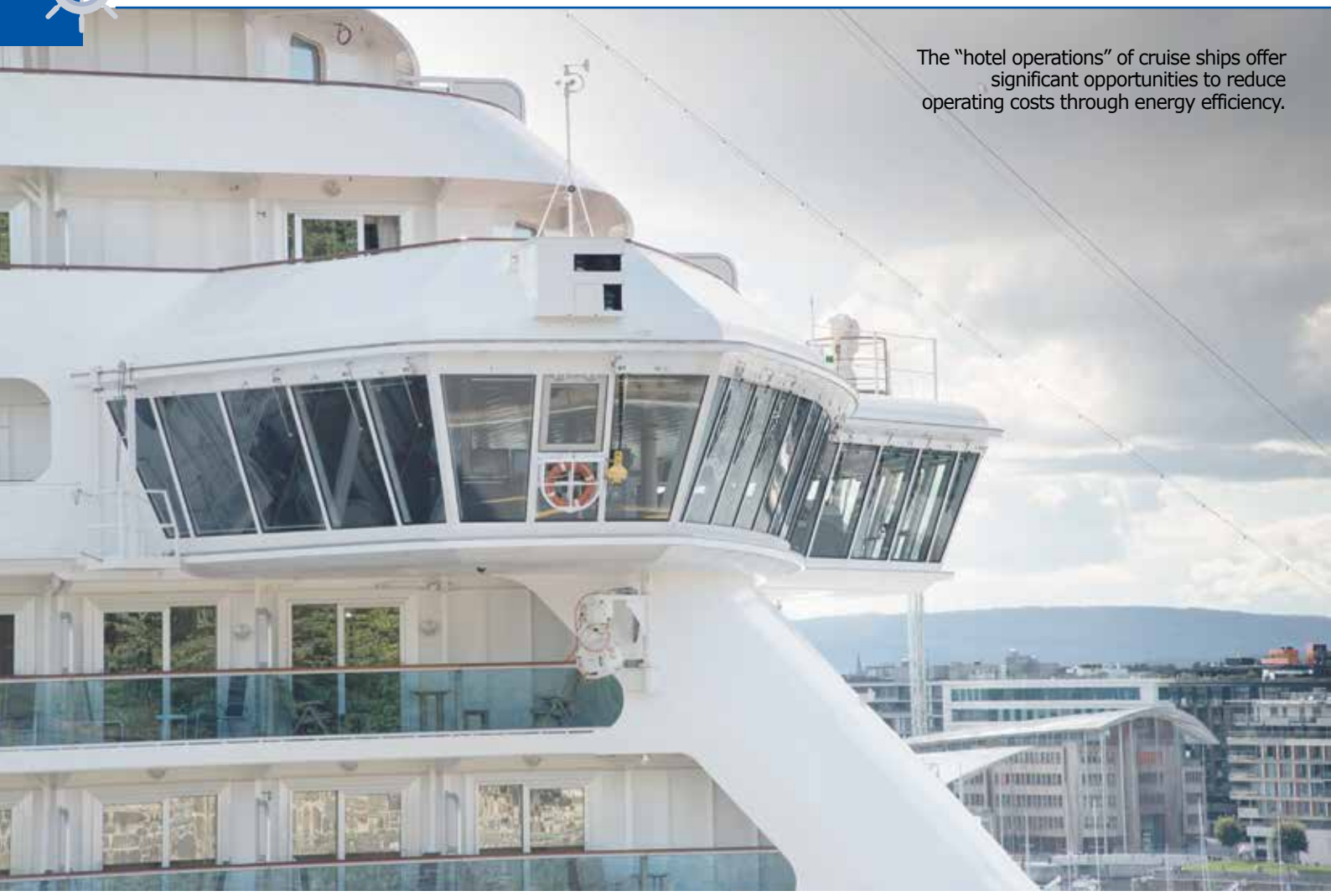
L051/52
수위감지
신호전송기

THM80X
다기능 디지털
신호 표시 감시기

DPT02
레일부착 궤조형
신호변환기

길우트레이딩 1984

서울시 영등포구 선유로 33길 15, 703호(양평동3가, 에이스테크노타워)
TEL: 02-2636-0009 FAX : 02-2636-4753
www.gilwoo.co.kr www.gilwooshop.co.kr giltron@naver.com



The "hotel operations" of cruise ships offer significant opportunities to reduce operating costs through energy efficiency.

SAVE THE ENVIRONMENT – SAVE MONEY

- Ferries and cruise ships use innovative technologies to chart more efficient courses.

When large shipping companies like Stena Line proudly report that they have once again been able to reduce fuel consumption in their fleet, then CATC from Gothenburg can also enjoy this success. The relatively young corporation from Sweden primarily specializes in reducing energy consumption in the heating, ventilation and air-conditioning systems used aboard ships. CATC, in close collaboration with WAGO, takes on complete system upgrades from the electrical design through programming and project management up to commissioning and future service.

WAGO

By Jens Stjärna, CATC

Stefan Wall & Urban Wase, WAGO

As early as 2005, the Stena Line shipping company consolidated their shipping division into an "Energy-saving Program" (ESP) to reduce energy consumption. The goal was an annual reduction of 2.5 percent, which they exceeded in 2015 with a reduction of 2.8 percent. "By 2030, we plan to reduce our CO_2 emissions by 35 percent per nautical mile," explains Erik Lewenhaupt, Head of Sustainability at Stena Line. "Within the context of ESP, we assess various points for saving energy, from the ship's propeller up to the lightbulbs. In addition, we rely on digital solutions for our fuel management system in order to optimize on-board operations using the data that we record from our ferries."

Tuning the subsystems reduces energy needs

In applications like these, the systems from CATC prove their worth. On cruise ships and ferries, they optimize pressure and temperature from fans, air-conditioning devices, and boilers such that, "the energy costs for a ship can be reduced by up to 40 percent," explains Jens Stjärna, one of the founders of CATC. The need for electrical power can be substantially reduced by primarily monitoring the systems of the "hotel system" (passenger and crew quarters) on ferries or cruise ships with the aid of the WAGO-I/O-SYSTEM 750, synchronizing the systems and controlling them simultaneously. And because all energy used on board has to be generated by the hotel generator, called a gen-set, efficiency increases here also reduce fuel consumption, as well as particulate and CO_2 emissions. These changes in turn reduce costs per mile.

"Luckily, environmental consciousness is increasing," states Stjärna, who has found the maritime industry to be rather old-fashioned when it comes to issues of sustainability. This trend can be linked to the fact that cruise ships have been increasingly criticized because their exhaust creates smog in harbors and fjords. In addition, ships from the Stena Line, travel exclusively in ECAs (emission control areas), here specific environmental guidelines apply regarding emissions, as

With 3,500 guests and more than 1,500 crew members, modern cruise ships house an entire small town.

The WAGO-I/O-SYSTEM 750 is approved for maritime use.

well as waste and wastewater disposal.

"At CATC, we anticipated the demand for more energy-efficient operation of ships, and today we are virtually the only ones dealing with such issues – this is naturally an advantage for us," states Stjärna.

The Swedish firm combines its experiences in air-conditioning technology and ship automation with WAGO products that have the corresponding approvals from top classification agencies. Stjärna explains that, "The WAGO systems correspond to the relevant maritime standards. When we were selecting systems, this was a primary criterion, in addition to the compact design of WAGO's products. When all of the components that we use are certified, it is easier for us and makes dealing with new customers more successful."

Retrofit for a better climate

Most projects at CATC include the complete upgrade of the entire control system for the HVAC technology on board. If a system replacement is planned as part of the retrofit, then the work usually begins in the engine room. There, they install touch screens that enable the personnel to monitor temperature and air pressure, and control them individually. Comparable operating and visualization solutions are also used in areas where passengers congregate, such as conference or dining rooms. "Our goal is to increase efficiency on board without compromising passenger and crew comfort," clarifies Stjärna.

Since the upgrades occur while the ship is operating, the technicians from CATC have accompanied ships around the world. "It is a tremendous advantage to be on site while commissioning the new systems," explains Stjärna. "This way, we gain direct feedback from our customers and can observe how the crew on board uses our systems." Stjärna explains that CATC recently completed a large project on one of the Stena Line ships that travels between Gothenburg, Sweden and Kiel, Germany. A completely new system was installed in both crew and passenger quarters, from the auto deck to the engine room. "The Stena Line employees, who work the auto deck, were especially happy about the retrofit," says Stjärna, "because our system improved ventilation there, and reduced exhaust gasses."

CATC's retrofit improved the climate in two places at once – both in the ship and in the environment around it. This also makes financial sense.

