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2016년 개정판

조선 & 해양 총람 Guide

Offshore & Shipbuilding

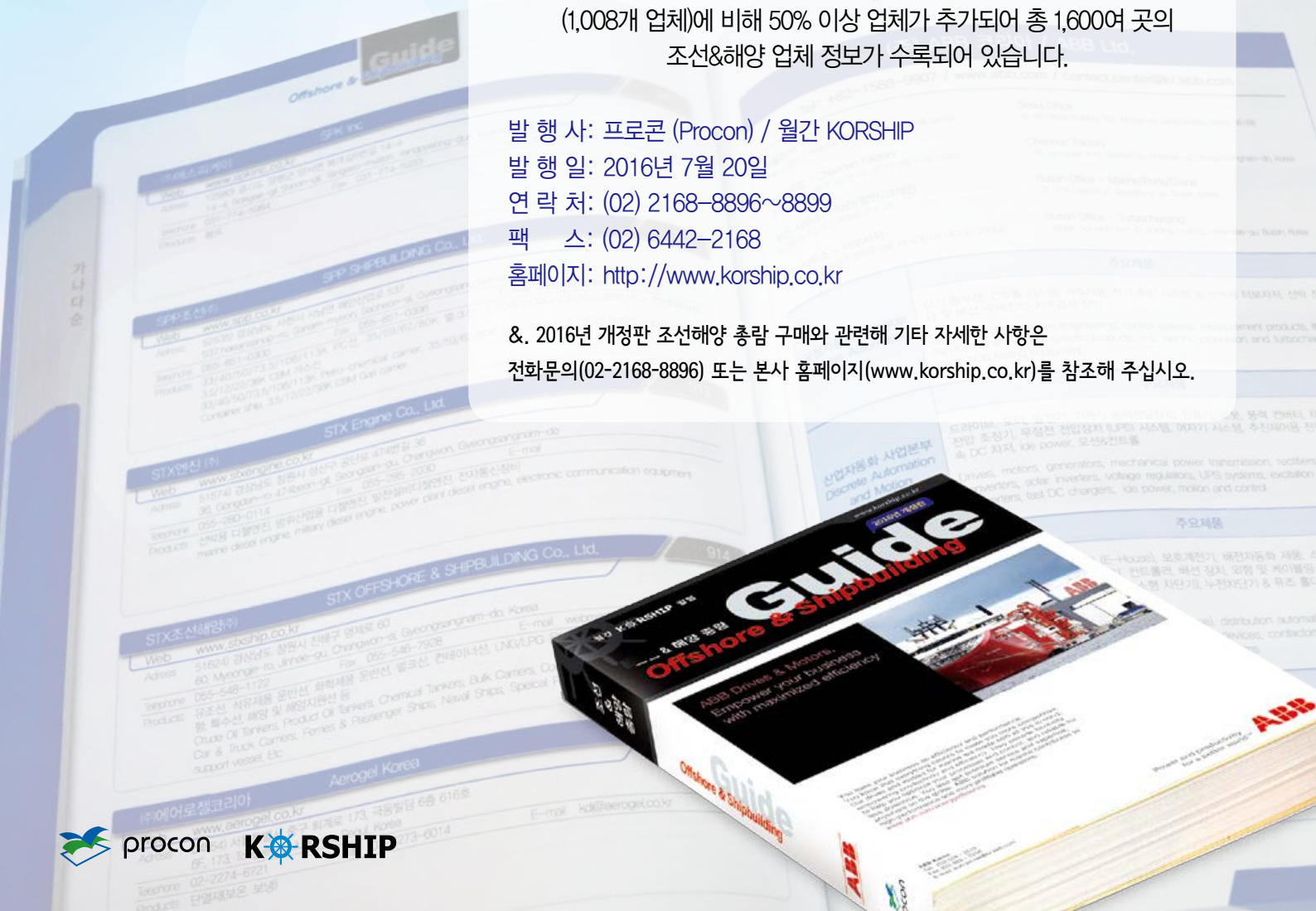
조선&해양 총람 '2016년 개정판' 발행

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

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

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.



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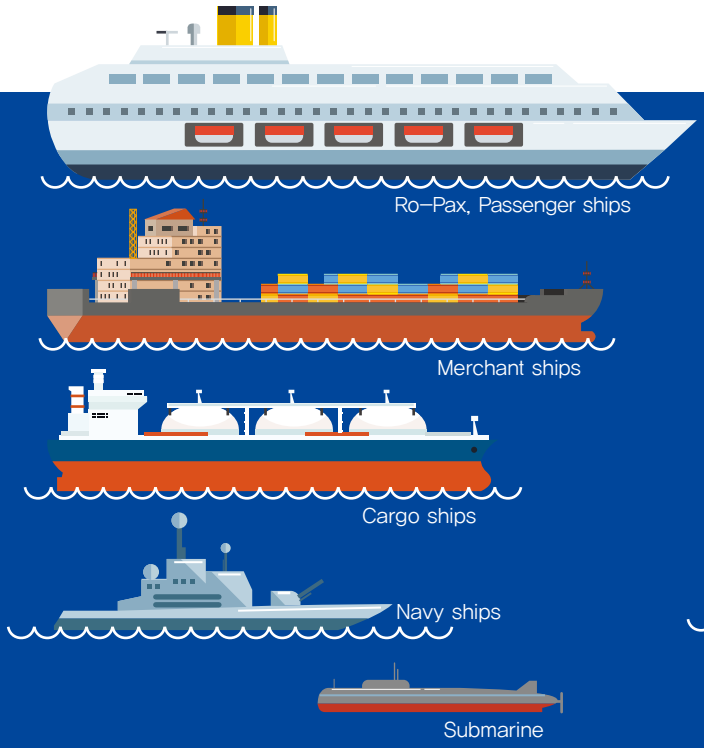

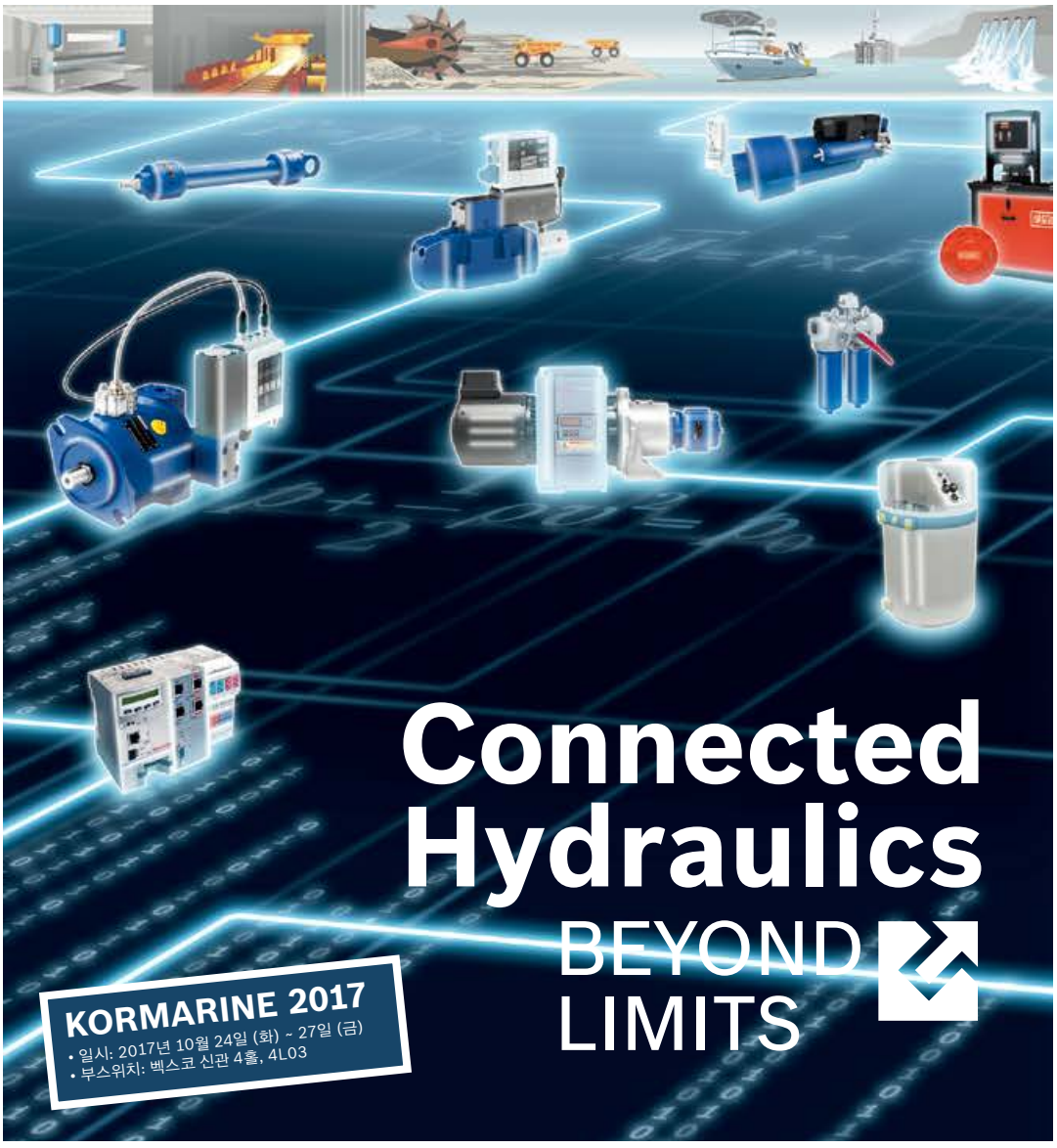

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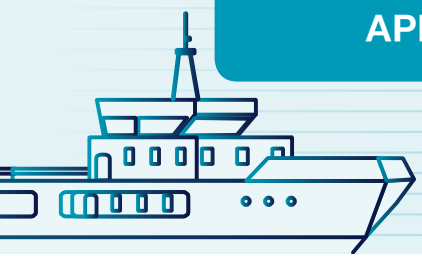

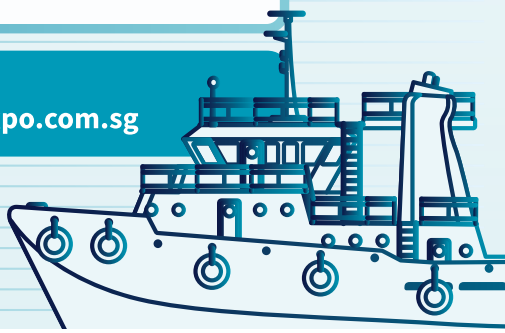

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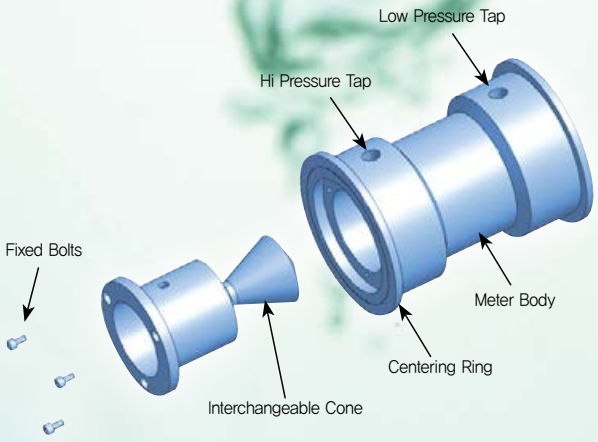

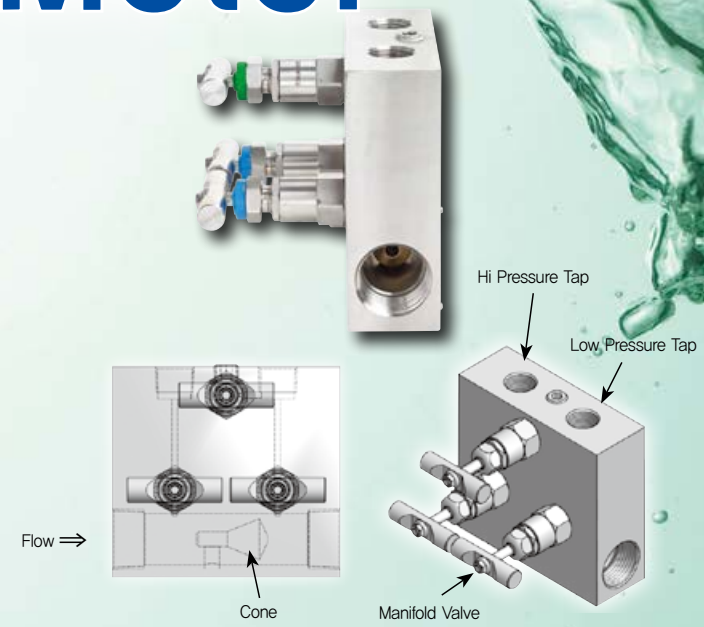

HFV-WM (Wafer type Cone Meter) **IVCM** (Integral Valve Cone Meter)

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)

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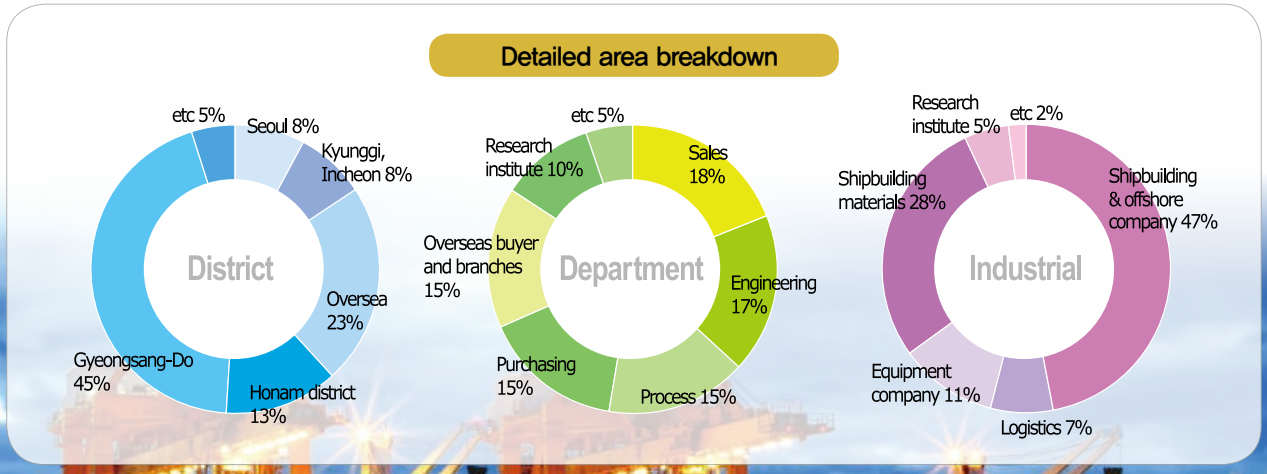

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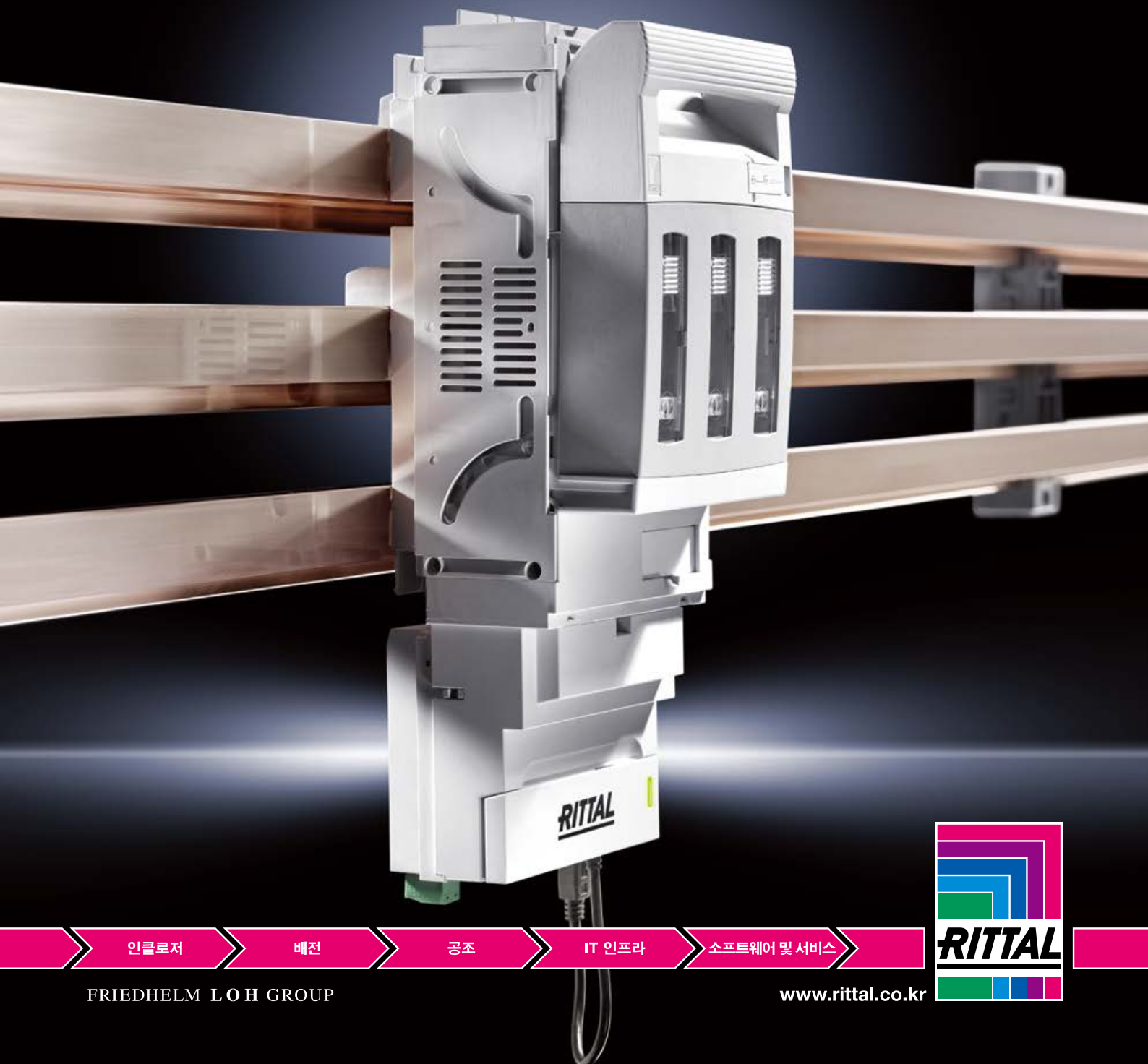

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SHI showcases in-house glycol LNG regasification system to shipowners

Samsung Heavy Industries (SHI) successfully developed its own LNG regasification system for LNG-FSRU. SHI showcased the system, called S-Regas (GI), to shipowners on 21th. 40 representatives from 19 shipowner companies including FSRU leaders like Golar LNG, Höegh LNG, GasLog attended the event.

The S-Regas (GI) utilizes glycol to regasify LNG into gas. S-Regas (GI) reduces chance of corrosion from traditional method of heating LNG directly with seawater, and is another energy efficient solution from SHI saving energy by 5%. The S-Regas (GI) is SHI's latest regasification achievement following the direct sea water regasification system.

In-house regasification system enables not only cost savings but also improvement in schedule and quality management, further enhancing SHI's leadership in the LNG-FSRU market. SHI representative said "In-house development of the LNG regasification system improves LNG-FSRU's safety and performance."

"SHI will continue to lead market by developing the next generation technologies in the whole LNG value chain. With proven track record and experience we will meet customer's needs such as saving operating costs of LNG-FSRU and solid performance," he adds.

삼성중공업, LNG-FSRU 핵심장비 독자 개발

삼성중공업은 지난 9월 21일 고객사를 대상으로 LNG-FSRU의 핵심 장비인 LNG 재기화시스템 'S-Regas(GI)'의 실증설비 시연회를 개최했다. 이날 행사에는 세계적인 LNG-FSRU 운용선사인 골라(Golar) LNG, 호그(Höegh) LNG, 가스로그(Gaslog)를 비롯한 국내외 19개 선주사 관계자 40여 명이 참석했다.

S-Regas(GI)는 글리콜(Glycol) 혼합액을 이용해 LNG를 기화시키는 방식의 시스템이다. 독자 기술로 개발된 이 시스템은 해수로 LNG를 직접 가열해 기화시키는 종전 방식에 비해 부식의 우려가 적고, 재기화에 사용되는 에너지도 5% 이상 절감할 수 있는 친환경 기술로 평가 받고 있다. 삼성중공업은 앞서 개발한 해수 직접식 재기화시스템의 후속으로 S-Regas(GI)를 개발했다.

LNG 재기화 시스템 국산화에 따른 원가절감 효과는 물론이고 효율적인 납기 및 품질 관리도 가능해지는 등 S-Regas 개발로 LNG-FSRU 시장에서 삼성중공업의 수주 경쟁력이 더욱 향상될 것으로 기대된다. 또한, LNG 재기화 시스템에 필요한 주요 부품을 국내에서 조달함에 따라 국내 기자재업체와의 상생 협력도 더욱 강화될 전망이다.

삼성중공업 관계자는 "LNG 재기화시스템 독자 개발을 통해 LNG-FSRU의 안전성과 성능이 더욱 향상될 것으로 기대된다"면서 "축적된 경험과 노하우를 바탕으로 LNG-FSRU 운영비용 절감과 가동율 보장 등에 대한 고객 니즈(Needs)를 반영한 가스 공급망 전반에 대한 기술 개발로 시장을 선도해 나갈 것"이라고 말했다.

KR launches industry's first 'Survey & Audit Preparation Guide'

Korean Register (KR) – an IACS member classification society – has launched the industry's first "Survey & Audit Preparation Guide" which will allow shipowners to check exactly what items need to be prepared for their next vessel survey audit, before submitting an application.

KR has used its extensive data resources and IT technology expertise to develop the new tailored service that will support shipowners' forward planning helping them to get the most out of their ship safety management activities. Previously, shipowners did not know which items they needed to prepare for the ship survey before submitting their application.

Mr JK Lee, Chairman and CEO KR, said "This is another example of our work to go 'above and beyond' when providing convenient value-adding services for our customers to support their business activities and enhance safety. The new guide – which is the first time any organisation has

offered such a service - will help with timely operational planning, and can be checked anytime, anywhere."
KR has been developing a specialist database for this purpose over the last two years. It includes the different types of international maritime conventions, KR's survey rules, the legal requirements of each flag state and identifies the specific actions and timeline for each shipowner.
The "Survey & Audit Preparation Guide" uses this data to help shipowners prepare for forthcoming ship surveys, ISM/ISPS audits and MLC inspections. The online guide also offers shipowners the option to print out tailor-made information when selecting types of survey and the ship's specification including the ship type, construction date and flag state.
The new service which is tailored to each ships' specific requirements is available on the homepage of KR's website. Current users of KR's e-Fleet system can access the "Survey & Audit Preparation Guide" free of charge, using their existing passwords and sign in details.

한국선급, 데이터베이스 기반 고객맞춤형 수검 안내시스템 개발

한국선급(KR)은 선박별 필요한 각종 검사 및 심사준비사항을 선주가 직접 확인할 수 있는 '수검 안내시스템'을 구축 완료하고 한국선급 홈페이지를 통해 서비스 제공하고 있다.
그 동안 선주들은 한국선급에 검사 및 심사 신청서를 접수한 후에야 선박검사준비에 필요한 사항을 파악할 수 있었지만, 이번 출시된 '수검 안내시스템'을 통해 검사 신청전에 언제 어디서든 자신의 선박에 대한 검사와 심사 준비사항을 파악이 가능해 선박안전관리 편의성을 향상시킬 수 있게 되었다.
한국선급은 지난 2015년부터 각종 선박관련 국제협약, 선급 자체 검사규칙, 세계 각 기국의 법령요건 등을 검토하고 선주가 필요한 사항을 식별하여 데이타베이스를 구축해왔다. 그리고 이를 기반으로 완성된 '수검 안내시스템'을 통해 선주들은 현존선 검사, ISM/ISPS 심사 그리고 MLC 검사에 대한 준비사항을 파악할 수 있을 뿐만 아니라 선종, 건조일자, 기국 등 선박의 제원과 검사의 종류를 선택하면 맞춤형 수검 안내서를 출력할 수 있다.
현재 한국선급의 e-Fleet 시스템 사용자라면 누구나 수검 안내 시스템에 무료로 접속하여 사용할 수 있으며, e-Fleet ID가 없는 경우에는 한국선급의 고객지원팀에 요청하면 별도의 접속 ID 발급이 가능하다.

NCH Korea announces, 'Degreaser Program' for maintenance and facility cleaning

NCH Korea announced that it launched 'Degreaser Program', a cleaning program designed for maintenance and facility managers.
NCH's Degreaser Program is designed to help busy maintenance and facility managers. It provides cleaning of bearings, forklifts, cogs and gears, food production equipment, engines and parts, electrical equipment, floors transport, heat exchangers, machinery, lifting gear and external storage tanks etc. The new Degreaser Program may be applied to HVAC cleaning, Electrical Cleaning, Floor & Wall Cleaning, Descaling, Machine Cleaning, Industrial Hygiene, Hood/Duct Cleaning, and Fleet Cleaning.
NCH's Degreaser program includes Degreasing products, Dilution equipment and Application equipment. With this cost effective maintenance program, companies can protect assets, minimize downtime and create a safer environment. NCH provides related knowledge and manpower, to support customers to complete special cleaning and reconditioning projects.
"New degreaser program provides outstanding cleansing quality, which helps to reduce manpower required. Also, with the combination of high-concentration degreaser and dilution equipment, we are able to provide a safe tested degreaser at lower cost. Our various types of degreasers are recognized for their excellent performances, and are being used in different industries across the globe. We plan to provide optimal products that are suitable for the business environment in Korea, and will also continuously run product and service experience program," said Joseph Youssef, Regional Industrial Maintenance Director, NCH Asia.

NCH코리아, 유지 보수 시설물 세척을 위한 '신개념 세척 프로그램' 발표

NCH코리아는 유지 보수 시설물 세척을 위한 '신개념 세척 프로그램(Degreaser Program)'을 제공한다고 밝혔다.
NCH의 신개념 세척 프로그램은 바쁜 유지보수 시설 매니저의 업무를 돕기 위해 베어링이나 지게차, 톱니바퀴와 기어, 식료품 생산 제조 장비, 엔진과 부품 전기/전자 장비, 운송 차량, 열교환기 기계, 리프

팅 기어 외부 스토리지 탱크 등의 세척 작업을 진행한다. NCH의 신개념 세척 프로그램은 HVAC(공조시스템, Heating, Ventilation and Air-Conditioning) 클리닝, 전기전자 클리닝, 바닥 및 벽 클리닝, 열교환기 세관, 냉각탑 세정 및 에바콘 세관, 장비 클리닝 산업, 위생용 제품 특수 방청 도장, 미끄럼 방지 도장 시공 작업 시에 활용할 수 있다.