"A system change can pay for itself within one to two years," according to Stjärna. This is due both to the energy savings, and that on-board can work more effectively due to the new software. "In the long-term, our customers save money."

iWELDEX 2018

제5회인천국제용접.절단및레이저설비산업전

The 5th International Welding, Cutting & Laser Equipments Exhibition Incheon Korea

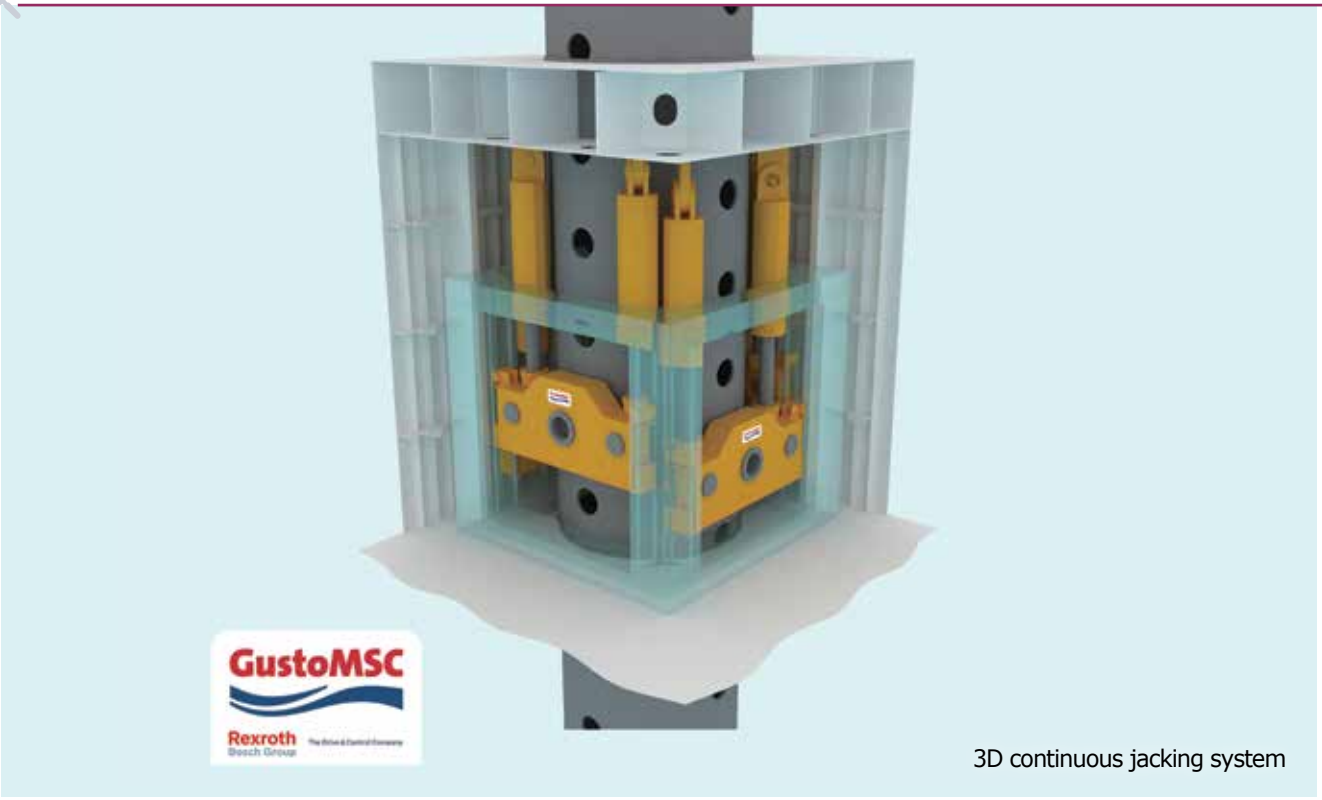
2018년 5월 23일(수)~25일(금) 3일간 인천.송도컨벤시아

http://www.welder.kr

대불공단 · 군산공단 · 아산평택공단 · 안산공단 · 시화공단 · 남동공단 · 경서공단 등
서해안 시대의 중심지 인천에서 용접 · 접합 · 절단설비 · 레이저 · 금속가공설비의
새로운 마케팅시장에서 용접인의 도전을 기다리고 있습니다.

조선 · 해양 · 항공 · 항만 · 물류 · 건설 · 자동차 · 조립금속 · 일반금속 등
서해안 시대의 중심 인천으로 용접인 여러분을 초대합니다.

■ 참가문의: 메탈넷코리아 전시사업부문 TeL: 02-3281-5037 Fax: 02-3281-0280



3D continuous jacking system

Bosch Rexroth delivers a drive & control solution for a Japanese "continuous jacking system"

Bosch Rexroth has received an order from GustoMSC to engineer, manufacture and commission the drive and control system for GustoMSC's most recent model in its successful series of continuous jacking systems. It is intended for a Japanese construction vessel, allowing it to perform precise and high speed windmill installations at sea. The continuous jacking system (CJS) is based on innovative lifting functions, in which 48 hydraulic cylinders directed by a digital control work together seamlessly. Sensors and displacement sensor systems provide feedback for the complex cylinder movements. The CJS lifts the vessel out of the water in one fluid motion, turning it into a stable offshore "construction platform".

Bosch Rexroth

Since the sixty's, Bosch Rexroth has been developing and delivering integrated drive & control solutions for what are commonly called jacking systems, usually on a turnkey basis. It has now delivered some fifty drive and control systems worldwide. These have not only been for lifting and installing oil and gas platforms and offshore windmills, but also for positioning and stabilizing dredging, mining and construction vessels for offshore applications.

Controlled jacking

"Jacking up" literally means lifting, which is precisely the function of a Bosch Rexroth drive and control jack-up or jack-

ing system. A continuous jacking system goes a step further, as it performs the "jacking" motion in a single, accurate and controlled movement. With its specialized knowledge of jacking principles and procedures, Bosch Rexroth has secured an important position in the global offshore world, building a close relationship with GustoMSC.
In addition to designing and supplying the complete jacking system, they have also designed the Japanese vessel, which is able to install windmills on the seabed in a single day under normal weather and sea conditions, drastically reducing the so-called "splash zone" transition!

Stable construction vessel

The CJS consists of four robust steel legs, with four movable jacks fitted around each leg, each connected to the piston rod of two hydraulic cylinders. The legs are first to be anchored into the seabed in a controlled manner, after which the vessel is lifted entirely out of the water, providing a kind of stable "construction platform" for erecting the windmill with the onboard cranes. Using hydraulically powered pins that drop into the holes in the legs, three jacks remain connected to the legs at all times during the leg and vessel movements.
The "separate" fourth jack is then moved to the starting position, after which it is anchored with the pin, and another jack is sent from the end position to the starting position. This makes it possible to place the leg on/in the seabed in one uniform motion, allowing for three-dimensional stabilization of the vessel and for lifting or lowering it at a constant speed. The movement pattern is extremely complex. It is regulated by the controls, the cylinder displacement sensor systems and other various sensors.
This means, for instance, that the cylinder of the jack that returns to the starting position moves much faster than the other cylinders that are lifting the vessel out of the water at that moment. This represents a new way of integrating hydraulics, electronics and software.
A total of 32 hydraulic lifting cylinders are active during the jacking up movement. There are another 16 cylinders for moving the anchoring pins, while the jacking system consists of valve blocks, the control system and specially designed software. Testing and commissioning takes place on site by GustoMSC in collaboration with Bosch Rexroth in Japan.

Protection against extreme conditions

The extreme conditions found in the offshore industry (in particular salty and aggressive environments) place exceptional demands on the equipment used. This was a serious factor taken into account during the design phase, which was translated into a functional design, material choice and special facilities. To create durable hydraulic cylinder rods, Bosch Rexroth applies different Enduroq surface-protective techniques such as HVOF coatings, stainless steel welding and laser cladding.
Both R&D and the procedures for applying high-grade protection under stringent quality standards are conducted in-house at Bosch Rexroth and are testaments to its quality guarantee. The Enduroq 2000 HVOF coating was used for the CJS on the Japanese construction vessel. HVOF stands for High Velocity Oxygen Fuel, a coating technique that also offers the option of applying a Cylinder Integrated Measuring System (CIMS).
This measurement system, developed by Bosch Rexroth, is based on the grooves in the rod's parent material, and is read by a sensitive sensor through the protective layer. This enables the exact rod position to be determined with a precision within tenths of millimeters. The hardware and software have been integrated in the newest generation of CIMS sensors, forming the basis for Condition Monitored Maintenance, part of Bosch and Bosch Rexroth Industry 4.0 developments.

Modular Hydraulic Power Unit (MHPU)

The hydraulic control of the CJS is provided by a power unit from a Bosch Rexroth Modular Hydraulic Power Unit (MHPU) introduced at the end of 2016 and specifically designed for the Marine & Offshore market. A Lloyd's Type Approval has been included in this program, but other Classifications are also possible, such as with ClassNK in this project. These high-end power units cover a power range of 350 to 3,000 kW at working pressures of up to 350 bars.
They are easy to configure using a list of options, enabling the system to be made more economical, without compromising on reliability and efficiency. Efficient IE3 electric motors, which can drive one or more pumps, are employed for driving the pump units. The MHPUs are also fitted with extra sensors and interfaces for Internet communications, preparing them for Industry 4.0 and condition monitoring. Finally, Bosch Rexroth's worldwide service organization guarantees professional support including rapid on-site spare parts service (from stock).

3D 연속 재킹 시스템

보쉬렉스로스, 일본에 '연속 재킹 시스템'을 위한 구동과 제어 솔루션 공급

보쉬렉스로스는 연속 재킹 시스템의 연속 시리즈로 GustoMSC의 최신 모델을 위한 구동과 제어 시스템을 설계, 제작, 시운전에 대한 수주를 했다. 연속 재킹 시스템은 해상에서 정밀한 고속 풍차 설치를 수행할 수 있도록 일본의 건설 작업선에 사용됐다. 연속 재킹 시스템(CJS)은 디지털 제어 작업을 통해 48개 유압 실린더를 연속으로 제어하는 혁신적인 리프팅 기능을 바탕으로 한다. 센서와 변위 센서 시스템은 복잡한 실린더 운동을 위한 피드백을 제공한다. CJS는 한 번의 플루이드 모션(fluid motion)으로 선박을 물 밖으로 들어올려 안정된 해양 '건설 플랫폼'으로 전환한다.

보쉬렉스로스

보쉬렉스로스는 60년대부터 보통 턴키 기반으로 흔히 재킹 시스템이라 부르는 통합 구동과 제어 솔루션을 개발 및 공급해왔다. 보쉬렉스로스는 지금까지 전 세계에 50여개의 구동과 제어 시스템을 인도했다. 인도된 구동과 제어 시스템은 석유와 가스 플랫폼 및 해양 풍차를 인양하고 설치하며 해양 용도를 위한 준설, 채광, 건설 작업선의 위치를 조정하고 안정화하는 데 사용됐다.

재킹 제어

'재킹'은 사전적으로 리프팅을 의미하며, 정확하게는 구동과 제어 잭업 또는 재킹 시스템의 기능이다. 연속 재킹 시스템은 한 번의 정확하고 제어된 움직임으로 재킹을 수행하기 때문에 한 걸음 더 나아간다. 보쉬렉스로스는 재킹 원리와 절차의 특화된 지식을 이용해 전세계 해양 분야에서 중요한 위치를 확보했으며 GustoMSC와 긴밀한 관계를 구축하고 있다. 또한 완전한 재킹 시스템의 설계와 공급 외에 정상 날씨와 해상 조건에서 하루 만에 해저에 풍차를 설치할 수 있어 소위 '물보라 지역' 전이를 크게 줄이는 일본 선박도 설계해왔다!

안정된 건설 작업선

CJS는 4개의 견고한 강철 다리로 구성되고, 다리 주위에 4개의 이동식 잭이 장착되며, 이동식 잭은 유압 실린더 2개의 피스톤 로드에 연결된다. 다리는 제어된 방식으로 먼저 해저에 고정하고, 고정 후 선박은 선박 탑재 크레인으로 풍차를 설치하기 위한 안정된 건설 플랫폼을 제공하도록 물 밖으로 완전히 들어올려진다.

다리의 구멍에 장착된 유압 구동 핀을 사용해 3개의 잭은 다리와 선박이 움직이는 동안 항상 다리에 연결되어 있다. 그 다음에 별도의 4번째 잭은 시작 위치로 이동하고, 이동 후 핀으로 고정되며, 다른 잭은 끝 위치에서 시작 위치로 이동된다. 이런 방식으로 한 번의 균일한 움직임으로 다리를 해저 위/내에 배치할 수 있어 선박의 3차원 안정화 및 일정한 속도로 인양 또는 하강이 가능하다. 운동 패턴은 매우 복잡하다. 운동은 제어장치, 실린더 변위 센서 시스템 및 기타 다양한 센서로 조정한다. 예를 들면 시작 위치로 복귀하는 잭의 실린더는 선박을 물 밖으로 들어올리는 다른 실린더보다 훨씬 빠르게 움직인다. 이는 유압장치, 전자장치 및 SW를 통합하는 새로운 방식을 의미한다.

총 32개의 유압식 인양 실린더는 재킹 운동 중 활성화된다. 앵커 핀을 움직이기 위한 다른 16개 실린더가 있고, 재킹 시스템은 밸브 블록, 제어 시스템 및 특수하게 설계된 소프트웨어로 구성된다. 시험 및 시운전은 GustoMSC와 보쉬렉스로스가 협력해 일본의 현장에서 수행한다.

극한 조건에 대한 보호

해양 산업(특히 염분과 침식 환경)에서 발견되는 극한 조건은 사용하는 장비에 특수한 조건을 요구한다. 이런 특수한 조건은 설계 단계에 고려되어 기능 설계, 소재 선택 및 특수 설비로 변환되는 중요한 요소가 된다. 내구성 유압식 실린더 로드를 만들기 위해 보쉬렉스로스는 HVOF 코팅, 스테인리스강 용접 및 레이저 클래딩과 같은 다양한 Enduroq 표면 보호 기법을 적용했다. 연구와 개발 및 엄격한 품질 기준으로 높은 등급의 보호를 적용하는 절차는 모두 보쉬렉스로스 내부에서 수행되며 품질을 보장하기 위한 방안이다.

Enduroq 2000 HVOF 코팅은 일본 건설 작업선의 CJS에 사용되었다. HVOF는 고속 산소 연료(High Velocity Oxygen Fuel)의 약자로 실린더 통합 측정 시스템(Cylinder Integrated Measuring System: CIMS)을 적용하는 옵션도 제공하는 코팅 기법이다. 보쉬렉스로스에서 개발한 이 측정 시스템은 로드의 모재(母材)에 있는 홈(groove)을 바탕으로 하며 보호층을 통해 감응 센서가 판독한다. 이 방식을 통해 0.1mm 이내의 정밀도로 정확한 로드 위치를 결정하는 것이 가능하다. 하드웨어와 소프트웨어는 최신 CIMS 센서에 통합되어 Bosch 및 Bosch Rexroth Industry 4.0 개발의 일부인 상태 모니터링 유지보수(Condition Monitored Maintenance)를 위한 기반이 된다.

모듈식 유압 동력 장치(MHPU)

CJS의 유압 제어는 2016년 말에 도입되어 선박 및 해양(Marine & Offshore) 시장을 위해 특수하게 설계된 보쉬렉스로스의 동력 장치인 모듈식 유압 동력 장치(MHPU)가 제공한다. Lloyd의 형식 승인은 이 사업에 포함되었으며, 이 사업에서 ClassNK와 같은 다른 선급도 가능하다. 이런 최첨단 동력 장치는 최대 350 bar의 작동 압력에서 350~3,000 kW의 동력 범위를 제공한다.

MHPU는 옵션 목록을 사용해 구성하기 쉬워 신뢰성과 효율의 저하 없이 시스템을 더 경제적으로 만들 수 있다. 하나 이상의 펌프를 구동할 수 있는 효율적인 IE3 전기 모터는 펌프 장치를 구동하기 위해 사용된다. MHPU에는 Industry 4.0 및 상태 모니터링을 위해 준비하고 있는 인터넷 통신을 위한 추가 센서와 인터페이스도 장착된다. 마지막으로 보쉬렉스로스의 전 세계 서비스 조직은 신속한 현장 예비부품 서비스(재고에서 반출)를 포함한 전문적인 지원을 보장한다.

Foreship designs refined by real-world experience

The benefits of designing ships for the conditions they face at sea are self-evident, but using voyage simulations and historical data means design decisions can be optimised for vessel performance, according to Foreship.

Foreship Ltd.