NCH의 신개념 세척 프로그램은 세척제, 자동 희석 장비, 세척 장비가 함께 제공되며, 빠른 세척과 장비를 사용할 수 없는 시간(다운 타임)의 최소화, 안전한 작업 환경 조성을 돕는다. 이와 함께 NCH는 고객들에게 시설물 세척 관련 전문지식, 인력을 함께 제공하여 특수 클리닝과 재생(리컨디셔닝) 프로젝트를 완수할 수 있도록 지원한다.

NCH 관계자는 "신개념 세척 프로그램은 뛰어난 세척력을 제공하여 노동력 절감이 가능하며, 고농축 세척제와 희석 장비의 결합으로 비용 절감, 전세계적으로 그 안전성을 인증받은 세정제를 제공해 작업자의 안전성을 보장한다"며, "우리의 다양한 세척제들은 그 뛰어난 성능을 인정받아 전세계 다양한 산업체에서 사용되고 있다. 이에 국내 고객의 시설 운영 환경에 맞춰 최적의 제품들을 공급하고, 지속적인 제품 및 서비스 체험 프로그램도 함께 진행할 것"이라고 밝혔다.

ABB to acquire GE Industrial Solutions

ABB announced the acquisition of GE Industrial Solutions, GE's global electrification solutions business. GE Industrial Solutions has deep customer relationships in more than 100 countries and an established installed base with strong roots in North America, ABB's biggest market. GE Industrial Solutions is headquartered in Atlanta, Georgia, and has about 13,500 employees around the world.

In 2016, GE Industrial Solutions had revenues of approximately $ 2.7 billion, with an operational EBITDA margin of approximately 8 percent and an operational EBITA margin of approximately 6 percent1. ABB will acquire GE Industrial Solutions for $2.6 billion; the transaction will be operationally accretive in year one. ABB expects to realize approximately $200 million of annual cost synergies in year five, which will be key in bringing GE Industrial Solutions to peer performance.

"With GE Industrial Solutions, we strengthen our Number 2 position in electrification globally and expand our access to the attractive North American market," said ABB CEO Ulrich Spiesshofer. "Combined with the long-term strategic supply relationship with GE, this transaction creates significant value for our shareholders."

He added "Together with the GE Industrial Solutions team, we will execute our well-established plans in a disciplined way to bring this business as part of the global ABB family back to peer performance. With this next step of active portfolio management, we continue to shift ABB's center of gravity, in line with our Next Level strategy, by strengthening competitiveness, mainly in the North American market, and lowering risk with an early-cycle business."

"This combination brings together two global businesses with a broad complement of electrical protection and distribution assets," said John Flannery, CEO of GE. "ABB values our people, domain expertise, and our ability to operate in the segments where we have depth and experience. GE will also benefit through an expanded strategic supply relationship with ABB as the two companies work together."

GE Industrial Solutions will be integrated into ABB's Electrification Products (EP) division, resulting in a unique global portfolio and very comprehensive offering for North American and global customers. They will benefit from ABB's innovative technologies and the ABB AbilityTM digital offering coupled with GE Industrial Solutions' complementary solutions and market access. Included in the acquisition is a long-term right to use the GE brand.

ABB's EP division delivers more than 1.5 million products to customers around the world every day through a global network of channel partners and end-customers. EP offers a comprehensive portfolio of low- and medium-voltage products and solutions for a smarter, more reliable flow of electricity from substation to socket.

ABB, GE 인더스리얼 솔루션 인수

ABB는 GE의 글로벌 전기 솔루션 사업인 GE 인더스트리얼 솔루션(GE Industrial Solutions)를 인수한다고 밝혔다. GE 인더스트리얼 솔루션은 100개 국에서 긴밀한 고객관계를 이어왔고, ABB의 가장 큰 시장인 북미지역에서 굳건한 역사와 광대한 설치기반을 갖고 있다.

GE 인더스트리얼 솔루션은 조지아주 애틀란타에 본사가 위치하고, 전세계 약 13,500명이 근무 중이다. 2016년 매출은 약 27억 달러이며, 운영 EBITDA 이익은 약 8%이고, 운영 EBITA 이익은 약 6%이다. ABB는 GE 인더스트리얼 솔루션을 26억 달러에 인수한다. 거래로 인해 1년 내 운영상 증가가 예상된다. ABB는 5년차에 2억 달러의 연간 비용 시너지 효과를 기대하고 있다.

ABB CEO 울리히 스피스호퍼(Ulrich Spiesshofer)는 "GE 인더스트리얼 솔루션 인수로 우리는 전세계 전기분야에서 2위 자리를 굳건히 하고 미국 시장 진출을 확대할 수 있게 되었다"라며, "GE와의 장기적인 전략적 공급 관계가 병행되어 이번 거래는 주주들에게 막대한 가치를 창출할 것"이라고 말했다.

그는 또한 "확립된 계획을 GE 인더스트리얼 솔루션 팀과 함께 체계적으로 수행하여 새롭게 인수한 사업이 글로벌 ABB의 일부로 필적할 만한 성과를 이뤄내도록 노력할 것이다. 적극적인 포트폴리오 관리와 함께 북미 시장을 중심으로 경쟁력을 강화하고 조기 사업으로 위험을 낮춰 ABB 내 무게 중심을 계

속적으로 바꿔 나가며 차세대 전략을 실행할 계획"이라고 전했다.

GE 존 플래너리(John Flannery) CEO는 "두 가지 글로벌 비즈니스가 함께 통합되어 전기 보호 및 배전 자산을 폭넓게 보완하게 되었다"라며, "ABB는 사람, 전문기술, 그리고 깊고 풍부한 경험과 능력을 중시한다. 두 회사의 통합은 ABB와의 확대된 전략적 공급관계를 형성하여 GE는 보다 더 많은 혜택을 기대하고 있다"고 말했다.

GE 인더스트리얼 솔루션은 ABB 전기제품(Electrification Products, EP) 사업본부로 통합되어, ABB는 북미는 물론 전세계 고객에게 독보적인 글로벌 포트폴리오와 포괄적인 제품을 제공할 예정이다. GE 인더스트리얼 솔루션의 상호보완 솔루션, 용이한 시장 접근이 ABB와 연결되어, 고객사는 ABB 혁신적인 기술과 ABB Ability 디지털 서비스 혜택을 받을 수 있게 된다.

ABB EP(전기제품) 사업본부는 전세계 채널 파트너 및 고객 네트워크를 통해 매일 150만개 이상의 제품을 제공하고 있다. EP는 보다 스마트하고 안정적인 전기 공급을 위해 저압, 고압 제품과 솔루션으로 변전소부터 소형 소켓에 이르기까지 포괄적인 포트폴리오를 제공한다.

HHI launched 1,800-ton submarine 'Shin Dol Seok Ham'

Hyundai Heavy Industries (HHI) held a ceremony to mark the launch of a submarine with a displacement of 1,800 tons at its Ulsan Headquarters on September 7. The ceremony was attended by Admiral Um Hyun-Sung, the Navy Chief of Staff, and Kang Hwan-Goo, President of HHI.

This submarine was named 'Shin Dol Seok Ham' in honor of General Shin Dol-Seok who led the troops to fight against Japanese army head-on in the provinces of Gangwon and Gyeongsang.

Measuring 65m in length and 6.3m in width, 'Shin Dol Seok Ham' can accommodate about 40 crews and sail with a maximum speed of 20 knots(about 37 km/h) and a cruising radius of approximately 10,000 nautical miles(roughly 19,000 km) equal to the round-trip distance between Busan and Hawaii.

In addition, 'Shin Dol Seok Ham' is outfitted with AIP (Air-Independent Propulsion) that allows submarines to operate even without any access to oxygen, expanding the capability of submarine to stay submerged, and also equipped with the latest combat system including automatic simultaneous target tracking system, torpedo guide and detection system.

HHI has delivered 4 submarines to date since it handed over the 214-class no. 1 submarine 'Son Wonil Ham' to the Navy in 2007, including no. 2 submarine 'Jeong Ji Ham', no. 3 submarine 'Ahn Jung Geun Ham', and no. 5 submarine 'Yoon Bonggil Ham'. Currently, HHI is building no. 7 submarine 'Hong Beomdo Ham' and no. 9 submarine 'Shin Dol Seok Ham'.

An official from HHI said, "With increased hull strength, Shin Dol Seok Ham has further improved its operational performance, including the ability to remain submerged at greater depth for longer span. We will continue to build excellent battleships with the world's best shipbuilding technology to help protect the nation's maritime sovereignty."

Shin Dol Seok Ham is scheduled for delivery to the Navy by December 2018 after completing the finishing works and sea trial.

현대중공업, 1800톤급 잠수함 '신돌석함' 진수

현대중공업은 지난 9월 7일 울산 본사에서 엄현성 해군참모총장, 강환구 현대중공업 사장 등이 참석한 가운데, 배수량 1,800톤급 잠수함의 진수식을 가졌다. 이번에 진수한 잠수함은 강원도와 경상도 일대에서 항일 의병운동에 앞장선 신돌석 장군을 기려 '신돌석함'으로 명명됐다.

길이 65미터, 폭 6.3미터인 신돌석함은 40여명의 승조원을 태울 수 있으며, 최대 속력 20노트(약 37km/h), 항속거리 1만여해리(1만9천여㎞)로 부산에서 하와이까지 왕복 운항할 수 있다. 또한 공기 없이도 추진동력을 얻을 수 있는 공기불요추진체계(AIP)를 탑재해 장시간 잠항할 수 있고, 자동화된 동시 표적 추적시스템과 어뢰 유도 및 탐지시스템 등 최신의 전투체계를 갖췄다.

현대중공업은 지난 2007년 214급 1번함인 '손원일함'을 시작으로 2번함 '정지함', 3번함 '안중근함', 5번함 '윤봉길함' 등 4척의 잠수함을 인도했으며, 7번함 '홍범도함'과 마지막 9번함인 '신돌석함'을 건조하고 있다.

현대중공업 관계자는 "신돌석함은 선체 강도를 높여 더 깊은 수심에서 잠항할 수 있는 등 작전 운용 성능을 한층 강화했다"며, "앞으로도 세계 최고의 조선기술을 바탕으로 우수한 전투함들을 건조해 우리나라의 해상 주권 수호에 힘을 보태겠다"고 말했다.

한편, 신돌석함은 마무리 작업과 해상작전 운용시험 등을 거쳐, 오는 2018년 12월 해군에 인도될 예정이다.

ABS Awards AIP for Innovative HHI FLNG Hull

ABS has granted Approval in Principle (AIP) to Hyundai Heavy Industries (HHI) floating liquefied natural gas (FLNG) hull design.

ABS and HHI collaborated with the objective of developing a technically feasible and class compliant FLNG hull design, using the latest industry trends while maintaining high safety standards. The ABS AIP demonstrates the design substantially complies with Class and Regulatory requirements and minimizes risk to project schedules and safe operations, giving regulatory agencies and other key stakeholders confidence in the design.

"ABS has a strong history of collaborating with the offshore industry to evaluate novel designs that enable industry efficiency," said ABS Executive Vice President, Global Offshore Ken Richardson. "Our work with HHI is another example of ABS's technical leadership promoting safety in innovative concepts."

"The Newbuilding Conversion FLNG hull design can be constructed for about half the cost as compared to a standard FLNG hull," said Jae-Eul Kim, HHI Senior Vice President, Shipbuilding Division. "In the current difficult energy market, Ready-to-Convert FLNG hull with ABS AIP gives the FLNG market an efficient approach, with competitive price and schedule, helping investors take financial investment decisions."

Myung-Jae Joo, Country Manager of Korea ABS (right), presents Jae-Eul Kim, Senior Vice President, Shipbuilding Division at HHI, the a certificate acknowledging Approval in Principle of Newbuilding Conversion FLNG hull design.

ABS has been the preferred classification organization for the offshore and energy industry for more than 60 years. With increasing global concern for the environment, clean gas-based energy plays an integral role within that framework. ABS applies its experience and knowledge to support members and clients involved in gas-related projects, including LNG and LPG transportation, the use of LNG and other gases as fuel and emerging offshore LNG terminal technology projects.

In addition, a Newbuild Conversion FPSO Hull concept design is under development, following the same process.

ROG Ship Repair completes complex moonpool project for FPSO Bluewater

When a Floating Production & Storage Offshore (FPSO) vessel was being towed from Europe to the Middle East, and encountered problematic weather conditions, Holland's ROG Ship Repair came to the rescue.

The 89,184 dwt, 248.1 m long FPSO Aoka Mizu (Japanese for Bluewater), which is owned and operated by Holland's Bluewater Energy Services, has recently been assigned a new contract. She will be utilised for the early production system (EPS) phase of the development on Hurricane's offshore field in the North Sea.

The contract for the upgrade of the 30,000 bpd, Aoka Mizu, was awarded to Dubai's Drydocks World and the vessel needed to be towed from Gdansk, in Poland, where she was in lay-up, to Dubai. During this passage, high sea states were expected and therefore the turret moonpool onboard this big blue lady had to be closed off.

Rotterdam's ROG Ship Repair, was awarded the fabrication and installation of the moonpool cover, with delivery required in a very short lead time. It took ROG just two weeks working 24/7 to fabricate this steel structure according the highest quality standards, in their workshops in Waalhaven.

After fabrication, the cover was transported to Maasvlakte, Rotterdam, where it was

positioned and coordinated on the seabed, ready and waiting for the arrival of Aoka Mizu. When the FPSO arrived, under tow, she was moored in a position precisely above the cover. ROG then came onboard to mount the hoisting arrangements.
Before lifting the cover into the Aoka Mizu, air pressure hoses where connected underneath the cover to ensure that it was not sucked onto the seabed. Divers connected the cover to the hoist and ROG began the controlled lift, which hoisted the moonpool cover into the correct position. Once in position, sea-fastenings were installed and secured.
ROG Ship Repair is one of the leading ship repair companies, with open sea accessibility, strategically located in the main port of Rotterdam with ISPS certification.

리탈코리아, 해양산업에 적합한 표준 솔루션 선보여

리탈 코리아가 부산에서 열리는 코마린(KORMARINE) 2017에서 해양관련 산업에 최적화하여 적용할 수 있는 표준 솔루션 "Rittal – The System"을 선보인다. 이번 전시회에서 리탈은 108㎡의 부스를 마련하고, 기업 홍보와 인클로저, 배전, 공조, IT 인프라와 소프트웨어 및 서비스에 대한 통합 솔루션을 소개한다.
리탈은 기존 설치대비 최대 30%의 공간을 절감시켜주는 첨단 버스바 시스템과 유럽연합 방폭 인증 ATEX를 포함하는 국제 인증 및 IP, NEMA와 같은 보호 등급, 그리고 우수한 내식 성능을 가진 다양한 재질의 인클로저 등 해양산업에 다방면으로 활용 가능한 기술과 제품을 폭넓게 알릴 예정이다. 또한, 표준형 제품을 생산, 제공하는 글로벌 기업 리탈은 전 세계 75개국에 있는 지사로부터 언제, 어디서든 원하는 서비스를 바로 받을 수 있다는 장점을 홍보할 계획이다.

리탈은 지난 2007년부터 코마린에 지속적으로 참가해 앞선 기술력과 제품을 소개하며 제품의 우수성과 외관상의 고급스러움을 널리 알려왔다. 이와 더불어 가격 경쟁력을 높이기 위한 노력을 지속적으로 기울여왔다. 그 결과 주력 상품인 TS 8 산업용 인클로저와 운영 하우징을 국내에서 생산하게 되었고 고성능, 고품질의 제품을 고객에게 만족스러운 가격으로 납품할 수 있게 되었다.
현재 리탈코리아의 본사는 인천 송도에 위치해 있고, 부산과 광주에 지사를 두고 있다. 송도 본사에서는 고객 초청 기술세미나도 진행하고 있어 관심이 있는 고객은 본사를 방문하여 다양한 리탈의 제품과 기술, 그리고 생산·물류 현장을 직접 확인할 수 있다. 또한, 데모 트럭으로 로드쇼를 진행하고 있어 일정이 바빠 방문이 어려운 고객들도 고객의 일터 또는 가까운 곳에서 직접 제품을 보고 선택할 수 있다.

B&R, 부산 지사 설립

자동화 산업 분야에 글로벌 리더인 B&R은 경남, 울산 등 남쪽 지역의 비즈니스 확장 및 고객들에게 보다 나은 서비스를 제공하기 위해 부산 센텀시티에 지사를 설립했다. 특히 영남 지역 고객에 대한 지원을 강화하는데 목표를 두고있다. B&R은 전세계에 180여개의 지사를 두고 고객들과 가까이 있으며 신속한 대응과 서비스를 위해 힘쓰고 있다. 또한 최근 다국적 기업인 ABB 그룹에 합류되어 보다 나은 지원을 할 수 있게 되었다.
B&R은 일반 산업 분야 및 공장 자동화를 위한 소프트웨어까지 산업 자동화에 필수적인 토탈 컨트롤 시스템을 공급하는 글로벌 기업으로, 포장, 식음료, 제약, 플라스틱, 반도체, 인쇄, 섬유, 자동차, 선박, 목가공, 금속과 광업, 화학, 빌딩 자동화 등 다양한 산업 분야의 기계 자동화와 프로세스 제어를 위한 솔루션을 공급하는 기업이다.

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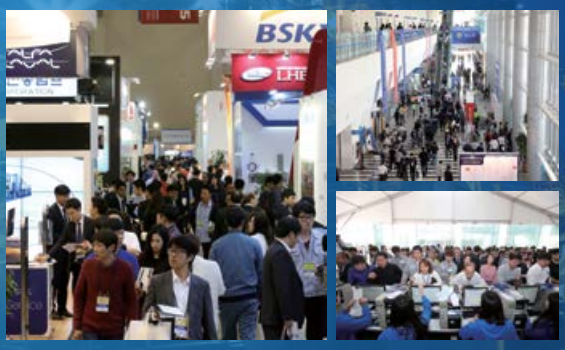
OCT 24 (TUE) - 27 (FRI), BEXCO, BUSAN, KOREA

Ministry of Trade, Industry and Energy | BUSAN METROPOLITAN CITY | KOSHIPA | Korea Marine Equipment Association KOMEA | Reed K. Fairs Exhibitions

KORMARINE 2017 which marks 20th anniversary this year is slated to open in BEXCO (Busan Exhibition & Convention Center), Busan for 4 days from October 24 to 27. This year's event will be the biggest in its history, attracting about 1,000 exhibitors from 45 countries, despite downturn in global shipbuilding and offshore industries. KORMARINE 2017 is expected to draw approximately 3,000 foreign buyers and 70,000 visitors from about 85 countries worldwide.



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'KORMARINE 2017' offering an insight into the future of global shipbuilding and offshore industry!

- The largest event in history with participation of 3 domestic shipbuilding heavyweights and unprecedented number of exhibitors

The global shipbuilding and offshore leaders gathered in Korea. KORMARINE 2017 will bring together world's renowned shipbuilding and offshore companies under one roof. The 20th International Marine, Shipbuilding & Offshore Exhibition 'KORMARINE 2017' is only about 20 days away. This year's event will run for 4 days from October 24 to 27 in BEXCO, Busan.

KORMARINE 2017 is organized by Ministry of Trade Industry & Energy, Busan Metropolitan City, Korea Offshore & Shipbuilding Association, Korea Marine Equipment Association, and Reed K. Fairs. This year's event, the biggest in its history, attracted about 1,000 exhibitors from 45 countries in the fields of shipbuilding, offshore plant, and oil & gas industries, featuring 2,200 booths with aggregate exhibition area reaching up to 40,000 sqm.

Significantly, this year's event drew all of the 3 domestic shipbuilding heavyweights (Hyundai Heavy Industries, Samsung Heavy Industries, and Daewoo Shipbuilding & Marine Engineering) for first the first time since the launch of KORMARINE. As the shipbuilding market shows a sign of recovery, inquiries from domestic and overseas companies and buyers have been increasing sharply. Revolving under the theme of advancement of shipbuilding industry and joint development, KORMARINE is expected to be recorded as the largest in its history, drawing unprecedented support and participation of many local organizations including Korea Gas Corporation (KOGAS) and Korea East-West Power Corporation.

Major exhibitors in KORMARINE 2017 include leaders in global shipbuilding and offshore industries, such as the 3 domestic shipbuilding heavyweights of Korea, ABB, Alfa laval, Boschrexroth, Azbil Korea, bosch rexroth korea, Danfoss, Emerson, Krohne, Kukdong Electric Wires, MAN Diesel & Turbo, Wärtsilä, etc. In addition, 15 countries, including Austria, China, Denmark, Finland, Germany, Greece, Italy, and Japan, set up their respective national pavilions providing a window into the latest technologies and industry trends of global maritime powerhouses.

Various events will take place in parallel during the KORMARINE, such as SEF (Asian shipbuilding expert forum), academic conference hosted by the Korean Society of Marine Engineering, Maritime CEO forum, KOMEA Forum, technical seminars and conferences, as well as KORMARINE conference.

This year, KORMARINE exhibition introduced the business match-making platform to promote undisrupted communication in business meetings between exhibitors and buyers. This platform can be used by both exhibitors and buyers to check profiles one another online and request meetings prior to the opening of the exhibition.

KORMARINE exhibition provides a chance to keep fingers on the pulse of current status of global shipbuilding industry. As shipbuilding market is beginning to show signs of bottomed out, this year's event is expected to provide a meaningful platform for predicting a turnaround in global shipbuilding industry.

KORMARINE CONFERENCE 2017

-Various events to be held in parallel

KORMARINE which marks 20th anniversary this year has evolved into the nation's largest exhibition in shipbuilding and offshore industry over the last 4 decades. KORMARINE Conference, held in parallel with KORMARINE, will run from October 25 to 26 in the Conference Room on the 3rd floor of BEXCO 2nd exhibition hall and is organized jointly by KSA (Korea Shipowners' Association), Korean Register of Shipping, KSME (Korean Society of Marine Engineering), Korea Maritime and Ocean University, KOMERI (Korean Marine Equipment Research Institute), KOMEA (Korea Marine Equipment Association), KOSHIPA (Korea Offshore & Shipbuilding Association).

October 25

Opening Ceremony

Keynote Speech - *The Outlook for the Maritime Sector*

Dr. Barrie Stevens (OECD, Senior Advisor to Ocean Economy Programme, France)

Market & Forecast

Chairperson - *Dr. Peter Swift (Ardmore Shipping Corporation, Director, UK)*

- Shipping Market Status and Forecast: *Adam Kent (Maritime Strategies International Ltd., Director, UK)*
- Energy's I-Phone Moment: *Mr. Henning Gloystein(Thomson Reuters, Editor in Charge, Asia Energy, Singapore)*
- Eco is the New Drive on the Shipbuilding Industry: *Mr. Moo Hyun Park(Hana Financial Investment, Equity Analyst, Korea)*

Ship Finance and Business Creation Opportunities with New Partners

Co-Chairperson- *Mr. Gerry Van der Sluys (Business Creation Investments AG, CEO,Switzerland)*

- Ship Finance on Swiss Perceptive: *Ms. Marcia Baumgartner (Bank Julius Baer & Co., Ltd., Switzerland)*
- Collaboration with Singapore in LNG: *Mr. Kok Min Tang (International Enterprise Singapore, Centre Director, Singapore)*
- Business Collaboration with Spain: *Mr. José Eusebio Marrero Marrero (DistribuidoraMaritimaPetrogas, Managing Director, Spain), Ms. Ida Stier (Stier Group, CEO, Spain), Mr. Woo Sung Chang Kim(Islaw Abogados, Partner, Spain)*
- The New Indonesia Energy Policy and The Prospect of Investment: *Prof. Ir Tumiran (The National Energy Council of the Republic Indonesia / Gajah Mada University, The Board Member, Indonesia)*
- Introduction of Vietnam National Shipping Lines: *Mr. Bui Viet Hoai (Vietnam National Shipping Lines, Deputy General Director/VSA, Vice Chairman, Vietnam)*
- Business Creation Opportunities in New Zealand: *Mr. Sean H Kim (CNS Shipping Co., Ltd., Managing Director, New Zealand)*

October 26

Keynote Speech - *The Ocean, Industry and Job Creation*

Ph.D. Tony Michell

Green Technology

Chairperson - *Mr. Chang-wook Kim (Korean Register, Executive Vice President,Korea)*

- Green Shipbuilding, Ecoship and Competence
- Two-stroke Marine Engines with Flexibility in Design and Operation for Gaseous Fuels and Emissions
- How Costamare View Environmental Issues and its Compliance?
- Evaluation of LNGCs Propulsion Options

The 4th Industrial Revolution & S IoT

Chairperson - Prof. Kangki Lee (Korea Maritime & Ocean University, Korea)

- Data & Digital Transformation in Marine & Offshore: *Mr. Sung-Gu Park (Lloyd's Register Marine & Offshore, Strategic Marketing Manager, Korea)*
- Utilization of AIS Data into Ship Operation & Complete Digitization of Vessel Logbook: *Mr. Deok-Hoon Jang (NAPA Shipping Solutions, Director of Global Sales, Korea)*
- Fourth Industrial Revolution & IoT: *Mr. June Sup Lee (KT, Vice President, Korea)*
- A Base Camp for Offshore Service Business: *Mr. Joseph Chai Yeol Baek (GLM Marine & Offshore Pte Ltd, Managing Director, Singapore)*

Future Marine Energy & Industries - Challenges and Opportunities

Chairperson - Prof. Daejun Chang (KAIST, Associate Professor, Korea)

- Footprint of LNG in Korea and KOGAS Strategy: *Mr. Ki Dong Kim(KOGAS, Principal Researcher, Korea)*
- Recent Progress in the Application of High Manganese Steel for Cryogenic Service: *Dr. Kihwan Kim (POSCO, Senior Principal Researcher, Korea)*
- The World's First Commercial LNG Fuelled B/C: *Mr. Hyun Kug Lee (Ilshin Marine Transport Co., Ltd., Executive Advisor, Korea)*
- Medium FSRU Heat Medium Comparison Study: *Ms. Ah Young Kang (KRISO, Engineer, Korea)*
- Risk Assessment on LNG-FPSO FEED: *Mr. Seong Na (KR Ship & Offshore Technology Center, Senior Surveyor, Korea)*

* This schedule is tentative and subject to changes in accordance with circumstance

Together with you, we make history

A century on board

Meet us at Kormarine, stand 3M09

ALFA LAVAL

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KORMARINE 2017 - Profiles of major exhibitors

- Attracting about 1,000 exhibitors from 45 countries

KORMARINE 2015 will attract about 1,000 exhibitors, including leading domestic and overseas companies such as Hyundai Heavy Industries, Samsung Heavy Industries, and Daewoo Shipbuilding & Marine Engineering for first the first time since the launch of KORMARINE. This year's event is expected to be even bigger than last year's and the largest in its history, featuring approximately 2,200 booths.

ABB	Booth No. 3D05
Aquastar	Booth No. 4E17
Cobham SATCOM	Booth No. 3E53
Coldharbour Marine	Booth No. 3B53
DongHwa Entec	Booth No. 3B39
E-Tec	Booth No. 6A04
EonC	Booth No. 5S09

HORIBA Korea	Booth No. 6A22
Hy-Lok	Booth No. 5F03
KNS	Booth No. 4B17
KROHNE Korea	Booth No. 3K39
KSP	Booth No. 5O09
Kukdong Electric Wires	Booth No. 3E31
Wärtsilä	Booth No. 4M03

ABB with new technology at Kormarine 2017

ABB

ABB unveil 'DC based power system platform', an innovative energy storage system, Yamal/Azipod® propulsion units, etc, the latest technology in KORMARINE 2017.

- Onboard DC Grid™

As a DC based power system platform, Onboard DC Grid™ tailored to the needs of the next generation of vessels. It serves applications from low to mid-power range by offering a competitive, flexible and state-of-the-art system platform. It is especially well suited to the integration of variable speed generators, energy storage and new energy sources such as fuel cells in a safe, fault tolerant and optimal way. It is highly configurable, enabling a perfect fit for the simplest to the most demanding application.

Based on industry leading power and automation products, Onboard

DC Grid™ is a modular power system platform comprising pre-engineered, verified and tested sub-system modules for sources and loads. This approach reduces customer risk by enabling a high quality and efficient engineering process and post-delivery support whilst not forsaking necessary flexibility needed for a tailored application fit.

- Energy Storage System

Energy Storage can serve as the sole energy source for an all-electric ship or as an effective support to the main engines in a hybrid vessel. In a hybrid vessel, energy storage is used for spinning reserve, peak shaving, enhanced dynamic support or to prevent black out. Energy storage can also be used for zero emission port call on a hybrid ship.
Energy storage can easily be integrated to an Onboard Dc Grid system, or to an AC power system. ABB have also developed a containerized solution for easy retrofit on an existing vessel.
ABB works continuously with its partners to research and develop tomorrow's power solutions for marine applications, applying a variety of power storage solutions to give shipbuilders, owners and operator's unprecedented flexibility when building and operating vessels. An energy storage system delivered by ABB will improve the existing system and provide a newbuilding several benefits in lower maintenance costs and maximize the energy efficiency and safety.

- Yamal and Azipod® propulsion units

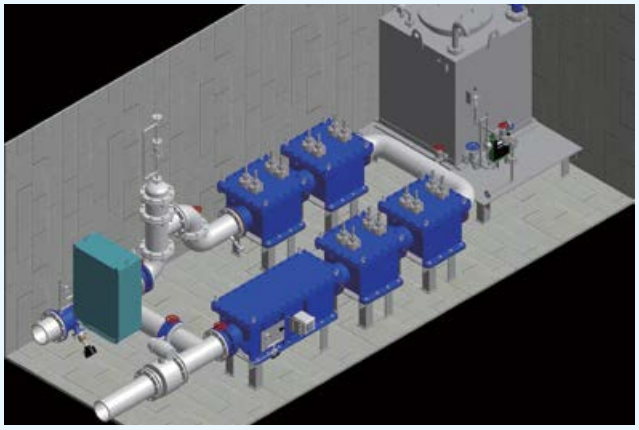
ABB secured a contract to supply electrical power and propulsion

systems for the 15 Yamal LNG carriers. The contract is part of a project to transport LNG from the Yamal peninsula in Northwest Siberia to Asia and Europe.
The LNG shipped out of Sabetta port is using the new 170,000m^3 LNG carriers built to ice-breaking capability of ARC 7, an ice-class scale that goes up to 9. Shipment to Asia via the Northern Sea Route in summer months resulting in substantially reduced delivery times when compared to transit via traditional routes, as well as cutting fuel consumption and ship fuel emissions.
The Azipod® propulsion units that will power the vessels through the arctic conditions has proven to be the technology of choice. Such vessels on which the Azipod propulsion units install will become the most powerful LNG carrier in the world.

Aquastar BWMS stands on final stage to take USCG type approval

Aquastar

In-line type Electrolysis BWMS manufacturer, Aquastar located in Busan, Korea, has been performing the Final Test since last August, 2017 for USCG Type Approval. One of Mega Containers Carrier owned by Hyundai Merchant Marine (HMM) was nominated to perform the On-board Test at the required areas where is from Singapore to Europe via Middle East under the conditions of various marine organisms. In this regard, HMM also announced that they had promised to provide full support to Aquastar's performance to acquire USCG T/A. In addition, the Land-base Test has been in progress smoothly at a subsidiary independent laboratory by Lloyd Register of Shipping(LR) in the DHI Denmark. Such a Test is performing at each 5 times interval in Sea Water and Brackish Water



condition and Aquastar is expecting to apply for USCG T/A at latest by the 1st Q of 2018 with full satisfaction of all conditions.
The Major Features of Aquastar BWMS are that there is No Filter, the Double Cathode Application in Electrolyzer Unit to make less the attachment of scales, Low Power Consumption, and to make up for the Electrolysis in Fresh Water, Aquastar is developing their own Fresh Water Treatment Solution with being underway to be approved by IMO & USCG T/A.
Moreover, to enhance the CLX Type of TRO Sensor's quality, Aquastar has developed TRO Sensor with the Electrode Type in collaboration with Halogen System Inc. from USA. Therefore, the technical development is expected to meet customer needs by the following fact that Aquastar BWMS system has the treatment water holding time with 24 hours less to meet the revised G8 guideline and USCG regulation as well.

Augmented Reality set to help maritime satcom technicians

Cobham SATCOM

Cobham SATCOM, leading technology and software specialists, reveals new AR smartglasses-based solution for ship-board antenna servicing during Kormarine 2017.
Cobham SATCOM, a company dedicated to keeping ships and boats safe with cutting-edge satellite and radio communications systems under the SAILOR and Sea Tel brands, is working with custom software house Kanda and Osterhout Design Group (ODG) smartglasses to build an Augmented Reality (AR) wearable solution for maritime service technicians. With AR already established as an efficiency-enhancing tool for business and industrial applications, the project will demonstrate how companies can introduce additional value for their customers using this exciting technology.
Visitors at Kormarine in Busan will hear how the team is working with ODG's award-winning R-7 smartglasses to develop a solution for installation technicians in the field who are tasked with in-situ 'conversions' of sophisticated SAILOR satellite communications (satcom) antennas already installed on ships. The smartglasses provide step-by-step guidance to their wearer during conversion installations, making paper manuals obsolete and greatly speeding up and simplifying the process.
The AR smartglasses solution will reduce costs for vessels and fleets when they are switching to a different satcom service but keeping the same antenna on board. The technician wearing the glasses will receive all the information required in their line of sight; ensuring that strict quality and technical guidelines are followed. By making sure the antennas are installed correctly during the conversion process, the satellite service provider and the end-user can be sure that the antenna will perform more reliably so that the vessel gets the best connection to the satellites and therefore the most reliable broadband and voice services.
"The use of AR in satcom antenna servicing is an exciting prospect, an innovative, new way of doing things for our global partners and a

massive step forward in enhancing our end-user experience," said Casper Jensen, Senior Vice President, Cobham SATCOM. "AR has the potential to revolutionise a multitude of industrial and business applications and we are confident that together with Creuna, ODG, and Kanda, we will enable satcom technicians to work smarter, faster and more accurately in the field."
In recent years Cobham SATCOM has focused on improving the digital experience for its customers. By adding AR smartglasses to its product offerings, the digital and physical world can be blended together to create even better user experiences.
"ODG's award-winning smartglasses are already setting the standard in industries across the entire spectrum of business, including those with hazardous conditions," said Bobby King, VP of Special Projects at ODG. "We are excited to have Cobham SATCOM leveraging the power and possibility of our ruggedized devices to build a remote assistance solution, and for the support it will bring to Cobham customers looking to leverage cutting edge solutions to improve efficiency, safety and speed in their maintenance and service tasks."

35 Years of Innovation in Marine Engineering: Coldharbour highlights big-ship BWTS

Coldharbour Marine

UK-based Coldharbour Marine is emphasising that its GLDTM ballast water treatment technology's combination of diffused inert gas and ultrasonic shock waves offers unique advantages when dealing with the high flow rates and power required for larger vessels including tankers, bulk carriers and gas carriers.

The award-winning Coldharbour's GLDTM ballast water treatment system is an in-tank arrangement which takes inert gas from the company's third-generation Sea GuardianTM inert gas generator to specially-designed gas lift diffusion (GLDTM) pipe assemblies inside a ship's ballast tanks. These have no moving parts and use natural fluid dynamics to 'stir' the tanks and diffuse the inert gas throughout the ballast water.

Coldharbour's technology has a range of unique selling points and is suitable both for newbuildings and retrofits. There are no filters to block or need back-flushing, which eliminates a significant potential source for in-port delays; the system is also not vulnerable to pressure drops, does not need additional power or ballast water pumps/piping upgrades, and involves no complex operating systems demanding specialised training.

The Sea Guardian IGG from Coldharbour Marine is an optimal choice for all inert gas applications on board, with its clean, stable burn, smaller footprint, vastly reduced maintenance and unrivalled track-record on reliability.

Many BWTS installed on larger ships have initially been designed for smaller vessels, with their fitness for scaling up and installation on larger ships relying on manufacturer claims. Coldharbour's technology has been specially designed for big ships deployed on long-haul routes.

Where other technologies filter, disinfect or use UV to treat ballast water on intake, Coldharbour's technology is based on an in-voyage treatment, a process that tackles the significant challenge of "regrowth". Regrowth is a problem for all BWTS technologies because no technology is 100% effective at killing 100% of organisms present. The scientific data on this is unequivocal. This means that organisms surviving an initial treatment process during ballast uptake will thrive and multiply during a long-haul ballast voyage. This runs the risk that the ballast water discharge standards required by the IMO's Convention will not be met when a vessel comes to discharge ballast at the terminal. The potential for costly delays and fines is obvious.

Inert Gas Generator by Coldharbour Marine

Using the in-voyage treatment approach eliminates not only the risk of regrowth, but also the delays, extra costs and even the requirement for a ship to sail for international waters, de-ballast, re-ballast and return to the terminal. Reputational damage for owners could also become an issue if vessels on long haul legs regularly fail Port State Control ballast discharge standards.

At Kormarine, Coldharbour will be unveiling the latest version of its GLDTM ballast water treatment system, specifically optimised to address the challenges faced by large bulk carrier operators, including the ability to treat heavy ballast stored in cargo holds.

'World Class Company' with Heat Transfer Technology

DongHwa Entec

Since its foundation in 1980, DongHwa Entec has been specializing in manufacturing a wide range of heat-exchangers, from marine heat-exchanger repairing service to heat-exchangers for power-generation and plant industry.

Currently, DongHwa Entec are heading into new arena of special heat-exchanger for LNG liquefaction & gasification plant, and accelerating the development of heat-exchanger for next-generation aircraft engine. Besides domestic market, DongHwa Entec also successfully diversified overseas business in Southeast Asia, Middle-East and Europe. Subsequently, DongHwa Entec generated more than 80% of sales in abroad, and today DongHwa Entec have become the leading heat-exchanger manufacturer in Korea.

Furthermore, in 2014, DongHwa Entec were honored with "World Class 300" Project which designed to discover small-medium sized companies with having the technology innovation capability and global growth strategy, and then evolve to world-class level ones through all kinds of support packages by the Korean government.

DongHwa Entec have been consistently investing in technology development and have been preparing for the future, because DongHwa Entec take to heart the lesson taught by one Chinese old-saying, "If you never look ahead, the troubles must be closed to you".

Global Heat-exchanger maker, DongHwa Entec captured the heat-exchanger market in Korean shipbuilding industry. Also, DongHwa Entec holds the leading position in global heat-exchanger market.

Based on accumulated knowhow, as the specialized manufacturer of heat-exchanger, DongHwa Entec will move forwards with motivated ambition and new mission for better environment and life of human-being.

Since its foundation in February 1980, as the manufacturer of heat-exchanger for the marine, petro-chemical and power generation industry, DongHwa Entec has been focused on research & development, product performance improvement as well as new product development while establishing the most competitive facilities and production processes.

The expert of energy system and heat-exchanger with the advanced research and development capability and mature energy application ability, DongHwa Entec achieved the thermal fluid-based technology and skilled manufacturing technology to serve the highly efficiency and high quality products to our customers. The excellent service of DongHwa Entec makes the end-user easy to use our products for long period of time.

Consequently, the global market competitiveness was achieved, and DongHwa Entec supply our products to the top 6 shipbuilders and top 3 engine manufacturers, small-and-medium ship-yards and shipping liners in Korean market. Moreover, the assertive management and high-quality strategy allowed us to develop foreign markets, so that DongHwa Entec directly exported our products to ship-yards in Japan and Southeast Asian countries and it became a source of foreign exchanges.

The 'energy' is an indispensible part of human-being and every people look for life in clean and pleasant environment, but currently DongHwa Entec are facing various obstacles. DongHwa Entec will be a solution provider against these problems. Also, while keeping customer's satisfaction as our top priority, DongHwa Entec will continue our utmost efforts to conduct researches. The imported products will be replaced by our products, and DongHwa Entec will spare no effort to contribute growth of local economy and technology development in related industries.

HORIBA, global leader of analysis/measurement system joins KORMARINE 2017

HORIBA Korea

The major challenge of most countries and companies are to protect earth from harmful materials which can affect to air, water, and soil these days. HORIBA, the global leader of environmental analysis is providing best solution to keep and inherit clean environment with 64 years of history.

The advanced analysis technology of HORIBA is providing accurate analysis to industries where need a measurement of environmental pollution such as air, water. HORIBA is not only products manufacturer but also providing all round environmental process/monitoring solution such as product installation and training.

Above of all this, HORIBA's air pollution monitoring analysis system receives high praise in field with its long term stability and degreed so local government and industry are using HORIBA products to measure air pollution widely as real-time.

Hereupon HORIBA Korea will exhibit below products in KORMARINE 2017.

- Air pollution monitoring analysis system

ENDA-5000: Applied preprocessing equipment which is excellent for continuous measurement and cross modulation formulary

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WM-100: Wash water Monitoring System for SOx and NOx Scrubber. Monitoring pH/Temperature, Turbidity, and PAH. WM-100 has flow type sensors give the operator easy maintenance work on board. As a option, Debubbler is available.

- Sulfur in oil analyzer

SLFA 6100/6800: SLFA-6100/6800 Energy Dispersive X-Ray Fluorescence Analyzer, which measures sulfur in oil ranging from 5ppm to 9.9999% and it's harmless to humans. Laboratory, analyzing institution, laboratory and QC of industry are using SLFA series.

Stack Gas Analysis System ENDA-5000

Global Leader of Fluid & Control System

Hy-Lok

Hy-Lok is one of the leading manufacturer for tube fitting and valves since its establishment in 1977. With the practical experiences, Hy-Lok has perfectly performed as a turnkey business from essential technique of Fluid & Control System to workmanships for installation in all industrial areas in the world. A great stock of knowledge on accumulated technical background will be supplied to the customers.
Hy-Lok has built the high level of customer's satisfactions of its quality by achieving internationally accredited certifications such as ISO 9001, ISO/TS 16949:2009, ISO 14001, OHSAS 18001, ASME, API, CE MARK, KEPIC and many others. As a specialist in the Fluid & Control System Industry, Hy-Lok is making utmost efforts to supply better technology and service to customers.
In order to be a successful partner with our customers, Hy-Lok makes ceaseless efforts, and provides the best quality products and services throughout worldwide service network system whenever customers need.
Based on pursing top quality and service, taking first priority for customer's satisfaction and expanding its operations worldwide, Hy-Lok is making it come true.
Instrument Tube Fittings: Hy-Lok Fittings have been designed with great care to meet the specifications required for a wide range of applications in a various industries and satisfied production standards. Hy-Lok Fittings have been used in most of the industrial fields

and supplied to well-known end users in the world on the basis of the best quality and reliable and wide technology.

Valves: Hy-Lok Instrument Valves, Manifolds and Piping Valves have been highly recognized by customers through the safety, reliability and corrosion resistance to meet the severe installation condition such as maritime and Power Plant.

Package Solution: Hy-Lok has designed and manufactured customized Package Solution such as Air Manifolds, Air Pipe Module for Train Brake System and Instrument Panel.

E-Tec and its exclusive Anti-Icing technology

E-Tec

E-Tec has participated in Kormarine 2013/2015 launching its unique technologies of 'Heat Tracing' and 'Anti-Icing'. Heat tracing is a technology of preventing equipment on vessels from heat loss. Furthermore, anti-icing is a new technology preventing the equipment from freezing and keeping them accessible all the time especially for ships operating in extremely cold climate.

What is so special about this anti-icing is that it has been relaunched as a system not only for equipment, but for safety of crew. Heated Walkway is one of anti-icing items. This item protects crews from safety accidents by preventing the surface of walkways exposed to cold climate from freezing. Also, Heated Handrail, which is also used to assist crews' safety by having heating system inside itself, has already been developed. Including the above-mentioned items, E-Tec is currently holding domestic patents for 6 anti-icing items and also meanwhile preparing for international patents.

The best part of E-Tec is that E-Tec is capable of designing, material supply, production, installation and commissioning - so called 'Turn-Key'. Since E-Tec has been registered on Samsung Heavy Industries.(SHI)'s vendor list in 2009, E-Tec has participated in various projects such as Drillship, Semi-rig, LNG Carrier, Shuttle Tanker and moreover, E-Tec is currently showing good performance in Hyundai

Heavy Industries (HHI) and Daewoo Shipbuilding & Marine Engineering (DSME).

Having its location in Geoje, E-Tec has its own laboratory equipped with a cold chamber to test the performance of their products under the severe environmental condition. Due to the newly opened North Pole Route and thereby rising demand of anti-icing, E-Tec will exert every effort in technical development to meet the increasing needs.

EonC's Torsional Vibration Monitoring device (ToVi-M) for marine applications

EonC

EonC, an engineering company specialized in noise and vibration control of diesel engine systems, is presenting its new torsional vibration monitoring device ToVi-M for marine applications.

ToVi-M is Torsional Vibration Monitoring and Misfiring detection

device for internal combustion engine drive systems. This monitoring device is an advanced model that prevents accidents by sending an alert to the ship operator when an abnormal vibration is detected at power-transmitting shafting equipment, including the crankshaft. ToVi-M also can detect the location of misfiring cylinder by using the patent technology, and has a self-learning function.

With ToVi-M, shipping segments such as container, oil carrier, off-shore drilling, construction and support vessels and ferries will have the leading safety monitoring system. ToVi-M enables ship owners and operators to enjoy lowering maintenance costs and free from the mechanical faults by monitoring torsional vibration status.

ToVi-M provides designers and ship builders with increased design flexibility in order to accommodate a wide range of shafting layout as well as simplicity of installation of the shafting design. EonC can improve the operating and maintenance performance of diesel engine driving systems by using following noise and vibration technologies.

- Torsional vibration control and monitoring

- Engineering services in noise and vibration field
- Torsional vibration analysis and measurement for approval
- Resiliently mounted system design and experimental test

VSAT+TVRO Hybrid Antenna Launching

KNS

The demands of more stable, more simple and more spatial maritime communication have been increasing. KNS is showing one of the solutions at Kormarine 2017. KNS is excited to announce it will be launching at Kormarine 2017, its upgraded Stabilized Antenna from its SuperTrack Z-Series.

The remarkable upgrade is the new Hybrid antenna. Until now, hybrid antennas were known as dual band antennas, but KNS is here introducing different hybrid antenna. The VSAT + TVRO Hybrid antenna. One antenna works like VSAT and TVRO simultaneously. VSAT + TVRO, 2 in 1! You will be able to enjoy two different services in one antenna from now on.

The other is New Complete Body Structure. KNS has created antenna with greater reliability, capable of performing under harsh environments, and is still able to maintain a stable connection and data throughput.

KNS has been developing and manufacturing not only VSAT and TVRO, but also antenna for military application with the highest technology for more than 15 years. KNS has been fulfilling many different and difficult requirements from many different customers and end users. You can look forward to the highest quality product of KNS.

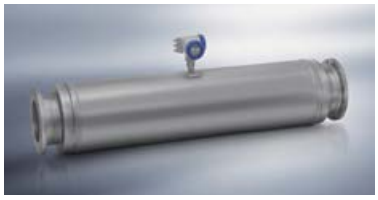
Launch of the OPTIMASS Highest capacity Coriolis flowmeters

KROHNE Korea

The OPTIMASS Highest capacity Coriolis flowmeters are designed to meet the stringent demands of the oil & gas and chemical industry. The new standard, high performance, high capacity meters for bulk flow measurements.

Since KROHNE operates the world's most precise volumetric calibration rig for flowmeters up to DN3000 with a certified accuracy of 0.013%, it has 0.1% flat line accuracy (20:1 turndown) with option of 0.05% flat line accuracy (10:1). Additionally, the Advanced EGM™ maintains operation over a wide range of gas fractions and complex flow conditions. Especially, OPTIMASS 6400 S150/200 are also designed for special application such as LNG and Cryogenic applications.

The Temperature range -200°C to +400°C for OPTIMASS6400 with pressure rating up to 200 barg/2900 psig and the Temperature range -45°C to +130°C for OPTIMASS2400 with secondary containment up to 150 barg/2175 psig.



OPTIMASS2400 S400

OPTIMASS6400 S150/S200

Furthermore, they also have custody transfer approvals OIML & MID and compliant with API & AGA and NAMUR. ATEX, IECEx, cFMus approvals and NACE compliance is also available.

Flow capacity

- OPTIMASS 2400 S400: up to 4600 t/h / 169,021 lb/min
- OPTIMASS 6400 S150: up to 480 t/h / 17,637 lb/min
- OPTIMASS 6400 S200: up to 825 t/h / 30,314 lb/min

Valve Spindle & Seat Ring for Marine Ship Engine and Die forging for Marine, Construction, Defense and Industrial Machinery

KSP

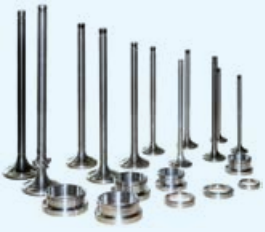
Do you want to stimulate your business by supplier whose price is reasonable and quality is excellent in the field of marine ship engine? Here is a dependable and trustworthy supplier of valve spindle and Bottom piece. Our company is KSP located in South Korea.

KSP was founded in 1991 as a special welding company and established its primary business in 1993 as a marine engine valve specialist company. Our business was opened to the public at the Korean Stock Exchange by listing on the KOSDAQ in December 2004.

KSP has four primary business fields, which are Exhaust Valve Business, Engine Valve Spindle Business, Die Forging Business and Friction Welding Business.

Exhaust Valve has been developed and supplying to Hyundai Heavy Industry. Regarding engine valve business, KSP is an expert manufacturer to manufacture the valve spindle of low & middle speed engines of Engine Licenser, MAN Diesel & Turbo, WARTSILA, HHI's HIMSEN and etc.

valve spindle for 2 stroke engine



valve spindle for 4 stroke engine

KSP has certificates for Nimonic 80A material up to 98bore & bottom welded spindle from engine licenser, up to RT-flex96C from WARTSILA. Regarding forging business, KSP has acquired numerous certificates which are ABS, BV, DNV, GL, KR, LR, NK, RINA, CCS and RS. Also, KSP has been supplying to the Hyundai Heavy

Industries, DOOSAN, CATERPILLAR, VOLVO etc. Regarding the Friction Welding Business, KSP has been patented to manufacture valve spindle for HHI.
KSP understands the world's business needs therefore, vast choices of production items, excellent technology and top notch quality products are our primary commitments. Our product confidence along with the eagerness to challenge the future are what inspires KSP.

Nexans Kukdong is a global leading cable supplier for ships and offshore facilities

Kukdong Electric Wires

Nexans brings energy to life through an extensive range of cables and cabling solutions that deliver increased performance for our customers worldwide. Nexans' teams are committed to a partnership approach that supports customers in four main business areas: Power transmission and distribution (submarine and land), Energy resources (Oil & Gas, Mining and Renewables), Transportation (Road, Rail, Air, Sea) and Building (Commercial, Residential and Data Centers). Nexans' strategy is founded on continuous innovation in products, solutions and services, employee development, customer training and the introduction of safe, low-environmental-impact industrial processes.
In 2013, Nexans became the first cable player to create a Foundation to introduce sustained initiatives for access to energy for disadvantaged communities worldwide.
Nexans is an active member of Europacable, the European Association of Wire & Cable Manufacturers, and a signatory of the Europacable Industry Charter. The Charter expresses its members' commitment to the principles and objectives of developing ethical, sustainable and high-quality cables.
Nexans, acting for the energy transition, has an industrial presence in 40 countries, commercial activities worldwide, is employing close to 26,000 people and generating sales in 2016 of 5.8 billion euros. Nexans is listed on Euronext Paris, compartment A.
Kukdong Electric Wires, a Nexans company, is the leading cable supplier for the shipbuilding and offshore markets. Kukdong has developed and manufactured the cables used in ships and offshore facilities since its establishment and has gained reputation as the world's leading manufacturer and supplier of the onboard marine cables. Specifically, Kukdong has climbed to the high growth path in tandem with the domestic shipbuilding industry playing a key role in the nation's economic growth.
The turning point for Kukdong came in 2003 when it became a

member of Nexans Group, the world's leader in the cable industry, thus paving the way for another great leap forward. In particular, the merger between Nexans and Kukdong has created synergic effect for both companies. Nexans has become the undisputed leading company in the field of marine cables used in various ships and offshore facilities and expanded its production base in Asia, the world's fastest growing region. That is consistent with the Nexans Group's policy for scaling up investment in the developing regions and growing markets. Meanwhile, Kukdong has been allowed to have access to the latest technology, global sales network, advanced business management techniques of Nexans, which are essential for the company's transformation into a global company. As majority of ship owners are concentrated in Europe, Nexans which is already registered as a vendor is better-positioned to enter European markets than unregistered domestic companies. In addition, Nexans can deliver whole products in full package much faster through its plants worldwide.
There are 4 Nexans Research Centers in Nexans Group and one of them is located in Jincheon which is the only one built out of Europe area. NRC Jincheon is specialized in rubber compounds which contributes to drive innovative products.

Wärtsilä highlights 'Future Proof' shipping at Kormarine 2017

Wärtsilä

At this year's Kormarine conference and exhibition, Wärtsilä will be highlighting its development work in preparing for the future trends and needs of the shipping industry. As a technology leader that has consistently been at the forefront of creating new products, systems and solutions that improve efficiency and provide added customer value, Wärtsilä is uniquely positioned to prepare the industry for its future.

The marine sector is undergoing a period of rapid transition driven by environmental compliance requirements and the need to lower operating costs through achieving greater efficiencies. This transition is being made possible by new technologies and the further development of existing ones. In this, Wärtsilä is playing a central role.

One of the key elements of the shipping industry's future is digitalisation. Wärtsilä is building on decades of expertise in digital development and accelerating the pace at which it creates new digital solutions, services and opportunities for its customers. New initiatives and innovations are already being created at the company's digital acceleration centres.