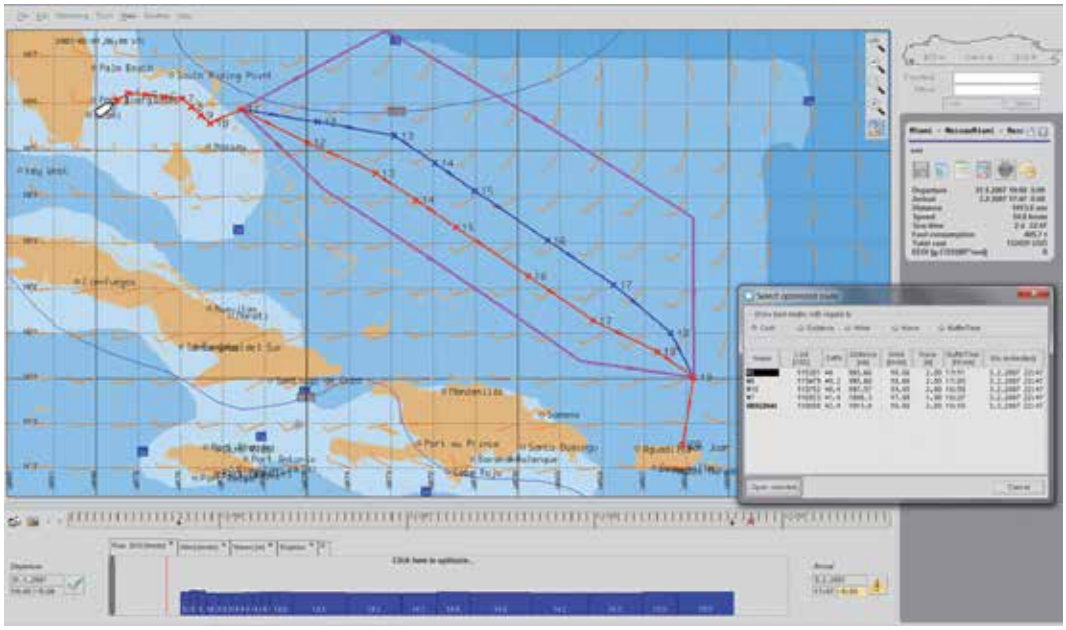
Naval architecture and marine engineering company Foreship has been leading the field in applying 'in-wave' analysis to factor in real sea states to hull form optimisation. Notably, it has used CFD analysis to support a case for the superior performance of bows featuring vertical stems over their bulbous counterparts at far lower wave heights than has previously been acknowledged. Real sea states have also provided useful input for Finite Element Method software when considering slamming and structural design issues.

However, CFD methods are only one part of Foreship's strategy designed to introduce real-world experience at an early stage in ship design. The Finnish company's continuing discussions with core cruise ship customers has been pushing forward with a completely new operability analysis and voyage simulation initiative to secure performance gains at the early design stages.

"We are optimizing the ship design for the best performance in real operational conditions; and by performance I mean fuel consumption and comfort on board," says Matthew Patey, Foreship Project Manager. Data inputs include the hull, the propellers, the rudders, the general arrangement and the main engines to calculate fuel consumption and motions on board the vessel during simulated voyages. Voyages are from port to port, start on a given day at a given time and have a target arrival date and time, and an initial routing.

"Realistic conditions are created by using hind-cast environmental data of the wind, waves and currents on the actual route the vessel will follow and using simulations of how the vessel will be operated," says Patey. "That includes decisions on the engines that minimize fuel consumption and what route to follow to avoid bad weather."

It is easier and more accurate to assess the impact of design



changes on fuel consumption and comfort using a single, consistent approach based on the same model and realistic weather conditions and a realistic route than to deal with these issues separately, Patey explains. Considered separately, each type of environmental data has inaccuracies, and there is a risk of inconsistency between analyses and communication failures between different design disciplines.

Foreship's initiative relies on established ship design and construction software, but introducing operating data such as voyage route planning at an earlier stage than is customary.

"Even though we are using well-known software in this application, we are not aware of anyone doing this sort of study at any stage using any system," says Patey. "There are organizations with voyage simulation software which don't design ships and there are designers who don't include operational simulations. It's also the case that some software packages in use are limited, and simply cannot consider weather routing."

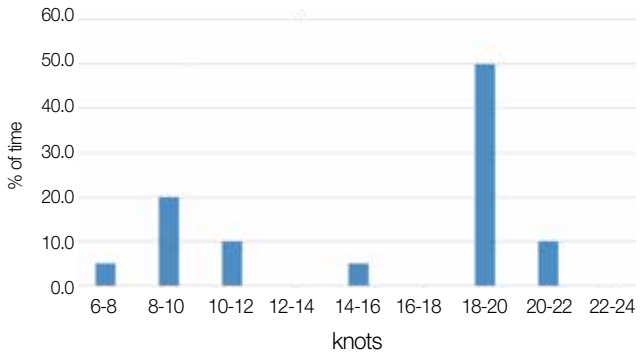
The effects of design decisions on fuel consumption and comfort on board can be evaluated quickly and realistically to give the most accurate picture possible of how the ship will perform before it actually goes into service, the Project Manager says. "From hind-cast data we get the wind, current and wave conditions during the voyage," says Patey. "These are used in the fuel consumption and motion calculations. The engine operating mode and the route the vessel follows are optimized for minimum fuel consumption and minimum motions, which would reflect the decisions made by the crew on board the vessel to save fuel and keep the vessel safe. With many years of data we can simulate voyages simply by changing the departure date."

Using this approach, the full impact of a design change can be considered in a single analysis. If the widening of the hull were being considered, for example, the effects on fuel consumption, speed, engine profile and passenger comfort could be simulated, and the different possibilities for engine configurations investigated very quickly. "We could assess any change in the design – for example the size of fin stabilizers and bilge keels from both the fuel consumption and comfort perspective – but also how best to operate the vessel and how this would change with changes in the vessel design, Patey says.

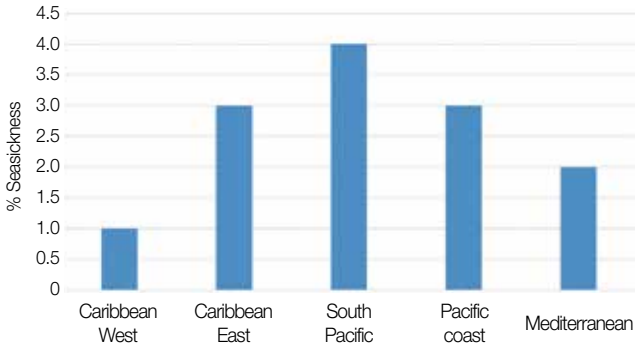
The Voyage Simulation approach establishes the operational profile of the vessel and the weather conditions under which it can safely, comfortably and

Matthew Patey,
Foreship Project Manager

Speed Profile for Vessel



Seasickness % by Itinerary

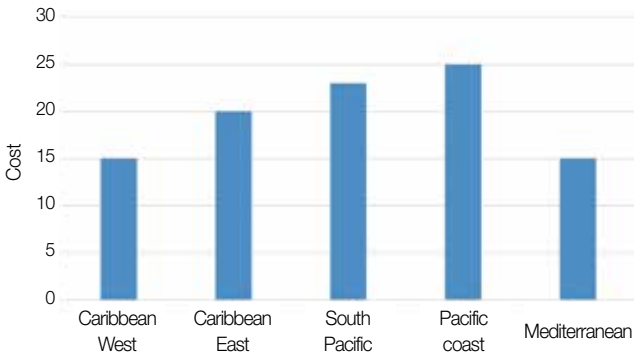


most profitably operate. It includes any design or operation decision that affects fuel consumption and comfort on board in the same analysis, and requires formal responses from designers to operational questions which – in their heart of hearts - may formerly have been considered of either indeterminate weight, or even background noise. These might include:

- When is the best time to cruise the South Pacific?
- Do we need to make the vessel bigger to extend the operating season?
- What should this itinerary's departure and arrival times be?
- What combinations of engines do we really need?
- How long will it take to return to port if we lose one propeller?

Even if the design is fixed, the use of voyage simulations will give owners a much more realistic picture of the operational capability of the vessel than has previously been possible, Patey says.

Fuel Cost per Nautical Mile by Itinerary



"The Operability Analysis can also be easily updated throughout the entire design process as the design changes and new performance data becomes available," he says. "The model can be tuned further as data from onboard systems is compiled from the operation of the vessel. This feedback from operations will help in the decision-making process during future newbuilding and conversion projects. In fact, this is the most valuable design data you can get and should be used in future designs. By using operational data from a reference vessel i.e. similar type ship as the new design, the operability analysis methods can be calibrated with existing data for the reference ship and applied more accurately in the new design. Issues such as marine growth, for example, have a significant effect on the fuel consumption, but depend on the route and cleaning schedule for the hull. This is data which is best obtained from real operational experience. Through the integration of real performance data in the operability analysis, a much more realistic assessment of the new vessel's performance can be made. Then the vessel design can be optimized not only for the actual environmental conditions but also for the way the vessel is expected to be operated."