Battery powered propulsion will certainly become increasingly utilised as a means of significantly reducing the level of exhaust emissions, while also reducing fuel and maintenance costs. Hybrid propulsion systems are anticipated to represent a significant percentage of all contracted ships within the coming ten years. Wärtsilä's hybrid propulsion solution involves the use of both energy storing batteries and conventional marine engines. The system optimises the overall operational performance of the vessel, and allows the engines to operate closer to their optimum design point where the efficiency is highest.

The Wärtsilä HY leverages the company's technical strengths in both engine design and electrical & automation (E&A) systems. The fully integrated hybrid power module combines engines, an energy storage system, and power electronics optimised to work together through a newly developed energy management system (EMS). It is the marine sector's first hybrid power module of this type produced, thereby establishing a new industry benchmark in marine hybrid propulsion. The new EMS, which has been specifically designed for this application, represents the latest generation integrated control system. It creates an outstanding means of interaction with the ship's onboard systems.

Wärtsilä is also launching a new portfolio of harbour and escort tug designs emphasising environmental sustainability. Since they typically operate in or close to harbours, tugs are particularly affected by environmental regulations, and the need for compliance is an increasing concern for tug owners and operators.

The new designs are based on the Wärtsilä HY concept, and among the benefits are the flexibility and efficiency provided to the operation of the tug by the company's advanced hybrid technology. Furthermore, the total installed main engine power is less than with conventional hybrid tug designs. Using less engine power also decreases the amount of engine maintenance needed, which again adds to the cost savings. Maximum bollard pull is achieved by power boosting from the batteries.

But the future of shipping will not only be about new technologies, it will also require new business models in order to achieve growth. Wärtsilä has set out its visions for the future based on its assessment of emerging trends, such as sharing economies, the new digital universe, the huge growth in energy storage capacity, and new affordable 'green' energy sources. These all represent both challenges and opportunities for the future of shipping.

Wärtsilä looks forward to discussing this vision of how different scenarios could shape the way that shipping companies will operate in the years to come at its stand number 4M03 in Hall 4 at Kormarine 2017.

In addition to looking to the future, Finland based Wärtsilä will also honour the past as it celebrates 100 years of Finnish independence at its 'Happy Hour' on day 1 of the exhibition. Visitors are most welcome.

Maritime innovators commit to Fleet Xpress applications

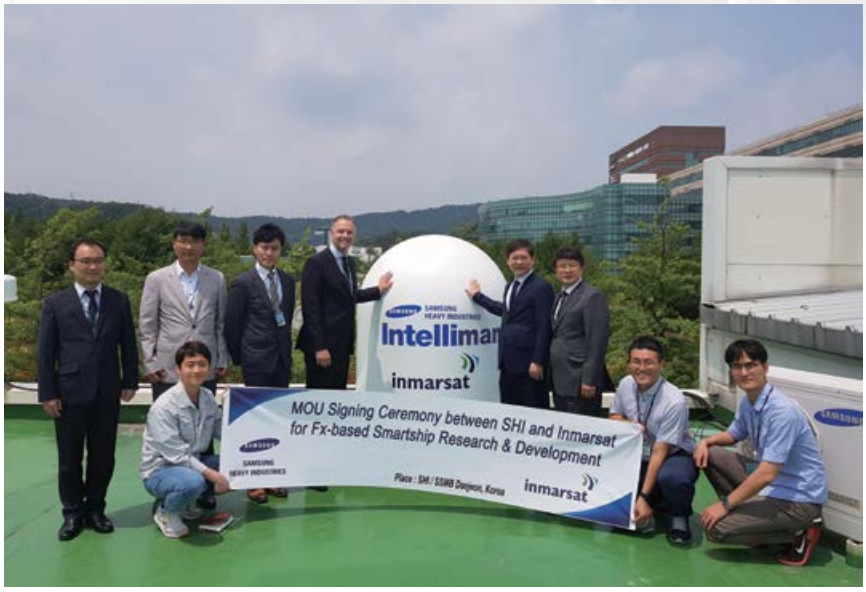
Ground-breaking agreements bringing together new app-based vessel management from two of the biggest names in maritime technology and Inmarsat confirm that shipping's much-hyped information superhighway is headed in the direction of Fleet Xpress.

A Memorandum of Understanding (MoU) signed between Samsung Heavy Industries (SHI) and Inmarsat Maritime in September establishes a far-reaching relationship to leverage the 'smart ship' connectivity offered by Fleet Xpress at the vessel construction stage. In a second arrangement, Inmarsat and Rolls-Royce have signed a letter of intent envisaging the delivery of vessel energy efficiency optimisation via Fleet Xpress 24/7 using Energy Management 2.0 software from Rolls-Royce Marine.

Both agreements come under CAP, the Certified Application Provider programme devised by Inmarsat Maritime to cultivate third party development of the management software that can fully exploit Fleet Xpress connectivity and its unique service enablement platform. They demonstrate that shipping's leading edge shipbuilders and marine technology brands see the high-speed broadband service as the gateway to the maritime internet.

Through its CAP programme, Inmarsat aims to support and enable products that become part of an eco-system of applications to broaden and enhance services beyond connectivity and enable 'value-adds' for end-users.

Stein A. Orø, Vice President Sales, Inmarsat Maritime, has been closely involved in the CAP programme and in the work towards securing partners for Inmarsat. "CAP is part of Inmarsat's strategy to support the global adoption of the Internet of Things (IoT) in the maritime market using Fleet Xpress," he said. "It offers partners a rich set of Application Programming Interfaces (APIs) that provide application-triggered bandwidth, a managed-cyber security solution and flexible third-party subscriptions on board Fleet Xpress vessels.



SHI & Inmarsat MOU signing ceremony.

"Applications covering real-time analysis of data for engine monitoring, weather information and fuel consumption rates can deliver real gains in operational efficiency, safety and compliance, IT security and crew welfare," added Orø. "Critically, third parties develop new business and a new revenue streams while offering full transparency in their own billing processes."

Dr. Booki Kim, Director of Central Research Institute, Samsung Heavy Industries & Construction Co is in no doubt of the agreement's potential significance. "The smart ship of today

demands intelligent solutions to cover remote operational management and equipment monitoring, and continuous lifecycle services to extend its life," he said. "As a global shipbuilder, SHI is partnering with Inmarsat in a mutual growth opportunity to deliver more competitive, next generation satellite-based vessel operations."

The agreement is of a strategic nature and envisages the leading South Korean yard installing Inmarsat-approved terminal hardware and offering applications to cover remote machinery diagnostics and CCTV services. Christened 'Smart Ship' by SHI, this is an entirely new service through which the yard group envisages owners harvesting data from preinstalled hull-monitors and equipment sensors onboard in real-time, leveraging Fleet Xpress from the moment the ship is delivered.

"The Fleet Xpress service allows SHI to build-in new levels of vessel efficiency," said Ronald Spithout, President Inmarsat Maritime. "The most forward-looking shipbuilders recognise collaboration as the key to shipping's exploitation of the Internet of Things. It is also further evidence that Inmarsat and its partners are driving shipping towards value-added applications that will digitalise this industry."

Fleet Xpress attracted commitments from 10,000 existing ships in its first year of operations. In 2017, the service drew significant accolades, winning the Smart4Sea Excellent Award for technological excellence in smart shipping and the Seatrade Award 2017 for Digital Technology.

Furthermore, the span of agreements which CAP can accommodate is demonstrated by the Letter of Intent signed between Inmarsat and Rolls-Royce, which has high level strategic significance but also promises a more immediate impact. The LOI foresees vessels enabled by Fleet Xpress and equipped with Rolls-Royce Energy Management 2.0 software maximising efficiency in a way that is constantly verifiable within the Inmarsat CAP, connected via Fleet Xpress and hosted on the Inmarsat digital platform.

In one context, the agreement conforms to the EU Monitoring Reporting and Verification and the IMO Ship Energy Efficiency Management Plan schemes. Monitoring ship fuel consumption and emissions is now required by law in some areas and is also increasingly used in vessel selection criteria by charterers.

In another context, operating via the Fleet Xpress enablement platform 'upgrades' the capabilities of the Rolls-Royce software by making it vessel performance management tool that operates on-demand and in real time.

"Combined Rolls-Royce/Inmarsat technological capabilities will deliver proven energy management software to shipowners with always-on, global reach," said Orø. "We have been talking with Rolls-Royce for some time and we are very happy to formalize an arrangement bringing together Fleet Xpress with the latest in maritime technology. This is a huge milestone for us and we look forward to real ship installations and publishable studies at a later stage."

Applicable for all ship types, Rolls-Royce Marine energy management software is used to reduce energy consumption, improve crew awareness of vessel performance and support environmental compliance. With

data collected from ship control systems and equipment sensors, Energy Management 2.0 also benchmarks efficiency against historical performance.

Rolls-Royce energy management software quantifies the effects of optimising operational efficiency on costs and the true impact of enhancements as they are phased in. Fleet Xpress always-on connectivity and the potential for app-triggered bandwidth mean that this data can be logged in real time, optimising the verifiable reporting capability already built in to Rolls-Royce Energy Management System software.

Meanwhile, the Rolls-Royce LOI foresees a non-exclusive contractual arrangement that could provide a template for other vendors, he says, especially among marine technology companies offering supporting services based on remote monitoring centres.

Shell Marine brings new approach to lubricants management

In a market of ship oversupply and very low freight and charter rates, vessel owners need assurance that their ships are operating safely, comply with increasingly complex environmental regulations, that efficiency is maximized and that operating costs are minimized.

Shell Marine recently introduced a multi-faceted strategy to address product selection, purchasing options and service requirements in an integrated way. The Marine Integrated Lubrication and Expert Solutions (MILES) programme is a unique approach to lubricants management.

Part of the MILES strategy is to offer a complete lubrication management service by combining stock levels, demand planning and supply costs. To maximise scale and benefits of MILES, Shell Marine is working with external experts to develop digital solutions utilising greater connectivity, artificial intelligence, machine learning and data science. This will allow Shell Marine to offer a wide range of new services, from building recommendations about optimal volume/port lifting to creating ways to reduce purchasing costs by overseeing the entire lubrication management for the vessel. Additionally, Shell Marine will be offering different payment solutions which help ship owners optimise their working capital and budgeting.

Shell Marine continuously reviews and optimises its supply chain arrangements to ensure security of supply through its network of more than 700 port locations in 59 countries worldwide.

Increasingly, customers seek services and technical expertise as well as product, with the lubricant supplier needing to address new operational complexities so that customers can focus on their core business. For example, Emissions Control Areas and a tightening cap on global sulphur emissions have brought ongoing uncertainties over future fuel choices, while market forces have prompted volatility in fuel pricing. Both the environmental imperative and fuel pricing instability bring challenges for engine performance and maintenance.

Shell Marine offers a suite of cylinder oils for all types of two-stroke engines to meet varying engine and fuel specifications, even under the most extreme operating conditions. Its portfolio has been developed to optimise performance in: new fuel-efficient engines; existing engines with years of life ahead; engines operating at full and part loads; and engines working both inside and outside Emissions Control Areas.

Ships entering Emissions Control Areas must now use fuels with max. 0.1% sulphur content or be fitted with equivalent exhaust gas abatement technology; vessels using higher BN cylinder oils whilst running on ultra-low sulphur fuels risk potential problems in the future. Shell Marine's intensive research shows that an imbalance between the acid produced from the sulphur in the fuel and the BN level in the cylinder oil can lead to deposit build-up, higher maintenance costs and reduced vessel availability. As a result, Shell Marine launched Shell Alexia S3, which is a BN 25 (SAE 50) cylinder oil recommended for vessels running on ULSF, distillates and LNG. Proven performance with millions of operating hours in the field and backed by No Objection Letters issued by MAN Diesel & Turbo and Wärtsilä (Winterthur Gas and Diesel).

Jan Toschka, Executive Director, Shell Marine

Meanwhile, during slow steaming, two-stroke low speed diesel engines burning residual fuel with sulphur levels >2.0% can be running under conditions of very high oil stress. These are the conditions in which engines are at risk of cold corrosion. In this case, Shell Alexia S6 has been developed as a high-performance cylinder lubricant with a unique formulation designed to provide additional protection for newer design engines operating under more demanding conditions; such as low load and high fuel sulphur content. With a BN of 100 (SAE 50), Alexia S6 offers outstanding acid neutralising properties to prolong the life of components, whilst its additive optimised formulation helps to keep the engine clean and minimise deposit build up on pistons, piston rings, ring grooves, under piston spaces and in cylinder ports.

Shell Alexia S6 is approved for use in line with the latest requirements set by Wärtsilä (Winterthur Gas and Diesel) and MAN Diesel & Turbo, the major manufacturers of low speed crosshead diesel engines.

Shell Marine is working very closely with OEMs and ship owners to protect the most modern ultra-efficient diesel engines against cold corrosion while still optimizing cylinder oil feed rates across the entire range of vessel operating conditions. Exhaustive laboratory testing in 2015 and extensive shipboard trials though 2016 have led on to the offering of Shell Alexia 140, an ultra-high BN oil with a BN of 140, for use on its own or as part of an onboard lubricant blending or mixing system.

Shell Alexia 140 was the first cylinder oil trialed by MAN Diesel and Turbo (MDT) for its 'ACOM' (Automated

Cylinder Oil Mixing) pilot scheme to establish best practice in matching lubricant BN to fuel sulphur content whilst minimising lubricant feed rates.

Four-stroke engines are also continuously evolving and require oil in lower amounts that can perform well at higher temperature and pressures. Shell Marine recently unveiled its next generation Shell Argina and Shell Gadinia trunk piston oils for the medium-speed engine market. These oils have been developed to address the pressure on owners to shift towards cleaner fuels that address emissions regulations. Shell thinks that demand for distillates and low-sulphur heavy fuel oil will only increase as shipping approaches a global fuel sulphur content cap of 0.5%, imposed by IMO from 2020. Already, dual-fuel engines are taking an increasing share of the four-stroke engine market.

Shell Argina and Shell Gadinia avoid sludge formation, improve piston and crankcase cleanliness, and thus block deposit formation. Both oil types offer improved detergency over previous Shell Marine products and those from competitors. They also feature excellent BN retention and viscosity control to address the faster oxidation that leads to deposit formation or lubricant contamination, without resorting to unnecessary oil sweetening. Compared with a high-performing industry reference oil, the new Shell Argina S5 shows a 12.6% improvement in BN retention and a 15-20% improvement in piston undercrown deposit thickness. For operators, this can translate into lower operating costs via longer oil life, less sweetening and reduced maintenance.

The Shell Argina range includes four grades: the BN20 Shell Argina S2 for residual and blended fuels; the 'mainstream' Shell Argina S3 (BN30) and Shell Argina S4 (BN40); and Shell Argina S5 (BN55) – offering extra protection from deposits and extended oil life. Shell Gadinia S3 is a new addition to the existing standard and anti-lacquering Gadinia variants, and has been developed to control oil consumption in modern engines burning distillate fuels.

Complementing its product portfolio, Shell Marine has introduced a range of technical services to support greater equipment reliability and reduced downtime, as well as early diagnosis of potential faults.

Internet of Things delivers innovative remote services for drives maintenance planning

ABB is making increasing use of the Internet of Things (IoT) concept to deliver a range of competitive advantages for customers such as improving data analysis, boosting productivity and enhancing reliability.

In many industrial applications, such as pumps or fans which are powered by a drive/motor combination, it is the drive that actually controls the operation. Even in larger systems, where an automation system or PLC controls the drive, it can provide important indicators about the operation of the motor and the application.

The Remote Services program uses the information from ABB's intelligent drives to provide the earliest possible indication of potential operational problems faster, helping operators to minimize costly breakdowns.

If there is a malfunction in the coke elevator, the whole process stops since nothing can be lifted.

Remote Support is reactive

Initially there are two variations of the services - Remote Support and the more advanced Remote Condition Monitoring. Jaana Kivela, ABB's product manager for Remote Services, explains how they were developed and are now being used.

"Remote Support is a reactive service. We only get involved when an operator has some concerns and actively asks us to check out the situation. This could be when a drive is sending a fault message. We collect data continuously from the drives covered, and as soon as there is a possible fault, the monitoring system starts sending greater amounts of data to facilitate more thorough analysis and faster problem resolution."

"The service delivery only starts when the customer contacts us with a problem. This ensures that we don't start working on something that isn't actually a problem for them. For example, they could have been testing something in their system that caused the drive to send the alarm. This means that we are using our expert drives knowledge in a very targeted manner, and only when necessary."

The fast response time means that the operator might avoid a breakdown altogether, or if there is an actual failure, the downtime will probably be much shorter. Because this service works remotely customers have peace of mind, knowing that no matter where the drive is located, they can

tap into ABB's expertise to solve their drive issues rapidly.

Remote Condition Monitoring is more proactive

Remote Condition Monitoring is a more comprehensive proactive service. ABB actively monitors the drives covered and uses deep experience of what is the 'normal' state of operation. ABB experts can make a good estimation of the condition of the device, and offer accurate maintenance recommendations. Also, as part of the service the experts are always looking out for early indications of possible faults.

"Ideally we want to spot problems before anything actually happens, to prevent breakdowns," Jaana Kivela continues. "We do not guarantee we can do that 100 percent, but there is a good opportunity to spot issues in advance. This is true both for ABB and the operator. We provide the customer with a portal they can use to access this live data, to see how the drive is operating and to look its history."

Success with first pilot in SSAB steel mill

The first pilot installation of the Remote Support service was carried out at the giant SSAB steel factory in Raahe on the west coast of Finland. It was only in the very early stages of the trial when it helped avoid a possible breakdown.

During the trial an alarm on the critical coke elevator operation was noticed by ABB personnel. Acting quickly, both remotely and on-site, the combined SSAB and ABB teams successfully worked together to avert what could have been a major problem. Ari Korkala, an electrical maintenance planner at the SSAB steel mill, explains the situation: "In the coking plant we have what is called the dry quenching stage where an elevator lifts a bucket of hot coke into the dry quenching chamber. The elevators are crucial and if there is a malfunction, the whole process stops since nothing can be lifted. In addition, the coke is very hot at about 1050° C, so that if it stops somewhere in between, it could cause a fire in the electrical rooms or elsewhere."

Thanks to drive alarms spotted via the Remote Support portal, the SSAB team discovered the possible elevator problem at an early stage.

Now being introduced on wider scale

In addition to SSAB, numerous other pilot trials were carried out in applications as diverse as mining, automotive and shipping. So far Remote Services have shown significant potential to be widely adopted throughout industry, not just in highly critical operations but eventually on all drives.

By using drive data in this manner, facilitated by the IoT, users and industrial operations can obtain a wide variety of new benefits by accessing information that is already available. Among these benefits are fast fault notification, rapid response and analysis by ABB specialists and, most importantly, an opportunity to reduce unplanned downtime and the major costs associated with breakdowns.

Transas plots course of shipping's digital voyage

Digital technology from Transas Marine that combines data with machine intelligence will remove the obstacles standing in the way of smarter shipping.

As shipping sails into the digital age, vessel owners, operators and managers are gradually unlearning a nervousness of technology, replacing it with an eagerness to apply technological solutions that improve the performance of ships, entire fleets and – ultimately - the bottom line.

Numerous innovative solutions have emerged to satisfy this growing appetite, taking advantage of advances in satellite communications, cheaper and more ubiquitous computing power, and new techniques in software engineering resulting in greater machine intelligence.

To get an idea of how far we have come, imagine how a demonstration of a driverless car would have grabbed front page headlines in the mainstream press 10 years ago; today such tests are hardly reported outside tech news outlets. In the long-run, these technologies may lead to autonomously-operated vessels. For the time being though, they provide a springboard that will accelerate the transition to smart shipping.

However, as things stand the technologies in question will fall short of their full potential, according to Frank Coles, CEO of Transas, the innovative, digital solutions company. "We are unlikely to reach full speed ahead because most contemporary work is in isolation. Developers often focus on efficiency gains for one job; they might do it well but they fail to comprehend the full picture. To date, the industry hasn't had the right support platforms to integrate its digital solutions and fully embrace a smarter way of operating ships and managing fleets. Overcoming this barrier will depend on breaking down these artificially imposed constraints and joining the dots."

For Coles, this realisation has become a focus for R&D at Transas, resulting in the birth of THESIS: the Transas Harmonised Eco System of Integrated Solutions. Announced in early 2016, THESIS is intended as a flexible shipping industry-specific platform that will allow a freer exchange of information between stakeholders in the maritime supply chain. Sharing the data generated on board ships, across fleets, and at shore-based facilities more widely will create a multiplier effect in the value derived from that data.

"Imagine if the shipping industry had access to its own powerful operating system – like Apple's iOS or Google's Android for smartphones," enthused Coles. "Consider how powerful it is to have all your devices connected and controlled by a single user profile which lets your data flow seamlessly between them thanks to cross-platform integration. As we have all personally experienced, this silently facilitates faster and more efficient ways of connected working and socialising. It is also scalable as evidenced by the spread of these networks into our homes and cars."

Frank Coles, CEO of Transas

"Now, transplant that approach to the maritime industry with the introduction of a platform for ship owners and operators, where instead of the captain's range of personal devices being linked and synced with each other, it's the bridge operations and the control of information and processes that is shared from ship to shore and across fleets."

The elements required to build this platform – THESIS – are mostly already in existence; they just haven't been joined together. To expedite matters, Transas entered two strategic partnerships earlier this year. Its new relationship with Japan Radio Company (JRC) will see the two companies working together on R&D, product distribution and project collaboration. One of the aims is to unite JRC's reputation in hardware with Transas' expertise in software to produce next-generation e-navigation solutions for both SOLAS and non-SOLAS markets. Initial projects include collaboration on the joint design and development of new electronic chart systems and radar products.

Transas is also partnering Satcom Global to incorporate integrated connectivity into THESIS, bringing the benefits of Satcom Global's Aura VSAT network to vessels using Transas' navigation and voyage optimisation solutions on board to connect seamlessly with shore-based fleet operations centres.

Crucially Transas is not limiting its thinking to ship-to-shore data exchange. THESIS is about connecting ship, operations office, training facilities and ship traffic control to create a cohesive community capable of joined-up decision-making. It will unite and empower stakeholders to achieve higher operational standards and greater environmental performance, while improving efficiency and safety.

THESIS is not simply a repackaging of existing products into a combined solution. Instead, Transas is working on entirely new software solutions to exploit emerging technologies such as artificial intelligence, to bolster situational awareness and enhance decision-support on board and on shore.

Transas ECDIS bridge

Specifically, the company plans to launch advanced software tools that reduce the risk of a human error on the bridge culminating in a serious incident. In a first for the industry, these will employ machine learning techniques to detect anomalies in vessel and operator behaviour and raise the alarm before the consequences of an action or momentary lapse in attention become irreversible. In addition to vessel track prediction, the solutions will detect a variety of excessive or unusual manoeuvring patterns, keeping an eye on parameters such as speed and rate of turn, as well as unexpected deviations in fuel consumption.

In addition to the safety benefits, the insight derived from pulling together a wider selection of datasets can be harnessed to boost operational efficiency at individual ship and fleet level in ways so far only imagined. Integrating metocean data, information from traffic separation schemes and regional regulations on acceptable fuel types will make it possible to optimise vessel routing to reduce fuel consumption based on new inputs that enrich the efficiency algorithms.

Using machine intelligence to augment the human in the loop can help in other ways. For decades shipping companies have conducted much of their business using spreadsheets, emails, and phone calls. Consequently, both operational decisions and transactions with regulators, customs, and other players in the supply chain involve disconnected conversations, unnecessary paperwork and administrative overheads. Coles believes there is scope to automate some of those workflows, create greater transparency and uncover opportunities for optimisation.

To substantiate this view, he points to Maersk, which last year announced that 'everything that can be digitalized will be digitized'. "It is not doing this for novelty value but sees real commercial value in adopting digital solutions to remove delays and inefficiencies," he said.

Putting in place a unified platform like THESIS is a critical step in enabling this revolution to come about. It ensures the necessary raw data is gathered, stored and easily accessible to the relevant stakeholders, as well as any new digital tools and solutions that emerge to extract meaning from data. "Technology shouldn't be an end in itself – but a tool to achieve an end. We want to help the industry improve by helping it make better decisions and boost competitive advantage," concluded Coles.

MAN reveals new flagship

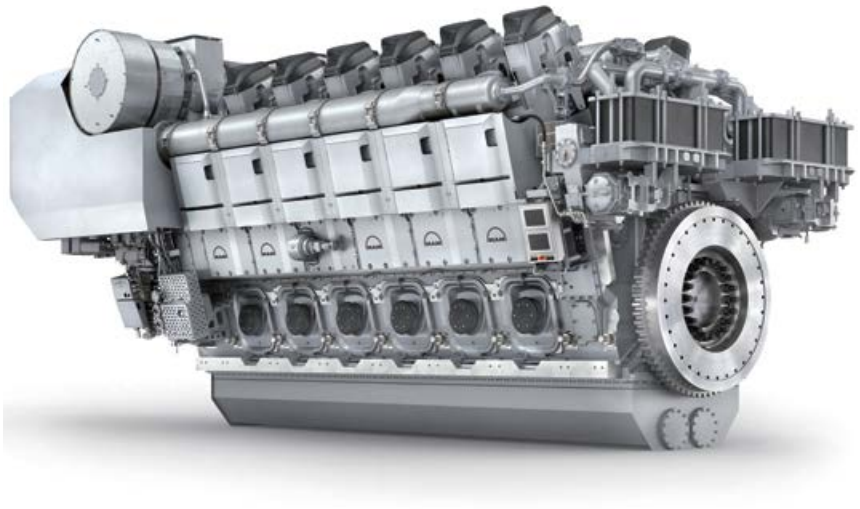
MAN Diesel & Turbo has revealed the successor to its 48/60CR engine in the company's 4x line of high-performance diesel engines.

The MAN 45/60CR marine diesel engine will initially be available as 12V and 14V versions that boast power outputs, of 15,600 and 18,200 kW respectively, with inline versions following at a later stage. For land-based power generation applications, MAN has developed the maximum power version, the 20V45/60 with 26 MW.

Wayne Jones, Chief Sales Officer of MAN Diesel & Turbo, said "The new engine combines the best features of the current 48/60CR, such as MAN's common-rail system with ECOMAP capability, and adds new technologies such as two-stage turbocharging for an unrivaled Specific Fuel Oil Consumption. The resultant reduction in operating expenses and positive environmental impact are sure to attract strong market interest."

MAN Diesel & Turbo states that the 45/60CR's power increase and low consumption are particularly aimed at such key, lifecycle-cost-oriented applications as cruise liners, RoPax ferries, RoRo vessels, and dredgers. The company is making the 45/60CR engine available first as 12V and 14V versions with 6L to 10L variants to follow later. It reports that the engine has been conceived from the beginning as a family concept that will accommodate future derivatives, for example, such as a dual-fuel derivative.

The first set of V-type engines will be available from end-2020 with delivery of the first L-type engines due from 2022.



Game-changing power density and efficiency

Jones added "With this engine, innovative engineering meets the vast experience of a world market-leader in four-stroke engine design. MAN's 4x family has accumulated millions of operating hours all over the world and we have listened closely to the needs of our customers. Accordingly, we knew exactly where we wanted to go in engineering the next generation of this global success story: We were aiming for a game-changing level in power density and efficiency, and we accomplished that mission."

Dr. Gunnar Stiesch, Head of Engineering Engines at MAN Diesel & Turbo, said "Next to a frontloading approach, using thermodynamic engine process calculations, we used computational fluid dynamics to simulate and optimize the combustion process. Also, finite elements analysis was used to optimize the engine's mechanical strength and vibration behavior. We then put the power unit to the test on the world's largest, four-stroke, single-cylinder test engine and started the experimental optimization and validation phase."

The new engine is also a new centerpiece of MAN's extended systems approach which reflects in the company's latest generation digital Safety and Control System, SaCoS 5000. Following a decentralized design concept, SaCoS 5000 offers unprecedented data availability and optimized alarm visualization and diagnosis. "Thanks to the new SaCoS, the MAN 45/60CR is not only online-ready but also equipped for the digital future of power generation", stated Stiesch.

The two-stage turbocharger module rounds off the MAN 45/60CR's superior profile. MAN Diesel & Turbo is the

pioneer in developing and operating two-stage turbocharging for large-bore engines, a concept which achieves excellent efficiency thanks to a low-pressure and a high-pressure turbocharger arranged in series. "We are the only company in the market that develops both engine and turbochargers", said Stiesch. "This unique, in-house competence allows us to truly tailor-design this engine for optimized two-stage turbocharging and to unleash its full potential. It's also noteworthy that, despite the turbocharging being two-stage, load pick-up behavior is the same as for the single-stage turbocharged 48/60CR engine. Operators thus profit from maximized peak pressure and optimal utilization of the Miller Cycle."

The perfect fit for shipping

Modern shipping faces constant demands to increase efficiency and comply with ever more stringent emissions regulations, amid growing public awareness of its environmental role.

The MAN V45/60CR engine enables owners and operators to meet such demands, while simultaneously optimizing operating expenses with unrivaled, low levels of fuel-consumption. Through increasing standardization and using modular sub-components, the new MAN V45/60CR engine also allows faster installation and easier maintenance.

The new four-stroke unit meets IMO Tier II, while IMO Tier III is met with MAN's in-house, compact SCR system; the engine is shortly scheduled for approval by all major classification societies.

The 45/60CR is suitable for use in a wide range of marine applications, especially applications with high power-demands like ultra-modern cruise vessels, large RoPax and RoRo ferries, as well as mega-dredgers. Its primary focus is on reliable power generation, performance flexibility and superior efficiency in either diesel-electric or diesel-mechanical configurations.

Calculations, based on a representative load-profile of a cruise vessel, show that a ship operating with an MAN 45/60CR engine can enjoy a fuel-oil cost benefit of 5 to 12% in comparison with a vessel powered by an equivalent engine from other manufacturers. For a cruise vessel of around 120,000 – 150,000 gross tonnage with 60 – 65 MW of installed power and an assumed fuel price of 500 EUR/t, this translates into annual savings of 0.9 to 2.4m EUR when employing the 45/60CR.

Extending the possibilities

The new engine combines the proven characteristics of its predecessor – the MAN 48/60CR – including its in-house common-rail injection system, with the latest innovations in diesel-engine technology such as two-stage turbocharging as previously mentioned here.

The MAN V45/60CR can also be combined with the innovative MAN ECOMAP 2.0 technology that grants operators the flexibility to run an engine following different SFOC power characteristics, facilitating optimal efficiency at different load points. The latest development with this innovative technology is the integration of the MAN SCR system into ECOMAP, offering even further possibilities to optimize the efficiency of the propulsion system, taking into account fuel and urea prices.

This offers operators a whole new dimension of unrivalled operational flexibility, and completely new opportunities for optimal economic operation – regardless of prevailing consumable prices.

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Providing a clear and safer vision

Vetrotech Saint-Gobain introduces new electrically heated fire-resistant glass solution for LNG Carriers.

One of the world's leading manufacturers of fire resistant glass, Vetrotech Saint-Gobain, introduces THERMOVIT© PRO A0, an electrically heated glass solution with A0 fire-resistance in line with IGC International Code for Liquefied Natural Gas (LNG) Carriers.

With over 30 years of experience in producing fire-resistant and heated glass, Vetrotech has developed a glass solution specifically for wheelhouse applications, which offers 60 minutes of fire integrity resistance (A0) and an integrated heating function in just one single laminated glass. Assisting with the safety of crew and ship, the Vetrotech Saint-Gobain solution meets the requirements set out within the IGC International Code for Liquefied Natural Gas (LNG) Carriers, which states wheelhouses in LNG carriers to be installed with A0 fire-protective glass.

Ruud van der Sterren, Business Manager Marine, said "Having clear fire-safety guidelines for a fuel carrying ship, such as an LNG carrier, is crucial. When holding large volumes of fuel onboard, it is essential that the crew are protected in the event of a fire to the highest possible standard. Safety glass is an essential component in assisting with fire safety, providing additional time for the crew to evacuate or navigate the ship to a safe destination."

A Glass Solution Resisting Extreme Temperatures - When sailing in areas where temperatures can fall below freezing – such as the arctic areas - the defrosting of glass is required before setting sail. It is common practice to use blowers directed on the glass to defrost and obtain clear views. This technique has disadvantages, when using blowers the water does not evaporate and may seep into the interior. This can cause longer term negative effects on the vessel and only provides localised clearing on the glass, resulting in limited vision. With its conductive coating THERMOVIT© Pro A0 heats the entire surface of the glass and ensures the glass remains frost, snow, vapor or condensation free.

Make Long-Term stays on a ship more comfortable - The coating applied on the new range of Vetrotech heated products has several features to create a comfortable living or working environment within the wheelhouse of the ship. The protective neutral coating improves the solar reflection, minimizing solar heat gain and has an impressive g-value of 0.58, allowing easier regulation of temperatures within the ship. When heated the glass can also help control colder environments to ensure that a warm and comfortable temperature is available.

The glass is suitable for use in both extreme heat and humidity and freezing conditions up to -40°C. Controlled heating of the glass evaporates and clears condensation from the glass, even in high humidity environments.

To meet architectural and technical requirements the THERMOVIT© product range comprises three different solutions which can be customized to all project needs. The glass is available in sizes up to 5500 mm and are in line with ISO614 and ISO21005 (standard for toughened glass), ISO3434 (standard for heated glass).

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Guidelines for a hydrogen-powered future

ClassNK leads the way towards a safe new generation of Liquefied Hydrogen carriers.

As a zero emission fuel and with availability around the world, hydrogen has the potential to transform modern society. Harnessing fuel-cells as the power source for private vehicles is the most visible of society's growing initiatives to exploit hydrogen energy, but considerable work remains before hydrogen power generation can be supported on an industrial scale. One key component will be the ability for ships to carry large amounts of liquefied hydrogen worldwide.

This is a main area of focus for HySTRA (CO_2-free Hydrogen Energy Supply-Chain Technology Research Association), which is promoted by NEDO (New Energy and Industrial Technology Development Organization) in Japan. Established in 2016, HySTRA has participation from Kawasaki Heavy Industries, Ltd., Iwatani Corporation, Shell, and J-Power (Electric Power Development Co., Ltd.) and aims to conduct a series of technical demonstrations to identify issues facing commercialization of the supply chain.

HySTRA has a roadmap for operational stages that need to be addressed to deliver a viable LH2 carrier, ranging from initial cool down/loading/unloading of liquefied hydrogen to sea going operations using a newly built pilot LH2 terminal in Kobe, Japan. With the Final Investment Decision stage progressing through 2017, the first LH2 Carrier is nonetheless expected to debut as soon as 2020.

ClassNK has been closely involved in these developments, contributing through risk assessment safety in an LH2 Carrier Front End Engineering Design (FEED) project undertaken at the end of 2015, working with, Kawasaki Heavy Industries, Ltd., Shell International Trading and Shipping, Japan Marine Science and National Maritime Research Institute. The target of the assessment is a preliminarily design of 2,500 m^3 capacity liquefied hydrogen carrier. The Society's leading role in the field is also demonstrated through its recently-published new Guidelines covering ships able to carry Liquefied Hydrogen.

"As a low carbon energy source, the use of hydrogen as a fuel offers significant potential to solve environmental problems caused by fuel emissions," said Hayato Suga, Director of ClassNK's Plan Approval Division. "However, realising that potential calls for practical solutions, so that its production is economically viable and it is carried in a secure supply chain to the place of consumption. Movement by ship represents the most efficient long distance transportation option for LH2, and ClassNK is positioning itself at the forefront of related technological developments."

Hayato Suga, Director of ClassNK's Plan Approval Division

Hydrogen must be kept at temperatures below -253°C to maintain its liquid state under atmospheric pressure, presenting an even tougher handling and storage challenge at sea than LNG. Currently, the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) outlines safety requirements for gas carriers like LNG, but there are no specific requirements for LH2 carriers covering its handling and transport hazards.

Hydrogen also has a lower boiling temperature than methane, for example, as well as lighter density, higher upper flammable limit, lower ignition energy. Hydrogen leakage from pipes

or cargo containment system may result in catastrophic consequences such as fire or explosion.

ClassNK's safety work, as part of the new LH2 carrier design with KHI, has focused on the hydrogen systems onboard, and how to build on experience with LNG carriers to develop viable LH2 cargo handling and cryogenic storage solutions in pressure vessel type cargo tanks with vacuum multi-layer insulation. Effective measures also need to be employed to reduce the possibility of leakage of hydrogen taking its high permeability into account.

The full risk assessment identified some 89 hazards as needing to be addressed to bring an LH2 carrier design to market, although only 10 were identified as 'serious'. Particular attention has been given to the risks associated with thermal stress on cargo piping or cargo tanks, and dealing with any potential unreliability in the emergency shut-down of the ship-shore interface.

ClassNK's new guidelines take in the provisions set out in IMO Interim Recommendations for Carriage of Liquefied Hydrogen in Bulk, adopted by the Maritime Safety Committee at IMO in November 2016.

ClassNK identified 23 additional safeguards, over and above the requirements of the IGC Code and the special requirements previously envisaged at IMO, all of which have been covered by the special requirements in the interim guidelines developed at IMO. The new safeguards focused principally on ventilation, fire suppression, enclosed spaces management and hydrogen detection. Additional Risk Control Options also extend to recommendations covering an insulation panel on the outer shell of the cargo containment system, Pressure Relief Valves of cargo tanks capable of relieving boil off gas during vacuum loss of the insulation system.

Developments at IMO are being crafted to offer a formal framework for anticipated agreements between Flag and Port Administrations over the carriage of LH2 based on a provisional assessment, following a proposal from Australia and Japan to the MSC in December 2014. A subsequent Correspondence Group involved 19 members under a Japanese coordinator. After adoption of the interim Recommendations last November, an agreement between Australia and Japan brought application of the safety requirements to a pilot LH2 carrier.

"The new guidelines are therefore very timely," said Mr Suga. "They crystallise the work ClassNK has done to date to bring the LH2 carrier concept to reality, in line with the needs of the market and regulators, and provide a template to review LH2 carrier ship design. Through additional safeguards, we have been able to reduce potential risks associated with LH2 transportation across the board. Further risk assessments, e.g. HAZID, HAZOP, FMEA etc. are due to be carried out to the pilot ship and the related system/equipment, corresponding to the design stage. All of this will consolidate ClassNK's position at the forefront of LH2 carrier innovation."

MacGregor establishes its Head office in Singapore

MacGregor, part of Cargotec, establishes its Head office in Singapore. This ends a period of more than three years where MacGregor has operated with a virtual head office. In line with MacGregor's strategy execution the company wants to strengthen its local presence in Asia and Michel van Roozendaal, President, MacGregor will relocate to Singapore as of 1 October 2017. In addition Finance and Sourcing operations will be led from Singapore. Consequently, Jani Oksanen, Vice President, Finance, MacGregor, will as of 1 October be based in Singapore.

With a global customer base and large geographic span of operations, MacGregor continues to have a strong leadership presence in Europe, where a majority of the company's competence centers are located. "As a global market leader in cargo and load handling serving our customers globally, a Head office in Singapore is a natural fit for MacGregor as the majority of shipbuilding takes place in Asia. Furthermore, close to 70% of MacGregor's Sourcing volume is purchased from Asian vendors," stated Michel van Roozendaal, President, MacGregor.

The new Head office will be established in the company's existing premises in Singapore, where MacGregor shares an office with its sister companies Hiab and Kalmar.

Hexagon, 디지털 전환 시대 자동화 설계 엔지니어링 '해법'

최근 산업계에서 부상하고 있는 키워드는 '디지털 전환(Digital Transformation)'이다. Hexagon PP&M 코리아는 현재 급변하고 있는 디지털 산업 환경에서의 대응 전략에 대해 발표했다.

Hexagon은 자동화 설계 엔지니어링 분야에서 가장 전문화된 기업으로, 조선해양 및 건설 분야에서 두각을 나타내고 있으며, 혁신적인 엔지니어링 툴들을 통해 기업의 효율성 및 생산성 향상을 높이는데 주력하고 있다.

최근 Intergraph® PP&M(Process, Power & Marine)에서 'Hexagon PP&M'으로 리브랜딩 후 사업영역 확대에 매진하고 있는 Hexagon PP&M 코리아는 지난 9월 5일 국내 엔지니어 및 관계자 460여명이 참석한 가운데, 'Hexagon PP&M User Conference 2017' 컨퍼런스를 서울에서 개최했다.

이날 행사는 Hexagon PP&M 코리아 백창현 대표이사의 개회사로 포문이 열렸다. 백창현 대표이사는 "오늘 행사는 국내 고객사들을 위해 마련된 자리로 상호 기술 교류를 통해 국내 산업 발전에 있어 유익한 시간이 되었으면 한다"고 말했다.

Hexagon PP&M 마티아스 스텐버그(Mattias Stenberg) 사장은 기조 연설에서 "글로벌 산업 환경은 매우 복잡하게 급변하고 있다. 특히 산업 기간 시설부터 인프라까지 광범위하게 영향을 주고 있는데, 이는 우리가 디지털 전환 시대에 직면해 있기 때문이다"라며, "과거와 비교해 자동화 부문은 생산성 측면에서 상당한 발전을 이뤘지만, 반면에 건설 분야를 비롯한 다른 산업 분야는 여전히 시작 단계로, 디지털 전환이 큰 변수가 될 것"이라고 말했다. 그는 "이번 행사의 주제는 커넥티비티 (connectivity), 비주얼라이제이션(visualization), 애널리틱스(analytics) 등 이 모든 것을 아우르는 디지털 전환이며, 이는 바로 우리의 전략과 일치한다"고 덧붙였다.

•기업의 가치 높이는 중장기 전략

현재와 같은 기업 간의 치열한 경쟁상황에서 디지털 전환에 따른 '4차 산업혁명'에 대응하기 위해서는 무엇보다도 혁신적인 기술들이 필요하다. Hexagon PP&M은 한국 내 고객사들과 오랫동안 긴밀한 협력관계를 유지해오고 있으며, 다양한 엔지니어링 툴들을 공급하고 있다.

마티아스 사장은 "한국 엔지니어들이 우리의 툴들을 효율적으로 사용해 최근 화두가 되고 있는 생산성 향상 및 비용 절감을 이끌어냄으로써 기업의 가치를 높이는데 있어 조력자가 되는 것이 목표다"라고 말했다.

Hexagon PP&M의 중장기적인 전략은 오일&가스 분야와 함께 건설 분야에서 시공부터 관리 및 유지 보수까지 다양한 엔지니어링 툴들을 제공함으로써 사업영역을 확대하는 것이다. 특히 Hexagon의 사업영역은 지형공간(Geospatial), 지오시스템(Geosystems), 제조 인텔리전스(Manufacturing Intelligence), 위치 정보수집(Positioning intelligence), PP&M(Process, Power & Marine) 등 크게 8부문으로 나뉘는데, 이들 영역을 연결한 시너지 효과를 극대화하는 것이다.

Hexagon PP&M 마티아스 스텐버그(Mattias Stenberg) 사장

최근 글로벌 경기둔화로 많은 기업들이 어려움을 호소하고 있다. Hexagon PP&M은 고객 성공 사례 프로그램을 통해 이러한 기업들의 어려움을 극복할 수 있도록 돕고 있다. 이 프로그램은 엔지니어들이 Hexagon

의 자동화 툴 뿐만 아니라 첨단 기술들을 이해하고, 산업 현장에서 적용할 수 있도록 교육시키는 것이 목적이다.

마티아스 사장은 "우리의 솔루션들을 직접 이용하고, 경험해 본 전세계 엔지니어들을 통해 그 우수성은 입증되었다고 본다. 아쉽게도 다양한 분야에서 많은 엔지니어들이 우리의 툴들을 사용하고 있지만, 실제 프로젝트에 적용하는 데에는 여전히 시간과 노력이 필요하다. 이를 위해 우리는 고객 성공 사례 프로그램을 통해 고객사들과 긴밀하게 소통하고 있다"고 말했다.

•자동화 역량 확대

Hexagon PP&M이 전망하는 산업 자동화 시장의 미래는 밝다. 조선해양, 건설 등 주력 분야를 비롯해 관련 산업 및 타 분야에까지 디지털 및 자동화 기술들이 접목되고 있기 때문인데, 더욱이 생산성과 비용 절감에 기업들의 사활이 걸려있는 상황에서 관련 솔루션들에 대한 관심은 앞으로 더욱 높아질 것으로 전망된다.

Hexagon PP&M 프란츠 커프너(Franz Kufner) 아시아-태평양 지역 부사장

프란츠 부사장은 "아태지역에서 우리는 시장 개척에 초점을 맞춰 그 동안 쌓아온 경험과 기술들을 고객사들에게 전달해왔다. 물론 최근 이슈가 되고 있는 인공지능이나 시각화, 증강현실 등 새로운 기술들을 접목한 엔지니어링 솔루션들 역시 마찬가지이다"라며, "Hexagon은 첨단 기술들을 통해 지속적으로 발전해나가고 있으며, 이러한 기술들을 엔지니어들이 현장에서 접목시킬 수 있도록 지원하는 것이 우리의 역할"이라고 말했다.

일례로 삼성중공업은 Hexagon PP&M 툴을 이용해 초기 구조 모델에서 생성된 3D 모델을 상세 설계 및 생산 설계에 직접 활용함으로써 기존 설계 기간을 25% 단축시킬 수 있었다. 또한 Hexagon PP&M의 클라우드 솔루션을 통해 일본의 한 기업은 컨스트럭션(Construction) 엔지니어링 부문에서 원격으로 엔지니어들 간의 협업이 가능해져 막대한 규모의 비용을 절감할 수 있었다.

•Hexagon의 새로운 도전!

글로벌 조선해양 시장의 변동성이 커지고 있는 가운데, 중국이 고부가가치 선박을 수주하면서 한국과의 경쟁이 심화되고 있다. Hexagon PP&M이 제공하는 설계 자동화 솔루션을 통해 차별화된 기술을 갖출 수 있는데, 이는 곧 디지털 정보를 기반한 빅데이터를 활용해야만 차별화된 경쟁력 확보가 가능하기 때문이다. 이 통합 솔루션은 데이터(자산) 통합 및 관리 등 엔지니어링의 작업 효율성을 높이고, 품질을 향상시키고, 궁극적으로는 전체 프로젝트의 비용 절감 효과를 가져올 수 있다.

Hexagon PP&M 코리아 백창현 대표이사

백창현 대표이사는 "이번 테크니컬 유저 포럼을 통해 국내 엔지니어들간에 서로 소통할 수 있는 장을 마련한 것에 대해 뜻 깊게 생각한다. Hexagon PP&M 코리아는 앞으로도 고객 성공 사례 프로그램을 통해 한국 내 고객사들과 혁신적인 기술들을 공유함으로써 협력관계를 더욱 강화할 계획"이라고 말했다.

한편 Hexagon PP&M 코리아는 한국에서 엔지니어링 3D 모델을 기반으로 조선해양, 건설을 포함해 전자, 반도체, 디스플레이, 바이오 부문까지 사업영역을 확장해나간다는 전략이다.

Driving safety and survival forward

- Complete through life solutions for all customer needs

Global leading company, safety products and services provider, Survitec is at the forefront of fixed fire suppression and safety systems, including renowned brands such as Unitor, Maritime Protection, Novenco Fire Fighting and XFlow.

Survitec Group

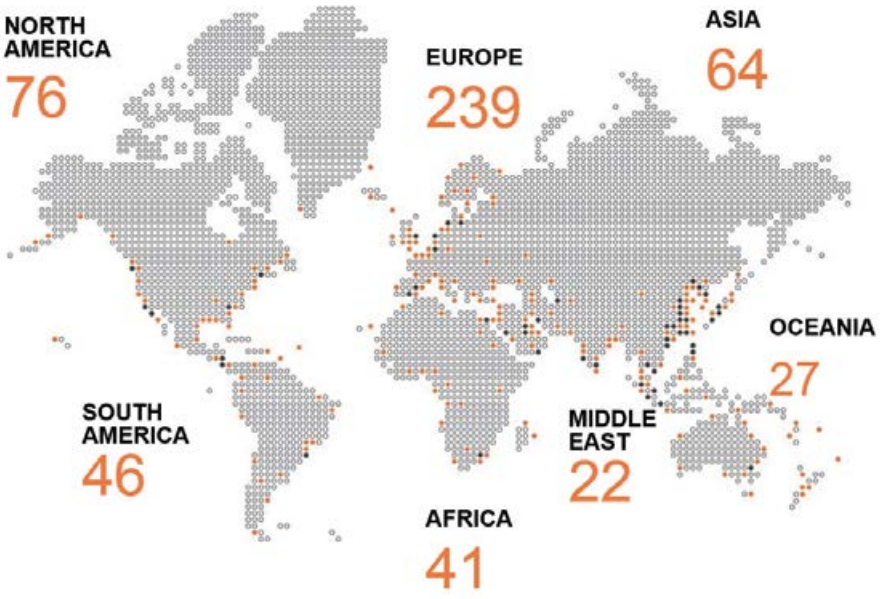
Survitec can trace its own proud history of innovation around safety and survival technology back almost a century to 1920, when the company it was born out of was founded. However, as it has grown in recent years and acquired other leading manufacturers and brands, its inherited legacy stretches back even further to the middle of the 19th century. Not many companies in the sector can offer this depth of expertise nor – given the range of organisations that have joined its ranks – the sheer breadth of products and services it offers as a complete safety solution provider.

This long legacy has seen Survitec achieve a number of 'firsts', as has its desire to be at the forefront of innovative new technology, bringing pioneering products to market before its competitors. It introduced the first inflatable life raft in 1932 that was – along with the original flotation life preserver – subsequently used in World War II; in 1976 it produced the first welded life raft (as well as an infant version of the latest adult lifejacket) and in 1979 it manufactured the world's first Marine Evacuation Systems (MES). Far from resting on its laurels, the company constantly strives to bring innovative ideas to all sectors, powered by significant investments in research and development. More recent innovations have included the only submarine escape suit to achieve safe depths of 310metres and a pioneering lifejacket with fully integrated EBS (Emergency Breathing System) for offshore workers in helicopter transit

160 year of innovation and market firsts

Onwards and upwards

The continued growth of market share through mergers and acquisitions cements Survitec's reputation as a provider of the most comprehensive range of solutions in the industry. This means that customers do not need to use multiple suppliers and can source everything they require from one enviable range. Having one central point of contact streamlines the sales function and also provides the reassurance of a service network broader



than anything available elsewhere. While the resultant cost efficiencies are beneficial to customers, it is often the time savings that are just as vital, especially when it comes to the supply of important safety equipment.

One of the most recent and high-profile mergers completed at the tail end of 2016 means that in addition to its existing stable of safety products and services, Survitec are now also at the forefront of fixed fire suppression and safety systems, including renowned brands such as Unitor, Maritime Protection, Novenco Fire Fighting and XFlow. These fixed firefighting and prevention systems complement an existing product range, including MES, life rafts, lifejackets, breathing apparatus and loose fire and rescue equipment.

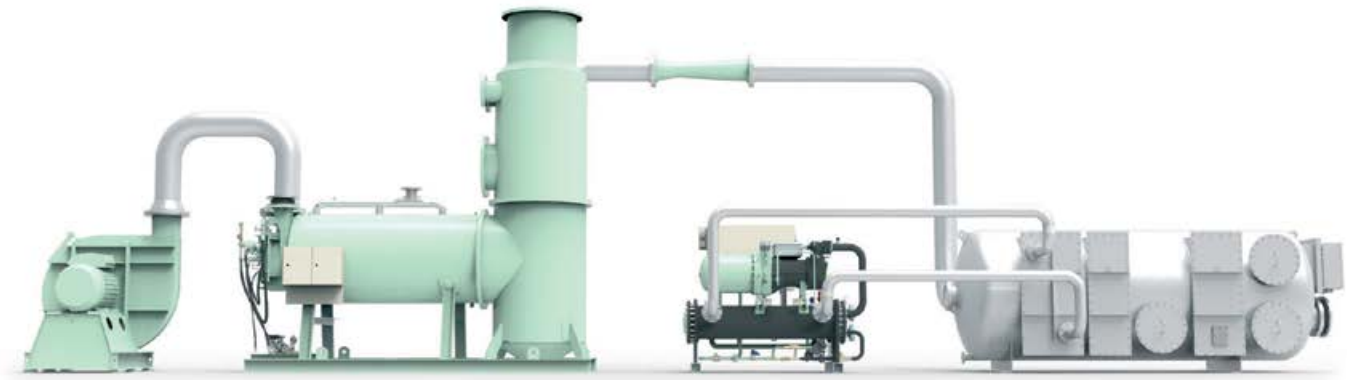
Focus on Korea

Survitec is proud to be exhibiting at KORMARINE 2017, the 20th edition of the region's premier maritime event and hosted in a country which is a key new build market. In addition to eight manufacturing locations and 15 offshore support centres globally, there are more than 70 Survitec-owned service centres worldwide, assisted by in excess of 500 third-party facilities covering 2,000 ports. With 64 of these premises in Asia, it shows Survitec's commitment to the region not only in terms of the provision of new equipment, but also in ensuring it is maintained and serviced to the highest possible standard.

A number of recent customer wins highlight a growing presence throughout Asia and Korea in particular. One contract involves the supply of several safety systems – including Inergen and deck/helideck foam fire-fighting systems – to Navy ships in Korean shipyards. Other purchases include orders from the 'big three' in Korea. These orders cover a range of products including Inert gas generators for liquefied natural gas carriers and floating storage & regasification units, solutions produced by Survitec's Maritime Protection brand.

Experts in our field

With new-build projects, Survitec is able to assist with systems delivery in addition to initial product supply and with vessels already in operation, it can offer not only product supply, but maintenance services, leasing solutions and regulatory advice. The latter is an area of particular expertise and the company always ensures all products not only meet existing standards, but are tested as rigorously as possible to try and future-proof them against stricter compliance that may come into effect further down the track. While priding itself on being selected by many shipyards for



Dry Inert Gas Generator

new build opportunities, all of its products can be retrofitted on to operating vessels too.