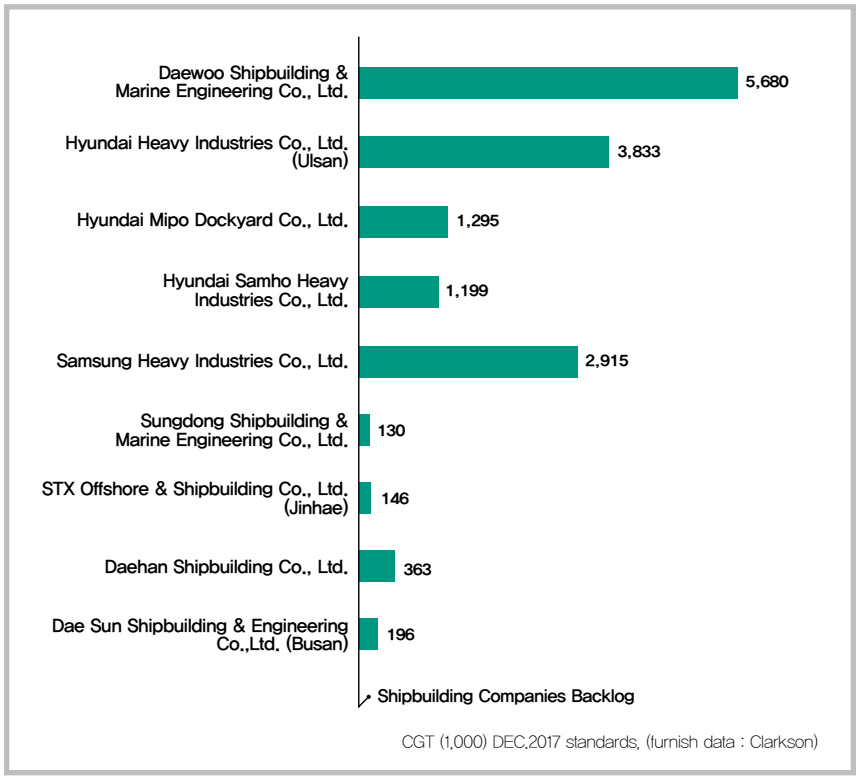
Patey reports that a number of its well-known cruise ship clients have expressed interest in Foreship's new operability analysis service and that at least two has sanctioned a full scale operability study, as part of its latest new construction projects.

"Because we see the effects of changes more easily, it is easier to make changes and optimize the design," he adds. "This will result in a better ship in the end because operability analysis can be used to give practical and accurate answers about the effect early design decisions will have on the fuel consumption and comfort."

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: Daewoo Shipbuilding & Marine Engineering Co., Ltd.

DSME won an order worth USD 480 million from Greece-based ship owners

Daewoo Shipbuilding & Marine Engineering (DSME) announced on December 7 that it won an order from Maran Gas Maritime, an affiliate of Greece's largest shipping company Angelicoussis Group, for 2 vessels including 1 LNG-FSRU (Floating Storage Regasification Unit) and 1 LNG carrier. On December 4, DSME clinched an order from Greece-based Aeolos for 1 unit of VLCC (Very Large Crude Carrier). Those contracts are valued at approximately USD 480 million.

The LNG-FSRU, LNG carrier, and VLCC, added recently to orderbook of DSME, are eco-friendly vessels conforming to environmental regulations of the International Maritime Organization (IMO) and incorporate the latest technologies of DSME such as high-efficiency engines and newest fuel-saving technologies.

The latest contracts attest to the strong relationship of trust between Angelicoussis Group and DSME. Including the latest contracts, Angelicoussis Group has placed orders at DSME for as many as 9 vessels which comprise 36% of 25 vessels ordered to DSME this year, thus easing DSME's effort to put itself back on track. DSME and Angelicoussis Group which has ordered 98 vessels to DSME thus far since its first trade with the shipbuilder in 1994 have maintained strong relationship of trust.

These contracts are also significant in that DSME added another ship owner of Greece to its list of customers while DSME President Jung Sung-rip is taking the helm of the shipbuilder in 14 years after he signed the last contract in 2003 during his tenure as CEO.

The latest contracts bring total number of vessels ordered to DSME to 25 units worth approximately USD 2.94 billion so far this year, which represents a two-fold increase from USD 1.55 billion recorded last year.

대우조선해양, 그리스 선주들로부터 4.8억 달러 수주

대우조선해양은 그리스 최대 해운사인 안젤리쿠시스 그룹 산하 마란가스(Maran Gas Maritime)로부터 LNG-FSRU 1척과 LNG운반선 1척 등 총 2척의 선박을 수주했다고 지난 12월 7일 밝혔다. 또 지난 12월 4일에도 그리스 에어로스(Aeolos)로부터 초대형원유운반선 1척을 수주했다. 이들 선박의 총 계약 규모는 약 4.8억 달러 규모다.

이번에 수주한 LNG-FSRU, LNG운반선, 그리고 초대형원유운반선은 국제해사기구(IMO)의 환경규제 기준에 충족하는 친환경선박으로 고효율 엔진과 최신 연료절감 기술 등 대우조선해양의 최신 기술이 적용된다.

이번 계약으로 안젤리쿠시스 그룹과 대우조선해양간의 신뢰관계가 다시 한번 조명을 받고 있다. 안젤리쿠시스 그룹은 이번 계약을 포함해 올해 대우조선해양이 수주한 25척의 선박 중 무려 36%에 달하는 9척의 선박을 발주해 대우조선해양 경영정상화에 큰 기여를 했으며, 1994년 첫 거래 이후 총 98척의 선박을 대우조선해양에 발주해오는 등 양사는 굳건한 신뢰관계를 이어오고 있다. 또한 에어로스와의 이번 계약은 정성립 사장이 CEO로 재직하던 지난 2003년 마지막 계약 이후 14년 만에 다시 대우조선해양과 인연을 이어가게 하는 것으로, 그리스 선주를 추가 확보해 고객군을 확대했다는 측면에서 의미 있는 수주다.

대우조선해양은 올해 들어 25척 약 29.4억 달러 상당의 선박을 수주하며, 지난해 15.5억 달러 수주실적 대비 두배가량 증가한 수주실적을 거뒀다.

ABS Awarded Classification Contract for LNG Bunker Barge

ABS was selected by Q-LNG, LLC, to class an Articulated Tug Barge (ATB) for LNG bunkering in North America. The vessel is scheduled to begin construction at VT Halter Marine in Pascagoula, Mississippi, in early 2018.

"This project represents another significant milestone for the region in the continued development of LNG infrastructure in North America, helping the maritime industry meet stricter emissions requirements," said ABS Chairman, President and CEO, Christopher J. Wiernicki. "ABS is committed to working with all project stakeholders to support safety both during construction and operations."

"We chose ABS as our class partner for this project because of their extensive understanding of LNG as fuel and LNG bunkering applications," said Q-LNG Transport President Chad Verret. "This project will expand the LNG supply chain and play a critical role in the advancement of LNG as a marine fuel throughout the region and North America."

The LNG bunker barge, with 4,000 cubic meters LNG capacity, will be owned and constructed by Q-LNG while the operations will be handled by New Orleans-based Harvey Gulf International Marine. The barge will be chartered by Shell, and will supply necessary LNG fuel to cruise vessels throughout the Southeast Coast of the US. The barge will be designed to be efficient and maneuverable to allow LNG bunker delivery to a range of customers.

ABS is also classing the LNG bunkering barge for North America that is currently being built at Conrad Orange Shipyard and is scheduled for delivery in 2018.

Recognizing the changing landscape and increased industry focus on gas, ABS launched its Global Gas Solutions team in 2013 to support industry in developing gas-related projects. The ABS Global Gas Solutions team 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 society of choice for some of the most advanced gas carriers in service.

Wärtsilä engines and exhaust gas cleaning chosen for new cruise ship

Wärtsilä has been contracted to supply the engines and exhaust gas cleaning systems for a new 104 metres long exploration cruise vessel. The ship is being built at the China Merchants Heavy Industry (Jiangsu) Co shipyard in China for Sunstone Ships Inc of Miami, USA.

There are options for an additional nine vessels. The contract with Wärtsilä was placed by Ulstein Design and Solutions of Norway, the company responsible for delivering the design and equip-

The new exploration cruise vessel being built for Sunstone is to be equipped with Wärtsilä engines and exhaust gas cleaning systems.

ment package to the yard. The order was booked in June 2017.

The full Wärtsilä scope of supply comprises two 6-cylinder Wärtsilä 20 engines fitted with the Wärtsilä NOR (NOx Reducer) exhaust gas cleaning system, and two 8-cylinder Wärtsilä 20 engines. The Wärtsilä NOR is based on SCR (Selective Catalytic Reduction) technology. The system is compliant with various NOx (Nitrogen Oxides) emission reduction needs, such as the IMO Tier III rules.

"We are delighted to be cooperating with the Ulstein company in this newbuild project. The Wärtsilä 20 engine is a very good product fit for this vessel, while the NOR system is optimised and validated for all our medium speed engines in terms of reliability, flexibility and size," said Cato Esperø, Sales Director, Wärtsilä Norway.

"Reliability and performance are important criteria for cruise vessels since they are mostly operating to strict schedules. At the same time, environmental sustainability is today an essential element in the cruise sector. Wärtsilä's reputation speaks for itself in all these areas," said Ove Dimmen, Sales manager, Ulstein Design & Solutions AS.

The Wärtsilä equipment will be delivered to the yard in January 2018, and the ship is expected to begin operations in September 2019.