Maritime Protection is one of the brands that recently came under the Survitec umbrella and is an engineering and manufacturing business that specialises in inert gas systems for the marine and offshore sectors. Using inert gas prevents explosions and fires onboard ships carrying crude oil, hydrocarbon gases or refined oil products. Its newest product is a system for the generation of dry inert gas for the application of liquefied natural gas carriers and is an innovative concept incorporating Norwegian design and equipment manufacturing capabilities. Maritime Protection also offers a nitrogen system which aids in the transportation of flammable and sensitive cargo, keeps ships compliant with regulations and is the purest solution available to reduce the risk of cargo contamination. It is based on membrane technology and designed in accordance with SOLAS and other maritime standards.

In this respect, Maritime Protection is typical of the type of company that Survitec has acquired, in that it has a long-established and proud reputation for excellence within its own field, while also incorporating outside influences where necessary to ensure that what results is a truly globally pioneering end product.

Survitec takes great pride in the innovative nature of its product and solution design, and the Novenco Fire Fighting XFlow water mist system is one such example. It offers users the opportunity to integrate local application fire-fighting systems, total flooding systems and the protection of accommodation areas in a single system, ensuring all those onboard the ship are afforded the ultimate protection. The system spreads a fine water mist that extinguishes fires fast without any risk to people or environment, and also minimises the risk of important apparatus being damaged. Aside from the special XFlow nozzles, the system uses standard components, which keeps installation and maintenance costs affordable.

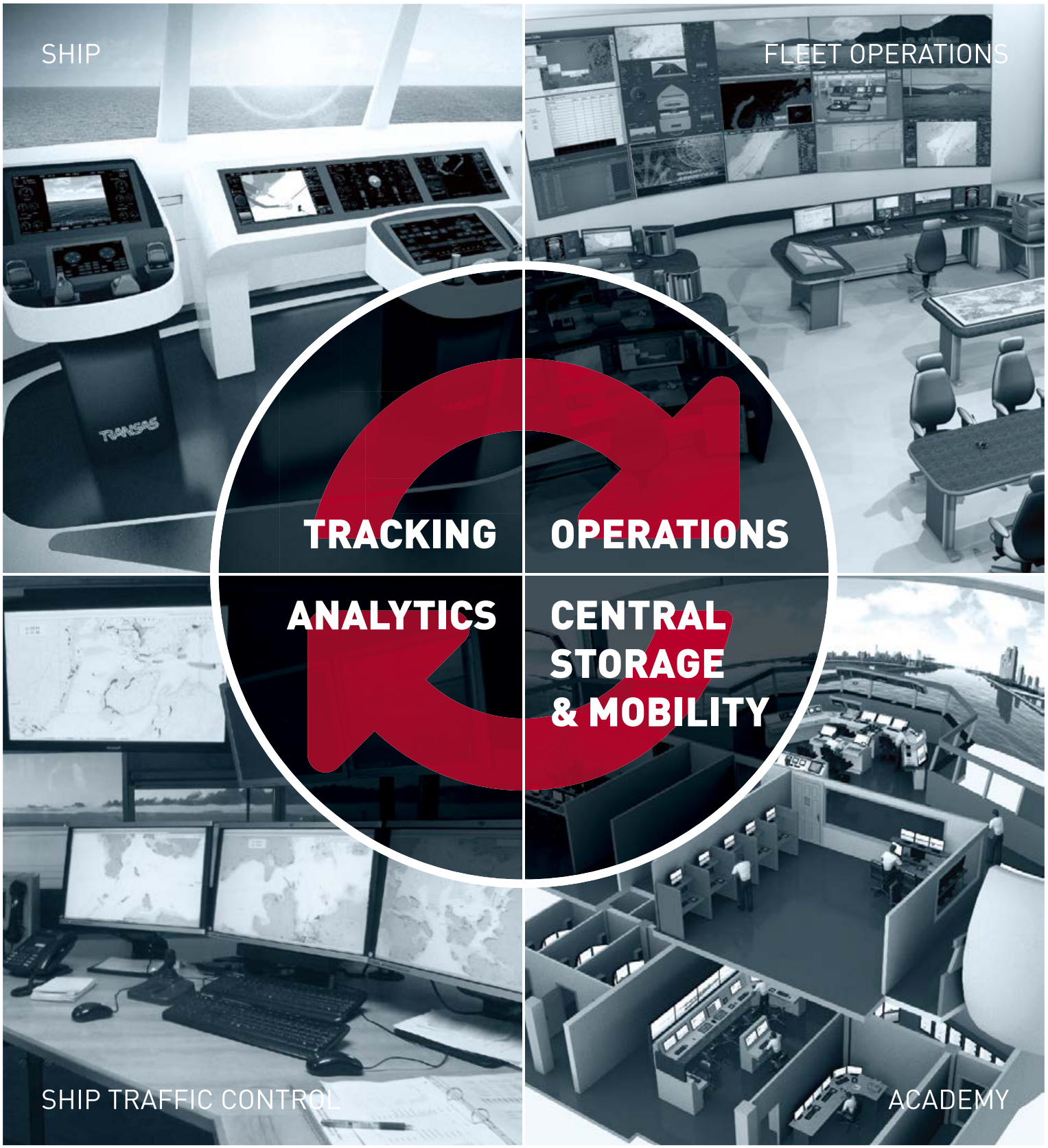
Safety first

Looking ahead, Survitec is working hard to maintain its reputation as the best in class. At the heart of every decision it makes is the end user and how it can ensure complete safety for customers at every moment, no matter how inhospitable the environment they operate is. As well as protecting those using their equipment from danger, Survitec also wants to make life as easy as it can for customers so that their relationship is better, easier and the whole process is made quicker.

This last objective is made that much easier by the sheer breadth of products and services available within the wider Survitec business – customers can come to one company for everything they require. As the world's largest maritime safety business Survitec aims to keep driving the industry forward and it looks forward to catching up with old friends – and making new ones – at KORMARINE 2017.

TRANSAS

Transas Harmonized Eco System of Integrated Solutions



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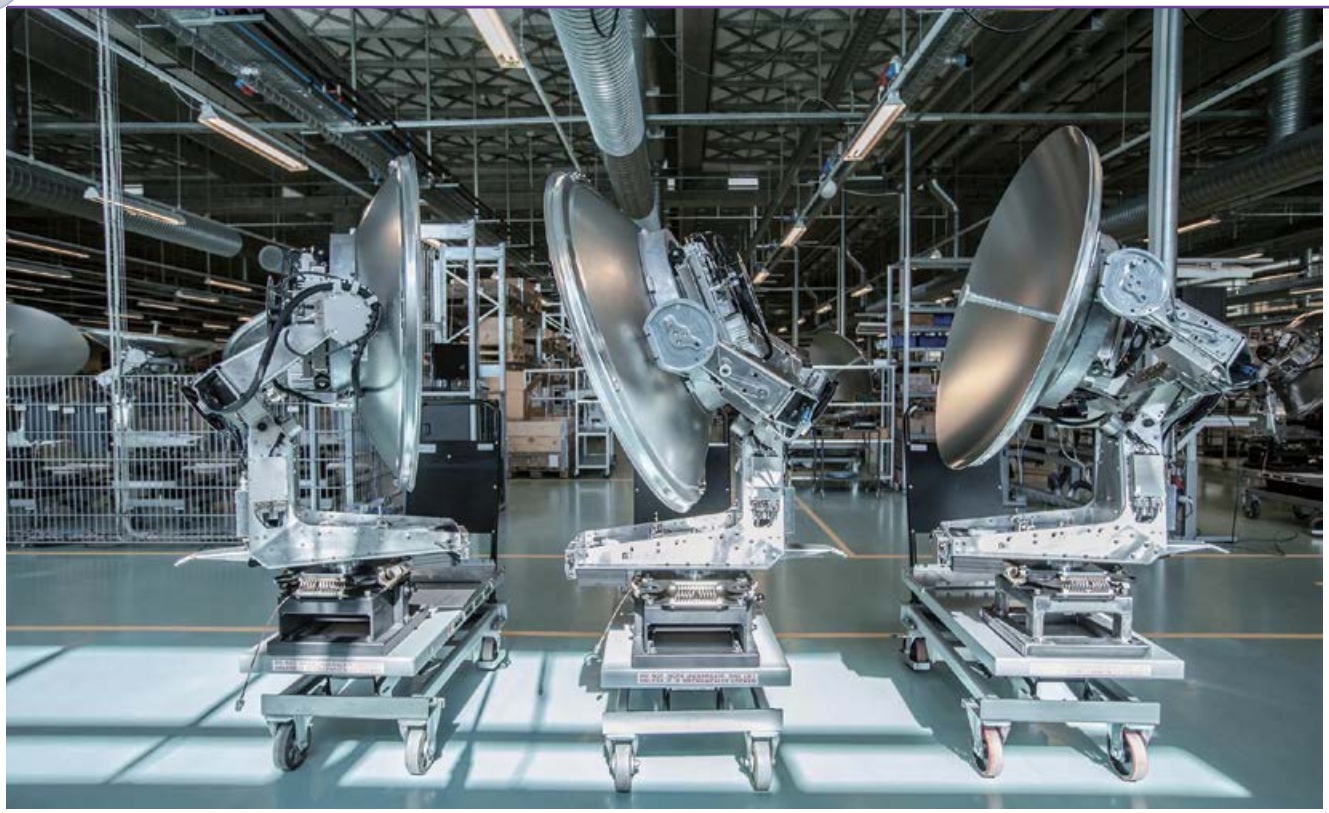

A philosophy for good communication

A scientific approach to product development complemented by rigorous live testing ensures that SAILOR communication systems will provide the Internet speeds and availability of service that today's shipping needs – and deserves.

Cobham SATCOM

Imagine taking a brisk evening walk along a beach trying to look at a specific star through a 5mm diameter 60cm long tube. Now imagine doing the same but from the deck of a cargo ship in the midst of raging storm in heavy swell. This is essentially what a maritime VSAT antenna has to do on a 24/7 basis in order to ensure connectivity between ship and shore. Whereas a conventional L-band antenna can be pointed within two degrees of its target satellite, Ku- or Ka-band systems must maintain an accuracy of 0.2 degrees regardless of weather conditions.

SAILOR communication systems have earned a reputation within the maritime industry for quality and reliability. When hardware is deployed in some of the toughest environments on the globe, such prestige is not secured by chance. Cobham SATCOM spends almost $ 40m annually on R&D, while approximately one-third of its workforce are involved in research activities. However, reputations are not earned simply by throwing resources at the problem and hoping that something sticks; what distinguishes Cobham SATCOM is its scientific approach to product development, backed up by rigorous and unique testing in the field.

For instance, in the development of the SAILOR 900 VSAT, the company started by gathering data on the conditions an antenna needs to tolerate from vessels sailing in different sea areas. Yellow watertight protective cases packed with an assortment of sensors were fitted on several vessels operating in the rough North Sea.

Several months later, Cobham researchers returned to collect their instrumentation, together with the valuable empirical data on vessel motion, which would later be analysed in the lab. The findings provided a rich addition to a dataset held by the company for the team tasked with creating a

high performance; robust antenna system capable of withstanding whatever the natural elements could throw at it. “People have a tendency to underestimate the stress placed on electronic and mechanical systems at sea, which are expected to run at 100% peak performance day in day out,” noted Jens Ewerling, Director, Maritime Broadband, Cobham SATCOM.

The ship motion data collected at sea was eventually fed into Cobham’s unique Advanced Dynamics Simulator (ADS) testing and development facility in Lyngby, Denmark. Similar to a flight simulator for pilots, the ADS is a computer-controlled platform that can be moved in any axes thanks to six electro-hydraulic pistons. “What the ADS gives us is the ability to run tests for extended periods, which for practical reasons just wouldn’t be possible on a ship. It is not unusual to subject a new antenna design to several thousand hours of physical testing,” says Ewerling.

In addition to the motion tests, antennas are assessed for their resilience to vibration, extreme temperatures, salt corrosion, and dampness. “SAILOR antennas are designed to function in ambient temperatures from -25 to +55°C. However, inside the dome it can be 20°C higher, so we stress-test the mechanical and electronic systems up to +75°C,” reveals Ewerling.

“Satellite links have shifted in status from nice-to-have luxury items to vital components, indispensable for cost efficient and safe operation. This increases the responsibility on us to deliver solutions that can be depended upon. Artificially inducing the various extreme environmental impacts an antenna will encounter during its operational life ensures that our products can withstand the test of time without any degradation in performance or reliability.”

However, simulated testing will only take you so far. To make absolutely certain antennas perform as they should pre-production prototypes are once again taken out for sea-trials. For the SAILOR 900 VSAT, this involved installation on two ships in the North Sea and another sailing between Asia and Europe. “We chose different routes in order to build a full picture of operating conditions,” added Ewerling. “It means we can be confident a ship will retain a communication link to shore whether it’s sailing through the Malacca Strait or around Cape Horn.”

The testing does not end after antennas enter production. SAILOR antennas are spot-checked throughout the manufacturing process, including out-of-box and on-air tests on a live satellite. “This type of testing makes sure that the quality is maintained through the lifetime of the products,” explains Ewerling.

Jens Ewerling, Director, Maritime Broadband, Cobham SATCOM

He adds that many antennas produced by Cobham SATCOM have a recorded Mean Time Between Failure (MTBF) of >300,000 hours - equivalent to more than three decades continuous operation, which exceeds the lifetime of most contemporary commercial ships.

Cobham SATCOM’s testing regime also delivers more immediate benefits for customers, Ewerling suggests. A satellite uses less power to transmit data to an accurately pointed antenna. Power is a determining factor in a satellite operator’s calculations of wholesale costs to the airtime provider, who in turn charges the end-user. In effect, a high quality antenna contributes to keeping down the costs of remote connectivity for everyone.

The differential is not just theoretical. In an upgrade project for a European ferry operator, a 1m SAILOR VSAT antenna significantly outperformed the 1.15m diameter antenna it was replacing from another manufacturer.

The same rigorously scientific approach was taken during the development of the SAILOR 600 VSAT Ku launched earlier this year. Here the challenge facing Cobham SATCOM engineers was to balance performance when operating on High Throughput Satellite Services, such as Intelsat’s EpicNG, and the smaller 60cm antenna form factor. Weighing only 35kg, the resulting antenna can be carried on board, making it especially relevant for installations where no cranes or forklifts are available. “The attention given during the development process has culminated in a compact solution that makes global high-throughput VSAT viable for more vessels,” says Ewerling.

The fact that SAILOR communication systems do not just fulfil end-user requirements but exceed them and set new industry benchmarks for performance and reliability is a testament to Cobham SATCOM’s analytical product development philosophy. It is something to think about the next time you take an evening stroll and look up at the night-sky.

Improving remote marine service

- A concept for the next generation ABB customer and service portal

ABB

By Maria Ralph, Veronika Domova, Petra Björndal, Elina Vartiainen, Goranka Zoric
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The level of remote automation, remote monitoring, and remote control have continuously increased over the decades in key industries. Military, power utilities, nuclear, rail, port authorities, highway authorities, emergency services, mining, oil and gas, aviation, and space industries are heavy users of remote technologies and operational centers to manage their operations, fleets of assets and emergency services. This industry trend confirms what has been recently coined the 4th Industrial Revolution by World Economic Forum founder Klaus Schwab [1] and is closely related to Zuboff's three laws [2] which are 1) everything that can be automated will be automated, 2) everything that can be informated is informated (the process of digitizing information) and 3) every digital application that can be used for monitoring and control will be used for monitoring and control. ABB is building on this operational concept to develop smarter solutions that more effectively support its remotely connected marine customers.

Remote connectivity from shore to ship.

Traditionally, diagnosing and troubleshooting problems for marine customers have been activities ABB engineers have done in person at customer sites. However, with the introduction of advanced sensors, cloud services and satellite communication technology, the service and support tools of remote diagnostics and troubleshooting – which have been sporadic for the past decade – are now becoming a common work practice.

ABB engineers are now in a position to offer marine customers more timely issue resolution due in large part to the ability

> “ABB is building on this operational concept to develop smarter solutions that more effectively support its remotely connected marine customers.”

to remotely connect to customer equipment onboard and collect data from sensors installed onsite. As a result, ABB engineers are able to support not just one customer but many customers at the same time since they may not need to travel to the site. The customer's technical staff are involved in the resolution process as well. In fact, when a problem occurs, a virtual team of all required experts is quickly formed to share relevant information and rectify the situation. This allows marine customers to get back online more quickly than in the past.

> “ABB engineers are able to support many customers at the same time since they may not need to travel to the site.”

With this approach to remotely support customers, both changes in work practices and an improvement of the tools supporting engineers are required. Just some of the changes needed for effective support are: providing engineers with quick and easy access to colleagues worldwide, enhancing how customer data is visualized to ensure engineers have a complete picture of the problem and ensuring relevant material is at each engineer's fingertips.

To this end, ABB Marine has developed a cloudbased fleet portal. This portal provides engineers working remotely with a more effective way to analyze the important information necessary to diagnose and troubleshoot customer issues. It provides the most critical information required to obtain an overview of an individual situation as well as a fleet of assets, helping them establish context and, in turn, the possibility of more timely resolutions of customers' cases.

Customer and supplier needs

Within any type of service support role, time is a critical factor. Being able to diagnose and efficiently resolve issues with

> The customer's technical staff are involved in the resolution process as well.

customers' equipment is the primary focus for ABB support engineers. As such, the tools used to support them need to be as effective as possible.

Designing effective support solutions requires an in-depth understanding of how support engineers work. Interviewing and observational approaches are used to gain valuable insights into real work practices and to assess goals, needs and concerns. In turn, this information provides the key design considerations for the creation of the new HMI (humanmachine interaction) solution. The prototype developed took into account the following key outcomes of the interviews and observations:

– Establishing the context for troubleshooting:
  1) In order to understand all possible solutions, remote support engineers need to gather as much relevant information as possible about the problem.

Figure 1. The Dashboard tool

Figure 2. The Map tool

  2) There is no easy way for technical crew members to easily and quickly transfer context information such as video or images to the remote support engineer handling the case.
  3) There is also no easy way for the remote support engineer to give suggestions to the technical crew located onboard.

– Information is distributed. Not all information for diagnosing and troubleshooting a problem is in one easily accessible location. Engineers therefore spend a lot of time searching for relevant material.

– Locating and coordinating with a local field engineer, who is both adequately qualified and who is in close physical proximity to the customer`s vessel, to go onsite for a hardware fix can be challenging.

> The tool provides reset information including locations for local support centers, port locations and airports.

Design concepts

Based on these identified needs, a new prototype of a fleet and service coordination portal was developed, comprised of four main components: Dashboard, Map, Fleet details and Analytics. The prototype was developed using contemporary web technologies such as HTML5, JavaScript, Angular JS, D3.js, bootstrap, CSS, Google Maps open API.

The Dashboard tool enables engineers to customize their view according to what information is important for them based on their role. The information on the dashboard can be rearranged to suit the user with information being added or deleted as they require for their work. Engineers can also filter information displayed in this view according to a certain customer or vessel.

The Map tool provides users with an interactive map that enables users to pan and zoom as well as filter information. Vessel locations are shown and individual vessels are color-coded to indicate those vessels with issues (ie, has active alarms) in red.

This enables the engineers to stay informed about the current state of all vessels they are responsible for monitoring at any one time. Zooming into the vessel enables the engineer to see a more detailed map view with the ship's planned route outlined. Additional information is also provided when zoomed into a specific vessel including locations for local support cen-

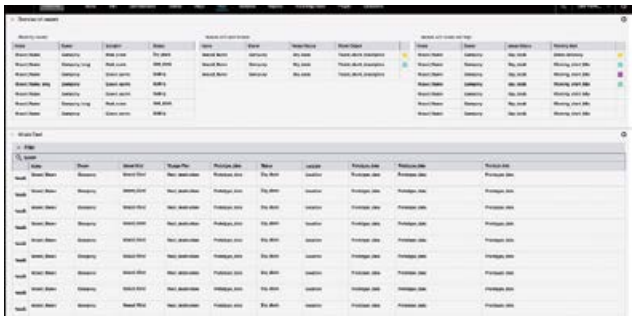


Figure 3. Fleet details

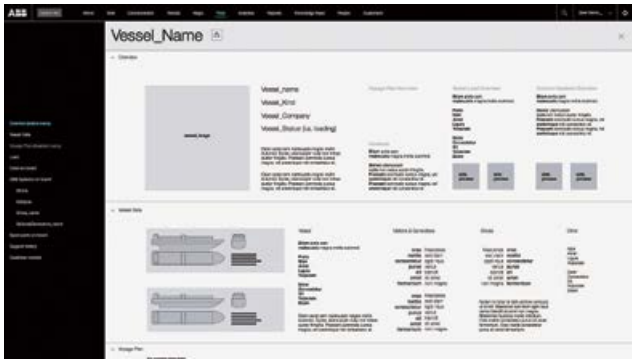


Figure 4. Fleet details drilled down

ters (ie, where local field engineers may be available), port locations, airports, as well as a night/daytime visualization to indicate under what time of the day the vessel is operating.

> “Being able to diagnose and efficiently resolve issues with customers’ equipment is the primary focus for ABB support engineers.”

The Fleet tool provides engineers with more detailed information about the vessels under their watch. Vessels can be grouped (filtered or sorted) into certain categories that can be filtered further, such as vessels with active alarms. Selecting a vessel from this list takes the engineer to a more detailed information page about that vessel with a breakdown of data such as systems onboard, equipment maintenance history, planned route and spare parts onboard.
Finally, the Analytics tool provides engineers with a customizable workspace whereby they can arrange the layout of information in a way that works best for them. Engineers can add or remove information, and can annotate data onscreen.

Figure 5. The Analytics tool

This workspace can also be used to collaborate with other remote service engineers to get further assistance on cases. The analytics concept provides engineers with a way to dig deeper into data, using pattern matching and data tagging to find commonalities and relationships between key signals. This capability allows them to make better data comparisons and therefore more informed decisions.

Production management benefits

The prototype developed provides remote service support engineers with an overall awareness of the state of the vessels they are monitoring and supporting. Providing these engineers with the right information in an intuitive and easy to understand format enables them to more effectively and quickly understand the current vessel’s state and any issues associated with that vessel. Providing a way to effectively identify issues with customers’ vessels, as well as competent support for understanding the problem at hand, enables engineers to use their advanced skill set to resolve customer issues in a timely manner.

Wave problems goodbye

ABB’s solution provides remote service support engineers with information in a more intuitive and easy to understand format, supporting them in their decision-making. The solution further demonstrates ABB’s commitment to producing high quality solutions targeting key domains and to improving processes for industry-leading service.

References

[1] K. Schwab. (January 14, 2016). The Fourth Industrial Revolution: what it means, how to respond [Online]. Available: https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-meansand-how-to-respond/
[2] In the Age of the Smart Machine: The Future of Work and Power (1988), Shoshana Zuboff

대형 선박을 위한 빅데이터

– Maritime 4.0: 기회와 과제

Maritime 4.0을 통해서 상선 해운 대형 선박에 빅데이터를 적용할 수 있다. Industry 4.0 이 공정 자동화를 위한 특정 양식을 지속적으로 채택해나가고 있지만, 선박 운용을 최적화하는 최초의 사이버 물리 시스템과 클라우드 기반의 네트워크 구조는 현장에서 활용하기에는 아직 갈 길이 많이 남아 있다. Maritime 4.0이 상선 해운 효율성 분야에서 막대한 이득을 안겨다줄 것이라고 확신하는 기업들은 주로 독일 해양 장비 제조업체들이다. 이것은 독일 산업분야에 대한 장미빛 전망에 불과한 것일까? VDMA(독일기계산업협회) 통계에 따르면, 해당 분야의 글로벌 제조업체를 선도하는 것은 독일 기업들인 것도 사실이다. 빅데이터가 해양 업계에 실질적으로 기여할 수 있는 것은 무엇이며 이러한 방대한 데이터와 관련있는 새로운 과제들에는 어떤 것들이 있을까?

WAGO

By Thorsten Sienk, Norman Südekum, Eva Banholzer

깊은 바다와 법정에서의 일은 신에게 달려 있다는 말이 있다. 이 말은 지금도 여전히 유효하다. 법정에서는 법적인 분쟁이 어떻게 해결될 것인지 확실하게 알 수 없으며, 이와 유사한 불확실성은 바다에서도 존재한다. 선박이 정해진 항로를 따라 운항을 하더라도 예상치 못한 기상 조건, 기술의 안정성 여부에 따른 영향을 받으며, 심지어 해적의 위험에 노출되기도 한다. 항행 자동화 선박이 불필요하게 중복되는 행정력과 안정성 측면에 대한 논의가 있는 한편, 해적은 선박 그 자체보다는 인질을 잡고 몸값을 받아내는데 더 관심이 있으므로 해적의 위험을 낮출 수 있을 것이라는 주장도 존재한다. 또한 육상운송에서는 물류에 이미 활용되고 있는 자동주행시스템이 전세계 바다에서의 항해 모습도 바꿀 수 있을까?

빅데이터의 엄청난 잠재력을 확신하는 업계 전문가들

공해상에서 화물선을 원격 조정하는 것은 현재로서는 꿈에 불과하지만, 자동화 기술이 점차 선박 설계 단계에 통합되고 몇 년 전에는 상상도 못했던 것이 가능하게 되는 등 점차 현실이 되어가고 있다. 실례로 하위 시스템의 네트워킹과 연결될 수 있는데, 이는 보다 미세한 조정과 월등한 효율성을 위한 시스템 연계, 지상에서 원격으

로 접근하여 선박의 데이터를 판독하거나, 선박의 운항에 관여하여 특정한 기능을 제어하는 것을 가능하게 한다.

VDMA "해양 장비 및 시스템" 부서의 디렉터인 하우커 쉴리겔(Hauke Schlegel)과 같은 업계 전문가들은 선박 내에 근무자들이 있든 없든 빅데이터의 "가공할 잠재력"에 대해 확신하고 있다. 독일 기업들이 전세계 시장을 이끄는 해양 분야는 빅데이터로 많은 혜택을 기대할 수 있고, 쉴리겔은 이를 매우 긍정적으로 평가한다. 가까운 미래에 중국, 일본, 그리고 한국에서 공급 과잉 문제로 인해 조선 분야의 어려움이 예상되는 반면, 독일 기계공학 엔지니어들과 시스템 디자이너들은 보다 양호한 미래가 기다리고 있을 것으로 전망된다. 모든 것이 좋을 것이라고는 할 수 없겠지만, 최소한 안정적인 미래를 기대해 볼 수 있다. 이제 디지털 혁명이 더 많은 기회를 가져다줄까? 조선업과 물류업은 새로운 기술로 어떠한 혜택을 기대할 수 있을까? 물류업의 효율성, 환경 보호적인 측면 및 안전에 대해 더 자세히 살펴보자.