Shell Marine Secures Big Ship Commitment from COSCO Shipping

COSCO SHIPPING Taurus, one of COSCO SHIPPING's 20,000 teu capacity containerships

Shell Marine has recently been awarded China Ocean Shipping (Group) Company's (COSCO SHIPPING) largest marine lubricants order in 2017. This order will include the full range of marine lubricants and technical services for seven out of COSCO SHIPPING's 10 new generation Ultra Large Container Carriers (ULCCs) with capacities of approximately 20,000 TEUs each, ordered in 2015 and due to be in service from 2018-2019. Shell Marine has supplied marine lubricants and services to over 140 COSCO SHIPPING vessels since 2004.

Jan Toschka, Shell Marine Executive Director, said, "The quality of marine lubricants is critical for engine reliability; the application of the right technical services enable ship owners and operators to

optimise their vessels' total cost of ownership. In today's highly competitive and challenging maritime sector, operational reliability and excellent account management have become table stakes and we in Shell Marine are stepping up to the plate. Securing this major contract for ships that play a leading role in delivering Chinese exports on the just-in-time basis required at this scale demonstrates owner preferences for proven lubricant performance, supported by a global logistics network and comprehensive technical services."

Toschka says that the level of customer engagement behind the latest COSCO SHIPPING deal included its provision of onboard testing, assisting not only in COSCO SHIPPING's blend-on-board program, its oil drain monitoring, but also providing customised analysis and comments in Chinese language as part of COSCO's Shell Rapid Lubricants Analysis report. Shell has also positioned one of its "Technical Maritime Hubs" in Shanghai with technical experts ready to provide services to COSCO SHIPPING.

COSCO SHIPPING is in the process of taking over Orient Overseas Container Line (OOCL), which today operates the largest container ships afloat. Earlier this year, OOCL appointed Shell Marine to provide integrated marine solutions to serve its marine lubricants and services for OOCL Hong Kong, the 21,413 TEU capacity vessel which, on delivery claimed the accolade of "world's largest container ship".

Shell Marine offers a complete portfolio of lubricating oils for marine engines burning gas, heavy fuel, gas oil or liquid biofuel. All its engine oils are designed to minimise deposit build-up and to help keep engines clean. Its Shell Alexia oils for two-stroke, slow speed engines meet a full range of vessel type and fuel grade needs offering owners peace of mind, whether slow steaming, operating in emissions control areas or undertaking fuel switching.

Korea Shipbuiling Orders awarded to domestic shipyards in 2015~2017

Data		Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard
2015	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)	-	Cosmoship Management S.A, Greece	-	Dae Sun Shipbuilding & Engineering
		180,000m³ LNG carriers	1 vessel	-	Mitsui O.S.K Lines, Japan	2018s	Daewoo Shipbuilding & Marine Engineering
	Mar	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
	Apr	319,000 DWT VLCCs	2 vessels	USD 198 million	Maran Tankers Management, Greece	The end of 2016	Daewoo Shipbuilding & Marine Engineering
		20,600 TEU container ships	3 vessels	-	CMA CGM, France	The end of 2017	Hanjin Heavy Industries & Construction (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
	Jun	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
		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 VLGCs	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
	Aug	Product Carriers	4 vessels	USD 144 million	Scorpio Tankers, U.S.A	The first of 2017	Hyundai Mipo Dockyard
	Sep	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
	Oct	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
	Nov	319,000 tons VLCCs	2 vessels	-	Maran Tankers Management, Greece	2017s	Daewoo Shipbuilding & Marine Engineering
	Dec	114,000 tons products carriers	2 vessels	-	Sea Tankers Group	2017. September	Daehan Shipbuilding
	Feb	158,000 DWT oil products carriers	2 vessels	-	Ditas Shipping, Turkey	2018s	Hyundai Heavy Industries
	May	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
	Jun	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	-	Ilshin Marine Transport, Korea	The end of 2017	Hyundai Mipo Dockyard

	Jul	31,000 tons Car ferry	1 vessels	-	Weidong Ferry	The end of 2018	Hyundai Mipo Dockyard
	Sep	180,000m³ LNG carriers	2 vessels	USD 367 million	Europe ship owner	-	Samsung Heavy Industries
	Oct	2,800 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
		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				
		157,000 DWT oil tankers	3 vessels	USD 170 million	Nordic American Tankers Limited, Norway	-	Samsung Heavy Industries
	Dec	14,500 TEU container ships	4 vessels	USD 700 million	IRISL, Iran	2th quarter 2018	Hyundai Heavy Industries
		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
2017	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
	Feb	RO-RO Ship	2 vessels	USD 117.8 million	CLdN, Luxembourg	The first of 2017	Hyundai Mipo Dockyard
		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	173,400m³ 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
		21,000m³ 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
		7,500m³ 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	84,000m³ 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
	Dec	LNG carriers	1 vessel	-	Greece, Maran Gas Maritime	-	Daewoo Shipbuilding & Marine Engineering
		300,000 DWT VLCCs	1 vessel	-	Greece, Enesel	-	Hyundai Heavy Industries
		300,000 DWT VLCCs	1 vessel	-	Korea, Hyundai Glovis	-	Hyundai Heavy Industries
		VLCCs	1 vessel	-	Greece, Aeolos	-	Daewoo Shipbuilding & Marine Engineering

*Note : Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until Dec 15, 2017)

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	Excelerate Energy, U.S.A	First quarter of 2014	Daewoo Shipbuilding & Marine Engineering
	Sep	Semi-submersible Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Second hallf of 2014	Daewoo Shipbuilding & Marine Engineering
		Well Intervention Vessel	2 vessels	USD 420 million	Eide Marine Services AS, Norway	2013	STX Finland
		Drillship	1 vessel	KRW 600 billion	Noble Drilling, U.S.A	Second half of 2014	Hyundai Heavy Industries
	Oct	Fixed Offshore Platform	-	USD 1.4 billion	Chevron, U.S.A	Second half of 2014	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 unit	USD 550 million	Offshore drilling company, Americas	-	Daewoo Shipbuilding & Marine Engineering
		Platform Supply Vessel	1 unit	-	Troms Offshore Supply AS, Norway	First half of 2013	STX OSV
		Offshore Plant Module	2 units	-	-	From 2013 to 2014	STX OSV
		Platform Supply Vessel	4 units	KRW 2 trillion	Island Offshore, Norway	Consecutively from the 3rd quarter	of 2013 to the 1st quarter of 2014
	Nov	Pipe Laying Support Vessel	2 units	USD 500 million	Odebrecht, Brazil	August of 2014	Daewoo Shipbuilding & Marine Engineering
	Dec	Offshore facilities (Gas platform and various facilities)	-	USD 900 million	Major multinational oil companies	2nd half of 2014	Hyundai Heavy Industries
2012	Jan	CPF (Central Processing Facility)	-	KRW 2.6 trillion	INPEX, Australia	4th quarter of 2015	Samsung Heavy Industries
		Semi-submersible rig	1 unit	USD 620 million	Odfjell, Norway	by mid 2014	Daewoo Shipbuilding & Marine Engineering
	Feb	LNG-FSRU	-	-	Hoegh, Norway	-	Hyundai Heavy Industries
	Mar	Offshore Platform	1 unit	USD 560 million	DONG E&P A/S, Danish	April 2015	Daewoo Shipbuilding & Marine Engineering
		FPSO	1 unit	USD 2.0 billion	INPEX, Australia	April 2016	Daewoo Shipbuilding & Marine Engineering
	Apr	Drillship	1 vessel	USD 645 million	Ensco plc	Third quarter 2014	Samsung Heavy Industries
	May	Semi-submersible Drilling Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Mid 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 vessel	USD 600 million	Seadrill, Norway	Second half of 2014	Samsung Heavy Industries
		Drillship	1 vessel	USD 655 million	Diamond Offshore Drilling Limited., U.S.A	4th quarter of 2014	Hyundai Heavy Industries
	Jun	Semi-submersible drilling rig	1 unit	USD 700 million	Fred Olsen Energy, Norway	March 2015	Hyundai Heavy Industries
		LNG-FPSO	1 unit	-	Petroliam Nasional Berhad, Malaysia	June 2015	Daewoo Shipbuilding & Marine Engineering
	Jul	Drillship	1 vessel	USD 645 million	Ensco plc	-	Samsung Heavy Industries
		Gas Compression Platform	1 unit	USD 420 million	(Letter of Award)	Second half of 2015	Hyundai Heavy Industries
	Aug	LNG-FSRU	8 vessels	-	Excelerate, U.S.A	Between early 2015~2017	Daewoo Shipbuilding & Marine Engineering
	Sep	Drillship	1 vessel	USD 620 million	Rowan, U.S.A	First half of 2015	Hyundai Heavy Industries
		Drillship	1 vessel	USD 623 million	-	-	Samsung Heavy Industries
	Oct	Drillship	4 vessels	USD 2.06 billion	Transocean, U.S.A	One-by-one from mid 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 vessel	USD 560 million	Atwood Oceanics, U.S.A	-	Daewoo Shipbuilding & Marine Engineering
		LNG-FSRU	1 vessel	USD 270 million	Hoegh LNG, Norway	First half of 2015	Hyundai Heavy Industries
	Nov	Drillship	1 vessel	USD 700 million	-	2nd half of 2015	STX Offshore & Shipbuilding
	Dec	offshore platform (Top side)	1 unit	USD 1.77 billion	Statoil, Norway	The end of 2016	Daewoo Shipbuilding & Marine Engineering
2013	Jan	Gas Production Platform (topside)	1 unit	USD 1.1 billion	Statoil, Norway	Mar 2016	Hyundai Heavy Industries
		LNG-FSRU	1 vessel	-	BW Maritime, Singapore	2015	Samsung Heavy Industries
	Mar	Floating Production Unit (FPU)	1 unit	USD 1.3 billion	Total, France	First half of 2016	Hyundai Heavy Industries
		Tension Leg Platform (TLP)	1 unit	USD 700 million	Total, France	First half of 2015	Hyundai Heavy Industries
	Apr	FPSO	1 unit	USD 1.9 billion	Chevron, U.S.A	-	Hyundai Heavy Industries
	May	Semi-Submersible Drilling Rig	1 unit	USD 750 million	Diamond Offshore, U.S.A	Nov of 2015	Hyundai Heavy Industries

	Jun	Ultra-deepwater Drillship	1 unit	USD 515 million	Ensco, United Kingdom	Third quarter of 2015	Samsung Heavy Industries
		FPSO	1 unit	USD 3.0 billion	Nigeria	Second half of 2017	Samsung Heavy Industries
		Jack-up Rig	2 units	USD 1.3 billion	Statoil, Norway	-	Samsung Heavy Industries
	Jul	Ultra-deepwater Drillship	2 units	USD 600 million	Seadrill, Norway	Second half of 2015	Samsung Heavy Industries
		Semi-Submersible Rig	1 vessel	USD 718 million	Stena, Sweden	First half of 2016	Samsung Heavy Industries
		Ultra-deepwater Drillship	1 unit	USD 570 million	Atwood Oceanics, U.S.A	The end of 2015	Daewoo Shipbuilding & Marine Engineering
	Sep	Drillship	1 unit	USD 550 million	-	Dec of 2015	Samsung Heavy Industries
		Ultra-deepwater Drillship	1 unit	USD 600 million	Ocean Rig, Greece	Dec of 2015	Samsung Heavy Industries
		Jack-up Rig	1 unit	USD 530 million	Maersk Drilling, Denmark	The middle of 2016	Daewoo Shipbuilding & Marine Engineering
	Oct	Drillship	2 vessels	USD 1.24 billion	-	Second half of 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 vessel	USD 520 million	Transocean, U.S.A	The middle of 2016	Daewoo Shipbuilding & Marine Engineering
		LNG-FSRU	1 unit	-	Gas Sayago (Joint venture)	Sep of 2016	Daewoo Shipbuilding & Marine Engineering
	Dec	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
2014	Feb	LNG-FPSO	1 unit	USD 1.45 billion	Petroliam 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
	Nov	Fixed Offshore Platform & Subma-rine Cable	4 units	USD 1.9 billion	ADMA-OPCO	Second half of 2019	Hyundai Heavy Industries
		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
2017	Jan	FPU	1 unit	USD 1.27 billion	British Petroreum, United Kingdom	Augst of 2020	Samsung Heavy Industries
		FSRU	1 unit	USD 230 million	Höegh LNG, Norway	May of 2019	Samsung Heavy Industries
		FSRU	1 unit	USD 230 million	Höegh LNG, Norway	4th quarter of 2018	Hyundai Heavy Industries
	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 Dec 15, 2017)

High expectation for containership order placement

Global new orders for containership are expected to reach 95 units this year, which represents about a 50% increase from the previous year. Particularly, 25-30 units of VLCCs (Very Large Crude Carriers) with a capacity of 15,000 TEU or higher are expected to be ordered. The order placement is likely to rebound this year, along with expansion of pre-owned containership trade volumes, as the environmental regulations of IMO (International Maritime Organization) are scheduled to take effect. Moreover, the rising SCFI (Shanghai Containerized Freight Index), indicative of containership segment trend, is also a positive factor contributing to the upturn in order placement.


CMA CGM


MSC


MAERSK LINE


CMA CGM


CMA CGM


MSC

New Product

DeltaV™ SIS - exida exSILentia® for Safety System Setup

Emerson Automation Solutions

Emerson and exida announce the release of the DeltaV™ safety instrumented system (SIS) configurator, an exida exSILentia® tool that automatically generates DeltaV SIS configurations. By pairing built-in DeltaV functionality with exida's comprehensive software tools for functional safety, users can develop safety logic configurations much faster and in fewer steps. Project teams can not only decrease time and effort of safety system configuration, but also deliver more consistent configurations with fewer errors, requiring less rework.

In traditional SIS configuration, project teams use the safety requirements specification (SRS), along with custom-built cause and effect matrices (CEM) as the basis for system configuration. The CEM data is manually interpreted and coded into the safety logic to configure the system. This configuration model requires multiple stages of data entry, taking too much time and presenting opportunities for human error. The new DeltaV SIS configurator leverages data structures created during the conceptual safety instrumented function (SIF) design, safety instrumented level (SIL) verification, and the SRS to automatically generate the safety system configuration.

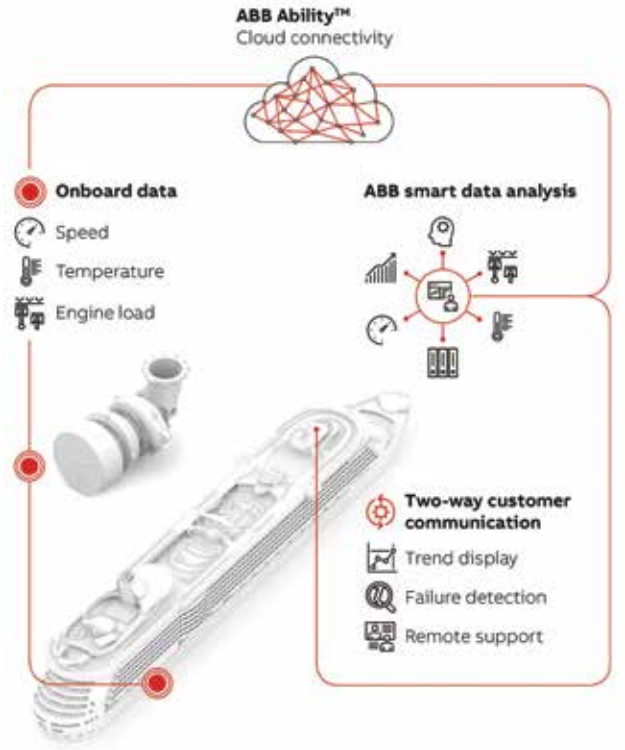
"With the DeltaV SIS Configurator, programming the logic only takes a fraction of the time, so the SIS conceptual design can be finalized before programming begins. This eliminates any rework due to changing requirements and dramatically impacts project schedule," said Iwan van Beurden, chief technology officer and director of product development at exida.

With automated SIS configuration, there is no need for entering data in multiple tools; everything is entered once into exSILentia, and an automated tool translates the information into the DeltaV safety logic configuration. The SRS data, SIF definition, and the associated SIL verification data are included.

-TEL: +82-2-3438-4600
-http://www2.emersonprocess.com

ABB Ability™ extended with digital turbocharging solutions for marine

ABB



Integrated turbocharger monitoring capability to capture and analyze operational data.

Growing the ABB Ability portfolio, ABB Turbocharging launches at Marintec 2017 in Shanghai its first digital turbocharging solutions for enhanced performance, perational flexibility and lower operating costs for marine customers. These solutions will further harness the power of digitalization through connection to the vessel optimization system and ABB's Collaborative Operations Centers for the marine sector. This combines the collective expertise of ABB in marine propulsion, optimization, advisory, and turbocharging, with digital connectivity.

Tekomar XPERT for engine performance analysis

Bringing marine customers actionable insights to improve their engine performance, ABB has acquired Tekomar XEPERT, a performance analysis and advisory software solution. Tekomar XPERT brings fuel savings across entire fleets through analysis of actual operation and performance data compared to sea trial and test data, identifying low performance on any engine at any load and providing recommendations for action. Available for all marine customers and currently in operation on over 1,000 vessels, Tekomar XPERT is targeted at two-stroke and auxiliary engines enabling increased efficiency of reporting and better collaboration for improved engine condition and maintenance.

ABB Ability Digital SIKO for uncompromised reliability at optimized costs

ABB has extended its SIKO concept (Sicherheitskonzept/ safety concept) through the power of digitalization, bringing to market ABB Ability Digital SIKO for uncompromised turbocharger reliability. Slow-steaming, now the standard in the merchant marine industry, brings changes in vessel operations. Based on the time-proven SIKO calculations for exchange intervals, Digital SIKO, first available for two-stroke applications, incorporates data from individual turbocharger operation.