무인 항해로 비용 절감

일반적으로 화물 운송 업계는 비용에 대한 압력을 점점더 많이 받고 있다. 그 이유는 간단하다. 2004년부터 2009년 사이의 호황기에 투기 수요가 몰려든 결과, 처리할 수 있는 해운 물량이 넘쳐나게 된 것이다. 그 결과 공급과잉 및 제 살 깎아먹기식 경쟁이 계속되고 있다. 이에 따라 운송 서비스 업계는 비용을 낮추어 경제적인 동력을 유지하고자 한다. 비용 감축이 논의되는 자리에는 노동 비용도 항상 함께 고려되기 마련이며, 이는 해운 회사도 예외는 아니다. '질'과 '양' 사이에서 선택해야 하는 어려운 문제로, 회사는 승선하는 인원을 감축하거나 전기기술분야 경력이 짧아서 상대적으로 낮은 보수를 지급해도 괜찮은 인력을 찾게 된다. 자동화는 이 두 가지 경우에 모두 도움이 될 수 있다. 자동화 시스템은 기존에 사람이 담당하던 많은 장기 작업을 처리할 수 있다. 또한 원격 작동이 가능하므로, 육지의 전문가들이 선박의 데이터를 읽은 후 선상의 유지보수 담당자에게 지시를 내릴 수 있다.

만약 승선 인원이 '0'으로 감축될 수 있다면 상당한 수익이 보장될 것이며, 선박 자동 항행 시스템이 실현될 경우 폐수 처리 시스템, 기후 관리 및 플랜트 탈염화 작업과 같은 소형하위 시스템 또한 필요가 없어질 것이다. 인력 관리에 필요한 비품을 제공하지 않아도 되면 해운 기업은 연료비의 약 10%를 절감할 수 있다.

Figure 1. 오늘날 브릿지에서가 아니라 대형 모니터로 상선과 여객선을 모니터한다.

필요 항목에 따른 비용 배분

선박 내에서는 승선인력 여부와 관계없이 보다 효율적으로 운용해야 할 작업들이 많이 있다. 측정, 평가, 대책 수립 등 Maritime 4.0은 이들 특정한 분야에 엄청난 가능성을 내포하고 있다. 건물 관리를 예를 들어보면 데이터 기록과 네트워킹을 활용해 전력 소모량과 비용을 산정하고 최적화할 수 있다.

컨테이너 화물선의 경우는 건물 관리의 경우와는 달리 여러 종류의 컨테이너에서 다양한 운송비를 초래할 수 있다. 이는 컨테이너의 표준 규격에도 불구하고 선적되는 화물이 제각각이기 때문이며 '리퍼(reefers)'의 경우 특히 더 그러하다. 리퍼는 냉동 컨테이너를 가리키는 용어로 냉동 컨테이너는 선박쪽 화물 냉각 시스템 또는 자체 냉각 시스템을 사용해 반드시 냉각해야 한다. 그리고 이는 온보드 네트워크에서 전력을 끌어서 사용하게 된다. 선박의 화물 냉각 시스템이든, 컨테이너의 자체 냉각 시스템이든 냉각은 선박의 연료 소비에 직접적으로 영향을 미친다. 제너레이터에서 전력을 공급하고 결과적으로 메인 엔진에 더 많은 전력이 필요하기 때문이다. 다른 컨테이너에 비해 냉동 컨테이너가 높은 해상 물류 비용에 책임이 있다는 점은 분명하다.

그러나 현장에서 인프라 비용은 선박에 실린 모든 컨테이너에 대해 동일하게 부과된다. 통합 네트워크 기술이 냉동 컨테이너가 요구하는 에너지 전력이 얼마나 높은지 산정할 수 있다면, 운송 비용은 항

Figure 2. 오슬로에서 노르웨이의 좁은 피요르드가 모여 있는 프레데릭스한에 이르기까지 육지와 선박간 간단하게 통신할 수 있다.

목에 따라 개별적으로 산출할 수 있다. 적도 근처에서 운항시 추운 지역보다 냉각 전력이 더 소요되므로 항로에 따라 다른 화물 요금을 부과할 수도 있다. 기술적으로 이러한 작업은 현재 이용 가능한 기술에 의해 문제없이 해결할 수 있다. 예를 들어 WAGO의 PFC200 컨트롤러는 클라우드 밖에서 컨트롤러 프로세서 성능에 상응하여 데이터를 모니터링할 수 있는 스토리지를 보유하고 있다. 이 모니터링은 냉각 체인이 중단되지 않고 냉동 컨테이너가 안전하게 작동하는 것을 기록하기 위해 이미 요구되고 있는 기능이다.

불필요한 운항을 줄이는 정확한 항로 계획

보다 정밀한 데이터 네트워킹에서 얻을 수 있는 다른 장점은 연료 소비와 관련이 있다. 즉 저압 지역 주변으로 항로를 계획할 경우 연료를 절감할 수 있는 것이다. 결과적으로 날씨 정보도 보다 정확하게 분석할 수 있어 안전성이 강화된다. 항구 정보의 추가 프로세싱도 이와 유사하다. 플레젠버그 기술 대학의 학장이자 박사인 홀거 워터(Holger Watter) 교수는 최근 다음과 같은 질문을 던졌다. "하적장에서 대기해야 한다면 항구까지 전속력으로 운항해 온 것이 무슨 소용인가?" 연료 소비를 고려할 때에는 화물 처리 준비가 되어 있는 항구에 화물선이나 컨테이너선이 제때 도착할 수 있도록 운항 속도를 조절하는 것이 보다 효율적이다.

전문가들은 연료 소비와 유휴 시간을 최적화하는데서 오는 금전적 이득이 막대하다고 판단하며, 이에 근거해 EU는 "통항량 관리(Sea Traffic Management)" 프로젝트를 출범했다. 이 이니셔티브는 통신, 네트워킹 및 빅 데이터를 활용해 선박 운영을 정확히 동기화하는 것을 목적으로 한다. 프로젝트의 기본 전제는 서로 조정 가능한 선박 데이터를 클라우드에 제공해 다른 선박도 접근할 수 있도록 한다는 점이다. 덕분에 선박들이 각자 안전하게 운항할수 있는 항

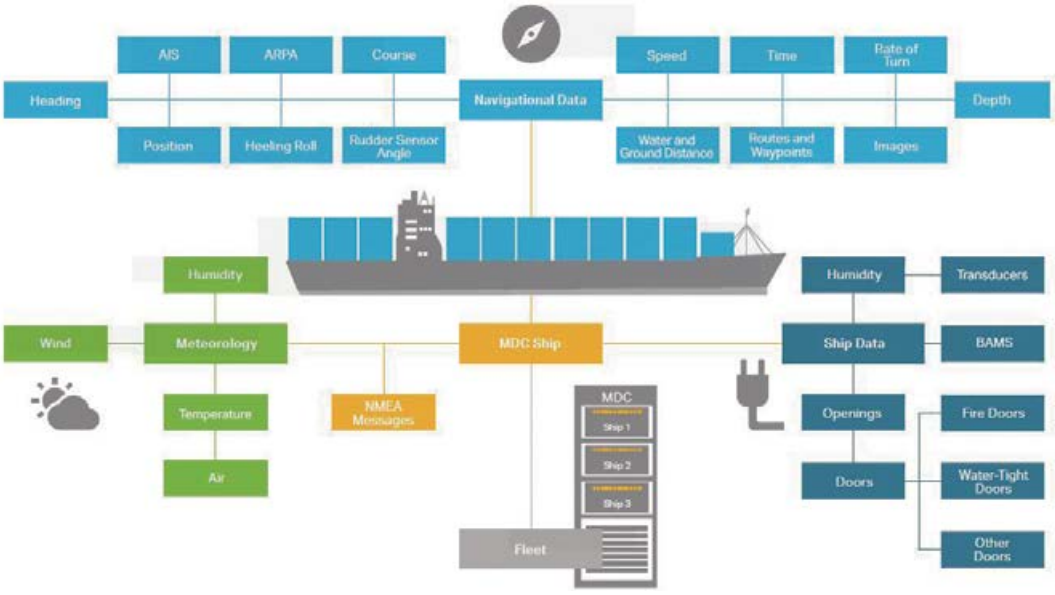


Figure 3. 모든 것이 긴밀하게 연결된다. 일러스트의 도표는 오늘날 해운업계에 빅데이터와의 긴밀한 네트워크가 얼마나 중요한지를 보여준다.

로를 알려주고 항구에 순서대로 제 시간에 도착하도록 유도할 수 있다.

또한 항구 근무자들 항해 동기화로 혜택을 누릴 수 있다. 선박의 도착 준비를 보다 쉽게 할 수 있으므로 임시 보관을 위한 물류 공간 및 물품 운송 처리량이 상당부분 감축된다. 또한 반도체와 기차 등의 수출품이 선적될 화물선을 기다리면서 오래 대기할 필요가 없다. 이러한 종류의 물류 계약은 금전적, 환경적인 이득으로 이어진다. 워터 교수는 "하지만 이러한 방법은 해운업계에서 아직 보편적인 방법은 아니다"라고 말하며, 선박회사들이 다양한 시나리오를 정확히 이해하고 해석하는 것이 더욱 중요하다고 덧붙였다. 워터 교수는 선박 승선 인력이 "데이터를 정확히 판독하고 올바른 조치를 결정할 수 있기를" 기대한다. 자동화 시스템이라고 해도 사람과 기계 간의 원활한 상호작용이 필요하기 때문이다.

더 강력한 IT 보안을 필요로 하는 Maritime 4.0

이러한 측면에서 선박의 브릿지는 오랜 동안 정보를 공유하는 자동화 관리 센터로 기능해 왔다. 이들 정보는 항행, 통신, 화물 정보는 물론 등록 서류와 화물고지서 등 행정 정보도 포함한다. 전자 지도와 자동화인식시스템(AIS)의 출현으로 공해상에서 디지털화가 빠르게 진행되고 있음은 분명한 사실이다. 이 트렌드는 점차 강화되어 가고 있으며 위에 서술한 잠재력이 그대로 구현될 것이다. 대형 선박을 위한 빅데이터? 분명 사용할 만한 가치가 있다!

그러나 비용 절감, 환경 보호 및 효율성 향상에는 댓가가 따른다.

Figure 4. 눈에 띄지는 않는 배치이지만 매우 중요한 결과를 초래한다. 해적의 공격시 두 개의 버튼을 동시에 누르면 종합적인 위기 관리프로그램이 백그라운드에서 실행된다.

Figure 5. AIS는 항로의 다른 배에 대한 핵심 정보를 제공한다.

바로 IT 보안에 대한 요구가 훨씬 강화된 것이다. 데이터 남용과 사이버 범죄의 위험은 디지털화, 네트워킹, 육지와 선박간 증가하는 통신과 더불어 함께 높아지게 됐다. Maritime 4.0은 IT 보안을 빼놓고서는 이야기할 수 없으며, 이는 단순히 사이버 공격으로부터 선박을 보호하는 것 이상의 문제로 선박의 작동 안전과 관련된 중요한 사항이다. 적절한 기술로 선박, 승선 근로자 및 환경을 함께 보호하려면 육지와 선박간 주고 받는 데이터를 안정적으로 암호화하는 것이 필수적이다. 예를들어 접근점과 접근 시간을 통제하거나 "디자인으로 IT 보안을 실현"한 컨트롤러를 사용할 수 있고, 육지와 바다간 연결이 어떤 이유로든 두절 된 경우 임시 저장소로 활용할 수 있다.

IT 보안: 계속되는 경쟁

해양 사고의 중대한 영향을 고려할 때 현재의 IT 보안법이 적용되는 주요 인프라 시설에 지상의 발전소와 상수원과는 달리 항해와 관련된 운영사항이 포함되어 있지 않다는 점은 놀랍습니다. 사실 IT 보안은 생산자, 해커, 작동자 사이에서 발생하는 "경쟁"으로 간주되어야 합니다. 새로운 위협에 효과적으로 대응하려면 하나의 제조업체에 의존하지 않는 오픈 운영 시스템이 가장 적합합니다. 오픈 시스템은 많은 프로그래머가 동시에 사용하여 보안의 헛점을 보다 빨리 인식하고 함께 힘을 합쳐 이를 개선할 수 있다는 장점이 있습니다. 따라서 WAGO의 PFC 제품군은 Linux®를 기반으로 실시간 확장이 가능하며, 제조사 및 차후 확장 여부와 관계없이 IT 보안을 위한 일반적인 기능을 기본으로 제공한다.

Oilfield fitted with mass flowmeters

An oil and gas producer needed an accurate oil meter at each wellhead, where the oil flows into a separator. They anticipated there would be gas entrained in the fluid coming out of the separator, so they installed mass flowmeter technology as this can handle entrained gas.

KROHNE

Denver-based Bonanza Creek Energy, Inc. is an exploration and production company which is focused on extracting oil and associated liquids-rich natural gas in the United States. The company has operations in Colorado's Denver-Julesburg Basin, a major oil and gas field that is being actively developed through the use of horizontal drilling and multi-stage fracture stimulation.

Bonanza Creek is developing its assets in the basin, by drilling horizontal lateral wells. They needed an accurate and reliable way to measure how much oil and water each well was producing. Tank gauging is the standard method used to measure the volume of production at each well. While simple and relatively accurate, tank gauging is time consuming, costly, and entails some safety risks. To account for the production variations among the wells and provide accurate well allocation measurement information, each well on a pad had to flow into a separate tank.

Figure 1. An OPTIMASS 6400 in a separator dog house.

Gas entrainment

Gas entrainment refers to the presence of gas bubbles in hydrocarbon fluids. Entrained gas can disturb the sensitivity of mass flow measurement of liquids, decreasing accuracy or even stopping measurement completely. It can occur for many reasons, for example, due to degassing; leaks upstream of (or in) a negative pressure area; excessive cavitation and levels falling below the minimum in supply containers, as well as agitators in tanks; or long drop distances for media into tanks. Entrainment can also occur due to status transitions in process control, such as when starting, shutting down, or cleaning the system.

Knowing that Bonanza Creek was seeking an accurate oil meter that could handle gas entrainment, Bob Phagan, sales engineer for I.C.S. Sales, arranged a demonstration of a new mass flowmeter device that is "gas bubble resistant." I.C.S. Sales is a leading manufacturer's representative in the Rocky Mountain region, specializing in process instrumentation.

Mass flowmeter

The new meter, the OPTIMASS Coriolis mass flowmeter, developed by KROHNE, offers an indication of gas bubbles

in a process by using a combination of various measurements to detect a two phase flow. The meter detects and signals gas entrainment reliably and maintains the active measurement in all measuring conditions with gas content from 0-100% by volume.

The measuring sensor and signal converter were designed to offer complete digital signal processing, from the production of the drive oscillation of the measuring tube to the evaluation of the sensor signals. The meter maintains continuous mass density measurement and provides measured values at all times. At the same time, it can report the two-phase status and output a preconfigured alarm, in accordance with NAMUR NE 107 requirements.

"We knew the new technology would be the best way for them to handle entrained gas in this application, and the demonstration showed them clearly how the meter could help," said Phagan. He explains that for this application, the OPTIMASS meters are installed on the crude oil leg of the oil/water/gas separator. Less expensive metering technology is used to meter the water, since it is of lower value to investors. Gas is metered using differential pressure (DP) devices.

After purchasing the first 30 meters in 2013, Bonanza Creek compared the tank volume versus the metered volume over a 24 hour period and found only minor differences in the measured values. These minor differences in the measured volumes were due to the phenomenon known as shrinkage. They have since installed more than 400 OPTIMASS meters. Bonanza Creek can now accurately manage wellhead allocation, and provide stakeholders with critical production data.

Increased accuracy

The model used depends upon the required accuracy. Private leases use the OPTIMASS 1400, which offers a published accuracy of 0.15%, while the OPTIMASS 6400 model is used for Federal Bureau of Land Management leases, with a published accuracy of 0.10%. The OPTIMASS 6400 has been approved for custody transfers of both liquids and gases, making it a good option for process industries and specialist applications like LNG, CNG, or supercritical gases in terminal or storage/bunkering, along with custody transfer applications.

The meter is the first Coriolis mass flowmeter in the world to feature advanced entrained gas management (EGM), with no loss of measurement with gas entrainment up to 100% of volume. Unlike other mass flowmeters, where relative movement between gas and fluid dampens the amplitude of the measuring tube and interferes with the electronics' capability to determine the actual resonant frequency, the OPTIMASS models with EGM can follow and correct the varying amplitudes. EGM continues to present an actual measured reading, together with an indication or configurable alarm that improves processes by identifying transient gas entrainments.

Figure 2. An OPTIMASS 1400 with a remote mount.

"Bonanza Creek has found the meters to be rugged and durable and the price compared to other options is a great benefit to them," said Phagan. "They have also found entrained gas management to be another huge benefit to their operations."

The new meters are now being used at other exploration and production companies working in the Wattenberg Fields. After a head to head demonstration and evaluation comparing OPTIMASS meters to a competitor meter without EGM, one major energy company purchased and installed about 180 OPTIMASS meters in 2015, and expects to purchase at least 60 more in 2016.

Enwa delivers reverse osmosis fresh water plant with capacity of producing 6,000 ton water per day

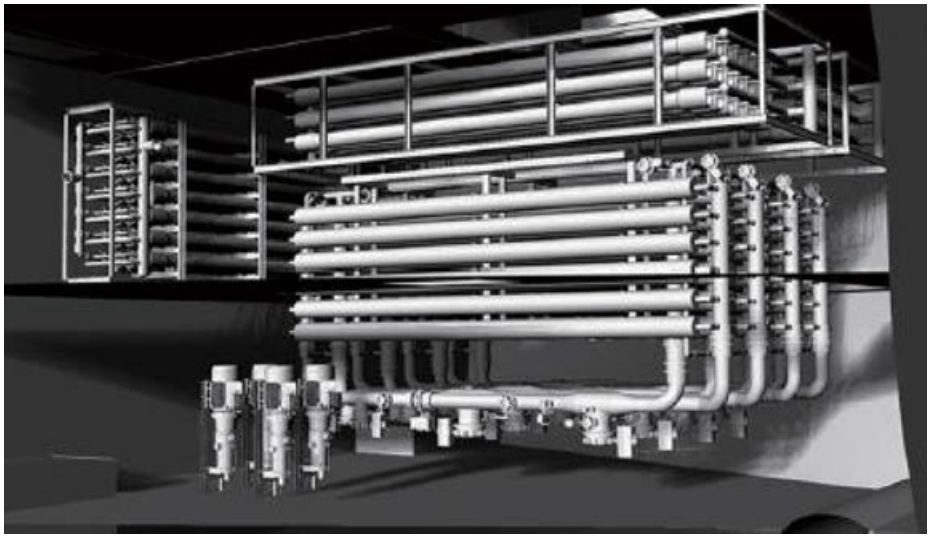
Enwa Water Technology will be delivering the reverse osmosis fresh water plant to two new large well boats with a capacity for fresh water production of 6,000 m³ (6 million liters) water per day.

Enwa Water Technology

Fresh water treatment – sustainable and efficient treatment

DESS Aquaculture Shipping AS (DAS) has recently contracted two new large well boats from Artic Group with a capacity for fresh water production of 6,000 m³ water per day (6 million liters). Enwa will deliver the reverse osmosis fresh water plant.

Within the aquaculture industry, fresh water treatment is



The RO fresh water plants that are embedded in the bow are designed and will be assembled at Enwa's production facilities in Gothenburg, Sweden. The plants are under production and are scheduled for delivery during the second half of 2017. The first boat will be ready Q1 2018 and the second by the summer 2018.

emerging as the most effective, gentle and sustainable method of removing lice from salmon. Enwa is pleased to take part in the industry's endeavors to find sustainable solutions that are better for the environment than many of the current methods.

Enwa delivers the fresh water plant

Production of large amounts of fresh water at a low cost coupled with efficient installation in compact and specialized vessels require considerable knowledge and experience. Enwa has long experience of designing and building RO solutions and the cooperation between Artic Group, SEACON and Enwa will provide a vessel with capacities upon delivery that will set a new standard in the industry.

Competence in many areas

Desalination of such large quantities of seawater requires knowledge in many areas whereas the desalination process probably is the easiest. Knowledge of raw water conditions, content in the ocean, seasonal and locality changes are essential in order to be able to dimension as reliable and economically efficient plants as possible. Enwa's technological development is partly based on research results together with Norwegian and international oceanographic environments.

Growing demand for RO's

Reverse Osmosis freshwater generators are growing in in popularity. The systems operate with relatively low energy consumption to produce water and have a high recovery rate. The majority of Enwa's customers can be found in the offshore, Oil & Gas and cruise segment. During the past few years there has been a rapidly growing demand also in the tanker market. It is becoming more and more common that both oil- and chemical tankers chose to install RO systems for their water production.

Enwa is a turnkey supplier of systems and products for water treatment on land and at sea. Demand for more and cleaner water is growing. "We're working continuously to meet this requirement and ensure that our solutions create real value for our clients," says Kjetil Øxnevad, Global Sales Director.

About company

The ENWA Group comprises a number of companies with water as their core business. Water Technology is one of three divisions, serving the offshore and marine markets as well as land-based industry and property.

The simulator gives the operator access to the aft deck to perform the complex range of operations using the actual control systems that would be on board.

Simulating – **The art deck**

Operations on seismic vessels to deploy streamers and sources can be complex and lengthy, making effective training vital. The latest simulator from Rolls-Royce mimics the aft deck and the challenge of deploying equipment safely and efficiently.

Rolls-Royce

As any apprentice will tell you, there is no substitute for experience. But some jobs are so critical and expensive to practise that the opportunity to learn and make mistakes without the pressures of being part of a real operation are becoming less commonplace.

Harnessing technology and simulation is now becoming the norm for many operations. As a result, the range of Rolls-Royce equipment with a bespoke simulator capability for crew training located at the Rolls-Royce Training Centre continues to grow. The latest addition is the aft deck simulator pod for the equipment and control systems onboard the latest generation seismic streamer vessels.

These 3D seismic survey vessels are deployed by the oil majors, and their systems provide geoscientists with the subsurface information they need to pinpoint and map potential hydrocarbon deposits and the geological formations around them. With the sensitive equipment deployed from the vessel's stern worth up to 60 per cent of the value of the vessel, the

cost of human error can be high. A full set of streamers can also take a number of days to deploy, depending on the size. Working 24/7 requires more than one exceptionally well trained crew, to minimise the potential for mishaps.

Although ship designs vary, the back deck of the vessel is the hub of activity during mobilisation - the deployment and retrieval of the towed streamers and sources. All are linked together and controlled from the vessel's control centre throughout the acquisition phase of the mission. The success of each mission depends on teamwork on the deck for a timely and trouble free mobilisation of a range of complex equipment.

Seismic operations

Seismic surveying relies on an energy source sending sound and pressure waves into the earth's crust, with some of the energy reflected back and recorded on sensors. The sensors record the time taken to travel through the earth's crust and back to their various locations.

On a vessel the energy is normally provided by air guns powered by compressed air. The pressure wave generated travels into the earth's crust and gets reflected back when it meets a geological boundary, for example the boundary between sand and rock layers.

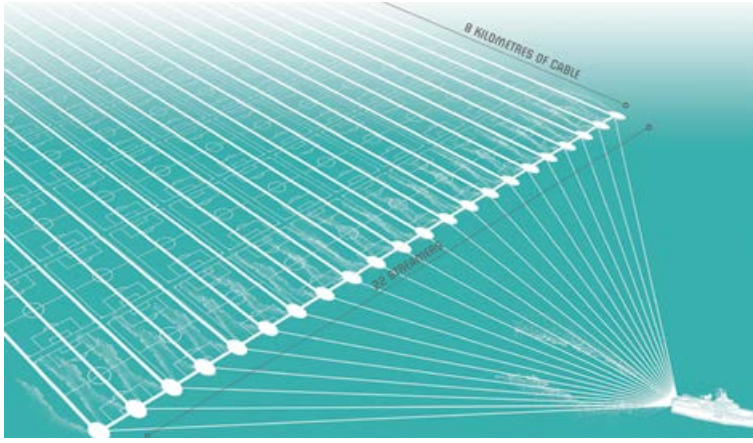
After a few seconds the reflected pressure wave is detected by recording sensors, embedded at intervals along the streamers. The time it takes for the pressure wave to return to the streamers is recorded by the onboard logging system and indicates how far down the geological boundary is located.

The recordings are then analysed and transformed into detailed visual images for analysis by experts ashore. As multiple streamers are deployed and run in parallel about 50m apart, pulled out wide by vanes, similar to the doors that spread a fishing trawl, a detailed three-dimensional map of the subsurface can be created.

The number of streamers deployed depends on the vessel and the survey being undertaken. The latest vessels are designed to deploy up to 24 streamers. Each streamer can carry several hundred thousand recording sensors and a complete streamer rig can cover an area greater than 12km^2, over eight times larger than Hyde Park.

Careful sequence of events

The designated survey area will have been programmed into the vessel's integrated navigation system. The seismic aft deck crew of four to five personnel work closely with the captain and



This schematic illustrates the number and length of cables that can be deployed from the latest seismic survey vessels.

monitor wind and weather. With the latest vessels capable of deploying streamers which can be between six and 12km long, the streamer reels are normally two decks high.

> "Efficient crews also save time, which is important for the vessel operator, as the vessel is only earing when it is working"

Each streamer is deployed individually by its own winch, through a fairlead and out over the stern. The first thing to reach the sea is the float attached to the end of the streamer, containing GPS sensors with a radar beacon. To keep the streamer at its required depth, monitoring and control devices (birds) are attached at regular intervals. Great care must be taken to ensure they are correctly ballasted as the salinity of the water in the area being surveyed can affect the streamers in built buoyancy. Where the streamer is attached to its 1km long lead-in cable to the ship, the forward float is added and a spar line is connected to the deflector plate that is used to spread the streamers many times wider than the vessel.

"This complex process is repeated for each streamer," says Arnstein Erdal, Lead Product Trainer at the Ålesund Training Centre. "It requires constant monitoring and adjusting of the control system, while constantly adding equipment to the streamer. It is vital the deck crew work together seamlessly and can second guess each other's action in any given situation.

"This only comes by working together. Efficient crews also save time, which is important for the vessel operator, as the vessel is only earning when it is working."

View of the actual aft deck with streamers deployed.

With the streamers in position the energy source equipment, normally air guns, can then be deployed. The normal arrangement is six to eight arrays with multiple guns towed some 500m behind the vessel. They are programmed to fire at ten-12 second intervals. All the in-sea equipment can be checked for position and is operated from the control room.

The new simulator has been designed to accurately represent the view of the aft deck and links to the control system that would be on board. “Our aim is to give a near true life experience where all the complexities of these operations can be practised,” adds Arnstein. “Faults and difficult working scenarios are injected as confidence increases, to ensure the crew can cope with virtually any set of circumstances. We are constantly developing the simulator to provide more functionality.”

As the deployment of a full streamer set-up can take a number of days working 24/7, simulator training means multiple crews can be trained.