Turbocharging monitoring for transparency of operations

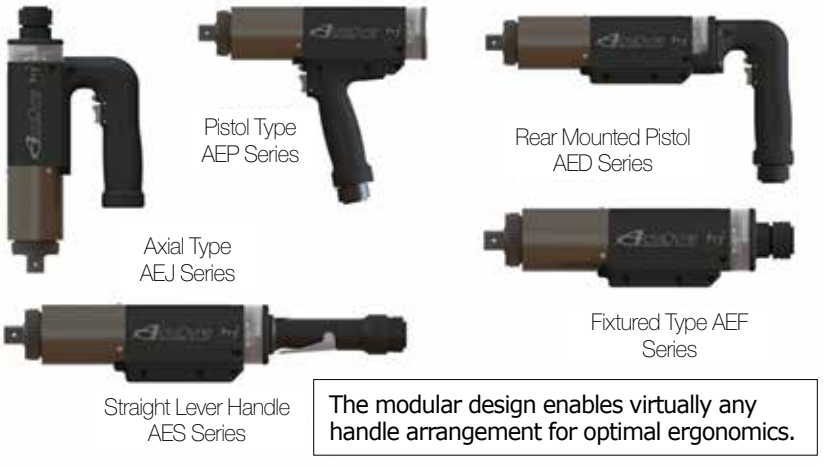
Combining digital connectivity and integrated reporting, ABB is enhancing data-driven decision making based on key parameters in the operation of engine and turbocharging systems. Making available actionable data on signals such as speeds, temperatures, and loads. ABB customers will gain transparency of operation for enhanced failure prevention, higher availability, and increased operational flexibility.

-TEL: +82-2-528-2510
-http://www.abb.co.kr

New Product

고성능 토르크 볼팅 툴

썬덴코리아



지난 20년간 국내 자동화 장비 솔루션을 리딩해온 전문업체 썬덴코리아는 다양한 동력원을 사용하는 고성능 토르크 볼팅 툴을 공급한다고 발표했다.

이미 자동차를 비롯한 각종 체결 작업 현장에 1,000대 이상의 서보프레스와 너트러너 시스템을 납품한 풍부한 경험을 앞세워 이번에 썬덴코리아는 High Torque 너트러너 전문업체인 미국 AIMCO와 독점 공급 계약을 체결하고, 자체 기술력을 토대로 국내 토르크 시장에 출사표를 던졌다.

AIMCO의 토르크 너트러너 제품의 가장 특징은 데이터를 저장할 수 있는 Transducerized DC(전기) 시스템을 비롯해, 공압 Wrench(에어), Cordless Battery(전기) Wrench 등 다양한 고객요구에 대응할 수 있는 툴을 보유하고 있다는 점이다.

- DC Controlled System – Controller, Tool, Cable로 구성되어 있으며 최대 256개 Parameter, 20,000개 체결 커브 및 1,000,000개 체결 데이터 저장, 최대 16,000Nm
- Pneumatic Wrench – High speed Dual Motor, 최대 5,100Nm
- Battery Wrench – Tool, Battery, Charger로 구성, 최대 4,100Nm

-TEL: +82-2-2054-3600
-http://www.sunden.co.kr

NCH 윤활제 5종 한국석유관리원 우수제품 인증

NCH코리아

NCH코리아는 자사의 '프리마루브 익스트림 블랙(PREMALUBE XTREME BLACK #1)'와 '프리마루브 레드(PREMALUBE RED #2)'를 포함한 윤활제(그리이스) 5종이 한국석유관리원으로부터 석유제품 품질 검사업무규정을 준수하는 '품질관리 우수제품'으로 인증을 획득했다고 밝혔다.

NCH가 한국석유관리원으로부터 '품질 관리 우수 제품' 인증 받은 제품은 다목적 알루미늄 복합계 그리이스인 프리마루브 블랙(PREMALUBE BLACK #2), 고온 고하중용 식품등급 그리이스인 퓨어 플렉스(PUREPLEX #2), 다목적 리튬 복합계 그리이스인 리씨플렉스(LITHIPLEX #), 프리마루브 익스트림 블랙(PREMALUBE XTREME BLACK #1), 프리마루브 레드(PREMALUBE RED #2)를 포함해 총 5종이다.

NCH의 윤활제(그리이스)는 제조 공정시 인체 유해 물질로부터 보호가 필요한 식품/음료 제조, 제약회사, 그리고 밀폐된 공간에서 현장작업이 요구되는 전기/전자/반도체 공장의 클린룸의 공조기, 각종 기계설비 등을 비롯해 직원 건강 및 제품의 품질 안전을 위해 검증을 거친 윤활제로서 사용될 수 있다.

NCH의 프리마루브 레드(PREMALUBE RED #2)는 고온 고하중 알루미늄 복합계 그리이스로서, –18~204℃에 이르는 넓은 사용 온도 범위를 제공하며 솔루몰을 함유하고 있으며 탁월한 내수성을 제공한다.

NCH의 프리마루브 익스트림 블랙(PREMALUBE XTREME BLACK #1)은 극고온, 극하중 초내수성 합성유계 그리이스다. 프리멀루브 익스트림 블랙은 –28~260℃에 이르는 넓은 사용 온도 범위를 제공하며, 칼슘 설포네이트 증주제를 포함하고 있는 합성유계 제품으로 지속적 마모방지와 극압보호 물 부식성 용액에 강하며 저항성 저온 고온 적용에 우수하다.

NCH코리아 관계자는 "이들 제품은 다양한 산업 분야 제조 환경에서도 신뢰하고 사용할 수 있을 뿐 아니라 밀폐된 공간에서 고객이 직접 접촉하고 숨쉬는 공기의 퀄리티를 안전하게 관리할 수 있고 설비의 산화 및 부식까지 막아 운영비용 절감에도 크게 기여하는 혁신적인 제품"이라며, "NCH는 산업 제조 현장의 환경을 개선할 수 있도록, 시설물을 깨끗하게 세척하고 유지 보수 관리하는 업무 전반에 사용되는 다양한 시설물 관리 제품들을 안정적으로 공급할 뿐 아니라 친환경 제품 및 솔루션 개발에 지속적으로 노력할 것"이라고 말했다.

-TEL: +82-2-3482-2581
-http://www.nch.co.kr

KORSHIP
Shipbuilding
Offshore
Oil & Gas
Offshore wind

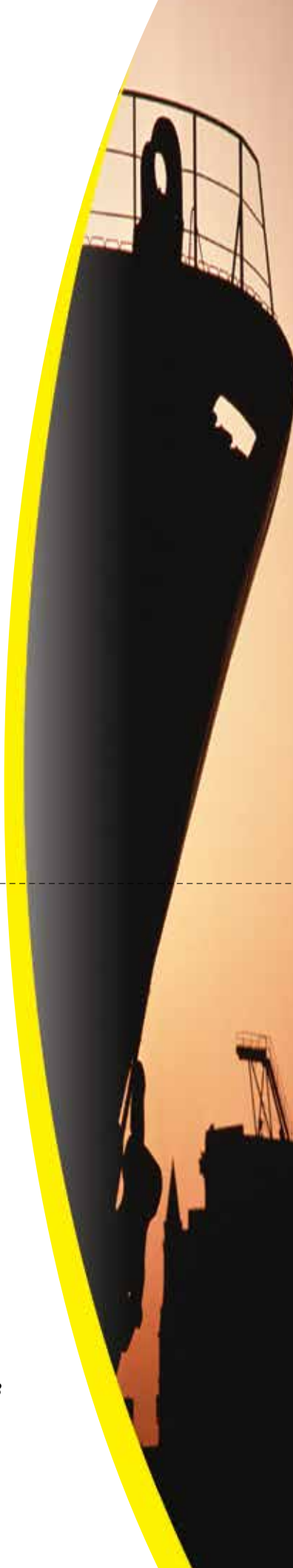
Registration No. : Youngdungpo Ra 00220
Published on Jan. 5. 2018
Publisher Yoseob Choi
Editor-in-Chief Chunghoon Lee
Senior Editor Chanyoung Choi
Designer Hyunju Seo
Marketing Manager Sungsu Park
Kijong Seo
Jongki Hong

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
Fax : +82-2-6442-2168
International : +82-10-5604-7311 (Chanyoung Choi)

www.korship.co.kr www.procon.co.kr
E-mail : korshipeditor@gmail.com
Price per Copy : ₩10,000
Annual Subscription Fee : ₩100,000

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



Application of Subscription

Company's Name :

Applicant :

Address :

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

Tel : Fax :

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

Inquiry : Tel / +82-2-2168-8898
Fax / +82-2-6442-2168
E-mail : victory@procon.co.kr