Real equipment

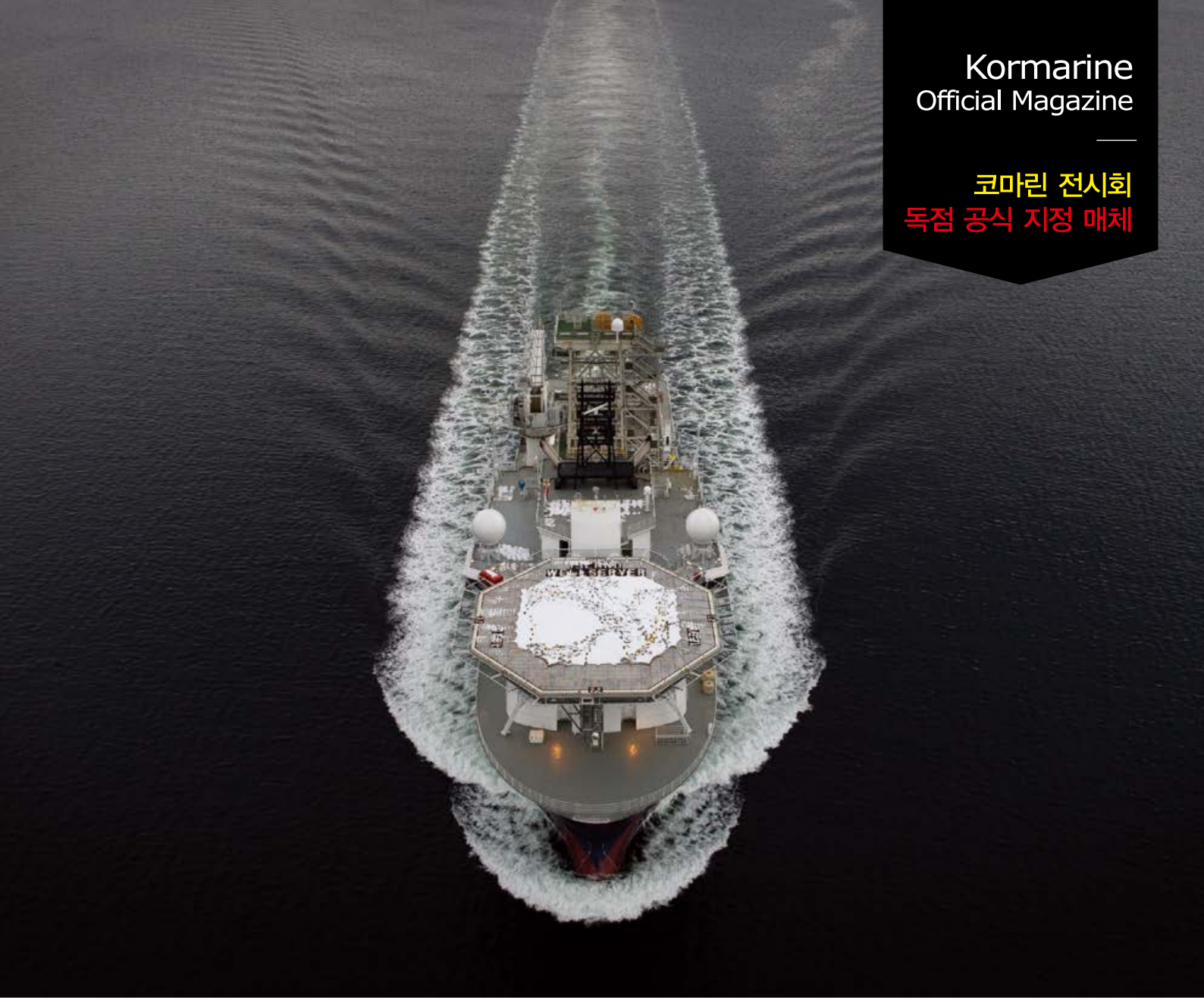
Crews can also step from the simulator into the real world in just a few seconds. The workshop area of the Training Centre is a neighbouring room and houses a fully functioning streamer winch with its hydraulic control system and

A short walk from the simulator, in the training workshop, is a working seismic winch, enabling students to also train on real equipment.

remotes. All operating modes can be run, including cable parameter setting as well as maintenance and trouble shooting on both the electrical and hydraulic equipment, as installed on the actual vessel.

Several other seismic and subsea courses are run at the Centre, with others soon to be added. Instructors also regularly visit customers to provide bespoke courses.

“This article originally appeared in In-Depth, the marine customer magazine of Rolls-Royce.”



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신조선 수주 시장 전년도 대비 증가

국내 추정 신조선 수주량은 8월말 기준 240척으로 전년도(154척) 대비 약 35% 이상 증가했다. 글로벌 선사들이 초대형 컨테이너 선박을 발주하고 있지만 지난 8월까지 국내 조선 업계의 컨테이너선 수주는 절벽인 상태이다. 조선 3사가 주도하던 초대형 컨테이너선 시장에 기술력을 높인 중국이 강력한 경쟁자로 부상하며, 프랑스 선사 CMA•CGM이 발주한 2만 2,000 TEU급 9척(6+3option)에 대한 수주 계약을 최근 체결한 것으로 전해졌다. 중국은 자국의 선사와 스위스 선사 MSC도 2만2,000 TEU급 컨테이너선 11척 발주를 논의하고 있는 것으로 알려지고 있다.

중소형 컨테이너선 부문에서는 한국, 중국, 일본의 수주 경쟁이 치열한 가운데, 올해 들어 8월까지 약 60여척(Option 포함)이 발주됐다.

한국은 대선조선이 8월 1,011 TEU 6척, 중국이 3,100 TEU 이하 38척, 일본이 1,900 TEU 4척, 싱가폴 Keppel AmFELS 조선소 2,525 TEU 8척, 미국 Philly Shipyard 3,600 TEU 4척을 수주한 것으로 나타났다. 중국은 지금까지 발주된 중소형 컨테이너선 중 38척으로 약 75%을 수주한 것으로 집계됐다.

벌크선 수주 시장에서는 중국이 15,265,950 DWT(15척)으로 1위, 그 뒤를 이어 일본(2,942,000 DWT, 32척), 한국(2,270,000 DWT, 7척) 순으로 집계됐다.

가스선 수주 시장에서는 한국이 3,570,600 CBM(23척) 수주해 부동의 수주 1위를 기록했으며, 중국(1,544,000 CBM, 16척)에 비해 2배 이상 수주량 격차를 벌이고 있다. 탱커선의 경우도 한국은 49,544,400 DWT(186척) 수주로, 중국의 15,969,350 DWT(141척) 수주에 비해 3배 이상 수주한 것으로 나타났다. 8월말 기준 신조선 수주 량에서는 한국이 1위를 유지했다.

국내 조선산업 신조선 추정 수주 현황

세계 조선소, 선주사, 리서치기관, Shipbrokers 및 국내외 언론의 보도자료 등을 종합한 국내 조선산업의 2017년 8월 31일 기준 신조선 추정 수주 현황을 보면 옵션을 포함하여 총 240척 중 Gas Carrier 23척(2,121,300 CBM), Tanker Carrier 186척(27,063,400 DWT), Bulker Carrier 7척(1,295,000 DWT), Container Ship 6척(6,066 TEU), Other vessels 18척을 수주한 것으로 나타났다. 이는 2016년 동기간 69척 대비 240척으로 3배 이상 증가한 것으로 추정되고 있다.(그림 1 참조)

월별 수주 현황을 보면 8월에는 Gas Carrier 8척(672,000 CBM), Tanker Carrier 11척(542,000 DWT), Bulker Carrier 4척(320,000 DWT), Container Ship 6척(6,066 TEU), Other vessels 1척을 수주한 것으로 나타나고 있으며, 올해 들어 Container Ship 6척을 첫 수주한 것으로 나타났다.(표 1~2 참조)

2017년 8월 31일 추정 수주금액을 보면 1월 US$ 545.7 Million, 2월 US$ 533 Million, 3월 US$ 2,013.3 Million, 4월 US$ 2,449 Million, 5월 US$ 2,138.9 Million, 6월 US$ 2,563.8 Million, 7월 US$ 1,560 Million, 8월 Gas Carrier US$ 600 Million, Tanker Carrier US$ 464.7 Million, Bulker Carrier US$ 120 Million, Container Ship US$ 111.6 Million, Other vessels US$ 60 Million으로 총 US$ 13,080 Million 중 Gas Carrier US$ 2,390.8 Million, Tanker Carrier US$ 9,376.8 Million,

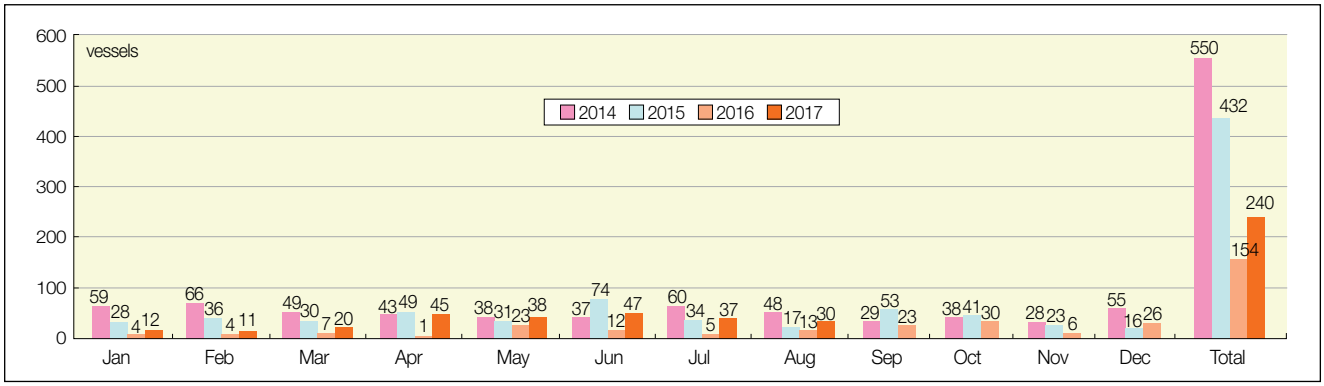


그림 1. 국내 조선소 2014–2016년 대비 2017년 추정 수주현황 추이 (옵션 포함)

Bulker Carrier US$ 345 Million, , Container Ship US$ 111.6 Million, , Other vessels US$ 855.8 Million으로 나타났다.(표 3 참조)

2017년 8월 국내 신조선 추정 수주 현황

국내 조선 업체별 2017년 8월 신조선 추정 수주 현황을 보면 현대중공업은 etherland의 Vitol SA사로부터 84,000 CBM LPG Gas Carrier 8척(2+6option)을 척당 추정 선가 US$ 75 Million에 수주했으며, 삼성중공업은 Russia의 Sovcomflot사로부터 42,000 DWT Tanker Carrier – Arc7 type 1척을 척당 추정 선가 US$ 146.7 Million에 수주했다.

현대미포조선은 China의 BoCom사로부터 50,000 DWT Tanker Carrier 6척 수주와 중국의 Weidong Ferry사로부터 31,000 DWT Car Ferry 1척을 수주한 것으로 나타나고 현대미포조선 Vinashin 조선소는 사우디아라비아의 Bahri Dry Bulk사로부터 80,000 DWT Bulker Carrier – Tier Ⅲ 4척을 척당 추정 선가 US$ 30 Million에 수주한 것으로 나타났다.

부산 소재 대선조선은 홍콩의 SITC lines으로부터 1,011 TEU Feeder Container Ships 6척을 척당 추정 선가 US$ 18.6 Million에 수주한 것으로 나타나 2017년 국내 첫 Container Ships 수주 소식을 알렸다. STX조선해양은 Greece의 Pantheon Tankers사로부터 50,000 DWT Tanker Carrier 4척(2+2option)을 척당 추정 선가 US$ 33 Million에 수주한 것으로 나타났다.(표 4~5)

2017년 국내 조선소 해양플랜트 추정 수주 현황

2017년 8월 31일 기준 해양플랜트(Offshore Rig) 추정 수주현황을 보면 2016년 1월에는 수주소식이 전무하였으나 2017년 1월에는 6기(3+3option), 2월 10기(2+8option), 6월 1기, 8월 1기 수주로 총 18기(7+11option)를 수주한 것으로 나타나고 있다.

업체별 해양플랜트 추정 수주 내용을 보면 삼성중공업은 총 6기(3+3option) 중 오일메이저 BP사가 발주하는 매드독(Mad Dog)II 프로젝트의 부유식 해양 생산설비(FPU, Floating Production Unit)를 약 1조 5,000억원(약 12.7억 달러)에 수주하여 국내 조선업계 새해 첫 수주를 기록했으며, 6월 Italia의 ENI으로부터 210,000ton FLNG 해양플랜트 1기를 25억 달러에 수주한 것으로 나타났다. 노르웨이 호그(Hoegh)LNG사로부터 170,000㎥ FSRU 1척을 약 2,700억원(약 2.3억 달러)에 수주했으며, 이 계약에는 FSRU 3척의 옵션도 포함돼 있는 것으로 전해졌다.

Division	Gas	Tanker	Bulker	Container	Other	Monthly Total
January		12				12
February	4	5			2	11
March	6	14				20
April	2	42			1	45
May	1	37				38
June	2	28	3		14	47
July		37				37
August	8	11	4	6	1	30
Total	23	186	7	6	18	240

표 1. 국내 조선소 선종별 수주현황 (옵션 포함 – 2017년 8월 31일 기준)

Division	Gas (CBM/㎥)	Tank (DWT)	Bulk (DWT)	Container (TEU)
January		1,394,000		
February	84,000	750,000		
March	952,300	2,795,700		
April	15,000	7,960,300		
May	38,000	6,855,000		
June	360,000	2,726,000	975,000	
July		4,040,400		
August	672,000	542,000	320,000	6,066
Total	2,121,300	27,063,400	1,295,000	6,066

표 2. 국내 조선소 선종별 수주량 추이 (옵션 포함 – 2017년 8월 31일 기준)

Division	Gas	Tanker	Bulker	Container	Other	Monthly Total
January	–	545.70	–	–	–	545.70
February	160.00	254.00	–	–	119.00	533.00
March	1,105.30	828.00	–	–	–	1,933.30
April	80.00	2,339.00	–	–	30.00	2,449.00
May	45.50	2,093.40	–	–	–	2,138.90
June	400.00	1,292.00	225.00	–	646.80	2,563.80
July	–	1,560.00	–	–	–	1,560.00
August	600.00	464.70	120.00	111.60	60.00	1,356.30
Total	2,390.80	9,376.80	345.00	111.60	855.80	13,080.00

표 3. 국내 조선소 2017년 월별 추정 수주금액 (옵션 포함 / Unit: US$–Million)

Division	Gas Carrier	Tanker Carrier	Bulker Carrier	Container Ships	Other vessels	Shipyard Total
HHI	13	28	3			44
DSME	4	19				23
SHI	2	19				21
HMD	4	49	4		5	62
HSHI		16				16
STX O&S		20				20
Sungdong		7				7
HHIC		10			12	22
DaeHan		16				16
DaeSun		2		6		8
Other Yard					1	1
Ships Total	23	186	7	6	18	240

표 4. 국내 조선업체 선종별 수주현황 (신조선 옵션포함 – 2017년 8월 31일 기준)

현대중공업은 총 4기(3+1option) 중 노르웨이 호그(Hoegh)LNG사로부터 170,000㎥ FSRU Options exercised 1척에 대한 계약을 체결과 TURKEY의 Kolin Construction–Kalyon Group에서 170,000㎥ FSRU 2기(1+1option)를 수주한 것으로 나타났으며, 8월 India의 Swan Energy사로부터 180,000㎥ FSRU 1기를 수주한 것으로 집계됐다. 대우조선해양은 미국의 Excelerate Energy사로부터 170,000㎥

NO	Shipyard	Date	Client	Country	Class of Order	Q'TY	Delivery
65	HHI	Aug	Vitol SA	Netherland	84,000CBM LPG Gas Carrier(2+6option)	8	2019
66	SHI	Aug	Sovcomflot	Russia	42,000 DWT Tanker Carrier – Arc7 type	1	2019
67	HMD	Aug	BoCom	China	50,000 DWT Tanker Carrier	6	2020
68	HMD Vinashin	Aug	Bahri Dry Bulk	Saudi	80,000 DWT Bulker Carrier – Tier III	4	2020
69	HMD	Aug	Weidong Ferry	China	31,000 DWT Car Ferry	1	N/A
70	DaeSun	Aug	SITC lines	HongKong	1,011TEU Feeder Container Ships	6	2019
71	STX	Aug	Pantheon Tankers	Greece	50,000 DWT Tanker Carrier(2+2option)	4	2019
Total By Volume of 2017						240 ships	

표 5. 2017년 8월 한국 주요 조선소 추정 신조선 수주현황 (신조선 옵션포함 – 2017년 8월 31일 기준) ※ HHI: 현대중공업, DSME: 대우조선해양, SHI: 삼성중공업, HSHI: 현대삼호중공업, HMD: 현대미포조선, HHIC: 한진중공업, Sungdong: 성동조선해양, Daesun: 대선조선, Daehan: 대한조선, Dongsung: 동성중공업

NO	Shipyard	Date	Client	Country	Class of Order	Q'TY	Delivery
1	SHI	Jan	BP	UK	FPU (Floating Production Unit)	1	2020
2	SHI	Jan	Hoegh LNG	Norway	170,000㎥ FSRU (1+3option)	4	2019–Q2
3	HHI	Jan	Hoegh LNG	Norway	170,000㎥ FSRU (options exercised)	1	2018Q4
4	HHI	Feb	Kolin Construction	TURKEY	170,000㎥ FSRU (1+1option)	2	2019
5	DSME	Feb	Excelerate Energy	USA	170,000㎥ FSRU (1+7option)	8	2019–20
6	SHI	Jun	ENI	Italia	210,000ton FLNG	1	2022
7	HHI	Aug	Swan Energy	India	180,000㎥ FSRU(Floating Storage and Regasification Unit)	1	2020
Total By Offshore Rig						18 Rig	

표 6. 2017년 국내 조선소 해양플랜트(Offshore Rig) 추정 수주 현황 * FSRU(부유식 액화천연가스 저장 재기화 설비: Floating Storage and Regasification Unit)

FSRU 8기(1+7option)에 대한 건조의향서(LOI)를 체결한 것으로 전해졌다.(표 6 참조)

세계 조선산업 2017년 신조선 추정 수주 현황

세계 조선소, 선주사, 리서치기관, Shipbrokers 및 국내외 언론의 보도 자료 등을 종합한 2017년 8월 31일 기준 세계 신조선 추정 수주 현황을 보면 총 776척 Gas Carrier 47척(45,324,000 CBM),, Tanker Carrier 340척(66,597,050 DWT), Bulker Carrier 198척(21,735,950 DWT), Container Ship 60척(296,736 TEU), Other vessels 131척을 수주한 것으로 나타나고 있다.

2017년 8월 31일 기준 월별 추정 신조선 수주 현황을 보면, 8월은 90척 중 Gas Carrier 8척(672,000 CBM),, Tanker Carrier 18척 (769,850 DWT), Bulker Carrier 30척(2,938,500 DWT), Container Ship 29척(237,966 TEU), Other vessels 5척을 수주한 것으로 나타나고 있다. (그림 2, 표 7~8 참조)

국가별 2017년 신조선 추정 수주 현황

2017년 8월 31일 기준 국가별 추정 신조선 수주현황을 보면 한국은 총 240척 중 Gas Carrier 23척(3,570,600 CBM), Tanker Carrier 186척(49,544,400 DWT), Bulker Carrier 7척(2,270,000 DWT), Container Ships 6척(6,066 TEU), Other vessels 18척을 수주한 것으로 나타나고 있으며 2017년 들어 8월에 첫 Container Ships 6척을 수주한 것으로 나타나고 있다

중국은 총 390척 중 Gas Carrier 16척(1,544,000 CBM), Tanker Carrier 141척(15,969,350 DWT), Bulker Carrier 151척(15,265,950 DWT), Container Ships 28척(248,470 TEU), Other vessels 44척을 수주한 것으로 나타나고 있다.

일본은 총 53척 중 Gas Carrier 3척(171,900 CBM), Tanker Carrier 9척(1,051,800 DWT), Bulker Carrie 32척(2,942,000 DWT), Container Ships 4척(7,600 TEU), Other vessels 5척을 수주한 것으로 나타나고 있으며 일본 또한 Tsuneishi Heavy – Cebu조선소에서 자국의 Mitsui

Division	Gas	Tanker	Bulker	Container	Other	Monthly Total
January	8	41	2	7	8	66
February	4	31	9	6	25	75
March	7	25	26	8	27	93
April	2	62	22	2	7	95
May	6	63	14	4	20	107
June	8	56	29	4	34	131
July	4	44	66	0	5	119
August	8	18	30	29	5	90
Total	47	340	198	60	131	776

표 7. 세계 조선소 2016년 선종별 수주 비교 (옵션 포함 – 2017년 8월 31일 기준)

Division	Gas(CBM/m³)	Tank(DWT)	Bulk(DWT)	Container (TEU)
January	512,000	2,838,300	31,450	12,400
February	84,000	2,885,300	541,000	12,900
March	959,800	3,274,700	2,806,000	8,050
April	15,000	11,627,500	3,212,000	920
May	75,500	12,195,000	806,000	10,100
June	860,400	5,961,000	4,068,000	14,400
July	2,145,300	27,045,400	7,333,000	0
August	672,000	769,850	2,938,500	237,966
Total	5,324,000	66,597,050	21,735,950	296,736

표 8. 세계 조선소 선종별 수주량 추이 (옵션 포함 – 2017년 8월 31일 기준)

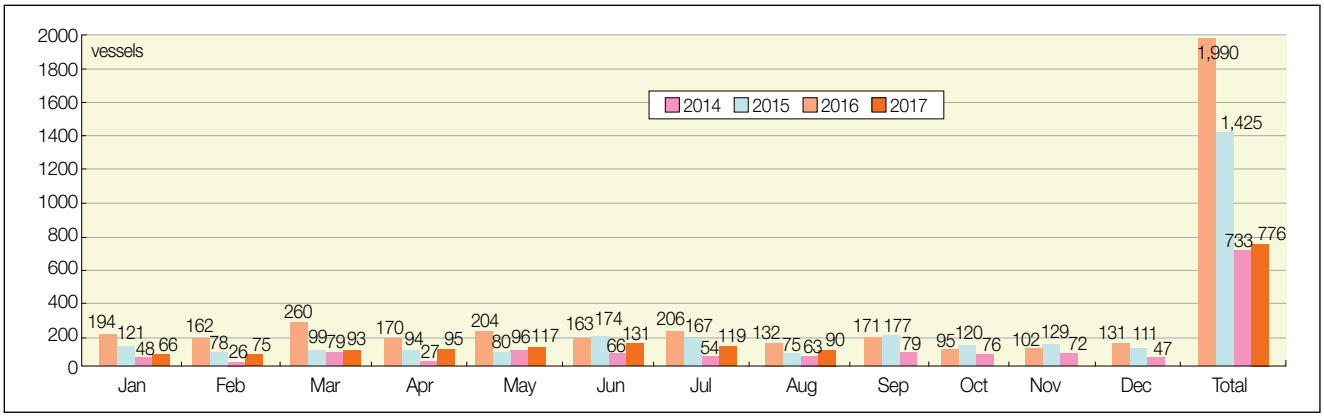


그림 2. 세계 조선소 2014~2016년 대비 2017년 추정 수주현황 추이

& Co으로부터 1,900TEU Container Ships 4척을 첫 수주한 것으로 나타나고 있으며 기타 국가의 경우 총 93척 중 Gas Carrier 5척 (37,500 CBM), Tanker Carrier 4척(31,500 DWT), Bulker Carrier 8척 (1,258,000 DWT), Container Ships 12척(34,600 TEU), Other vessels(Cruises, RoPax, MPP, etc) 64척을 수주한 것으로 나타나고 있으며 8월 대만의 CSBC(Kaohsiung)는 중국의 China Steel Express 으로부터 208,000 DWT Bulker Carrier 2척을 수주한 것으로 나타나고 Keppel AmFELS은 Hawaii의 Pasha Hawaii사로부터 2,525teu Container Ships 4척(2+2option)을 수주한 것으로 나타나고 있다.(표 9~10 참조)

2017년 8월 31일 기준 한중일 신조선 추정 수주금액(옵션 포함)을 보면 한국은 총 US$ 13,080 Million 중 1월 US$ 545.7 Million, 2월 US$ 533 Million, 3월 US$ 2,013.3 Million, 4월 US$ 2,449.00 Million, 5월 US$ 2,138.90 Million, 6월 US$ 2,563.8 Million, 7월 US$ 1,560 Million, 8월 US$ 1,356.3 Million으로 나타나고 있으며 중국은 총 US$ 16,217.6 Million 중 1월 US$ 1,627 Million, 2월 US$ 945 Million, 3월 US$ 3,186.4 Million, 4월 US$ 2,343.70 Million, 5월 US$ 1,380.90 Million, 6월 US$ 1,860 Million, 7월 US$ 2,813 Million, 8월 US$ 2,061.6 Million으로 나타나고 있고 일본은 총 US$ 1,494.5 Million 중 1월 US$ 34 Million, 2월 US$ 181.5 Million, 3월 US$ 141 Million, 4월 US$ 50 Million, 5월 US$ 61 Million, 6월 US$ 495 Million, 7월 US$ 56 Million, 8월 US$ 476 Million으로 나타나고 있다.(표 11 참조)

2017년 7월말 기준 신조선 수주는 전년 총수주량을 초과한 것으로 나타나고 있으며 그 동안 침체의 늪에서 신조선 수주 증가의 반등을 시작하고 있는 것으로 보이며 조선산업이 조금씩 회복세를 보이는 듯한 모습을 보이고는 있으나 아직 수주잔량에서는 반등하지 못하고 있는 상황이다.

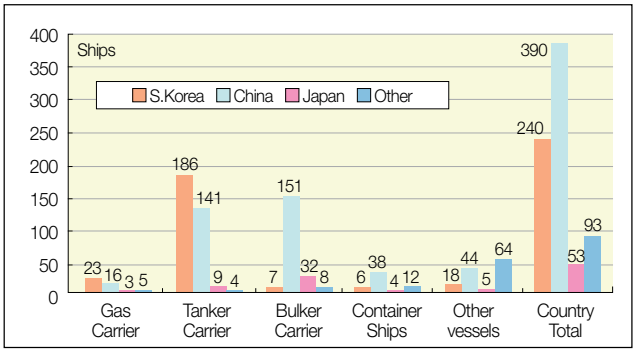


그림 3. 국가별 2017년 선종별 수주현황
(Other vessels: Ferry, Cruise, Car carriers, RoPax, MPP, etc. – 2017년 8월 31일 기준)

Division	Gas(CBM/m³)	Tank(DWT)	Bulk(DWT)	Container (TEU)
Korea	3,570,600	49,544,400	2,270,000	6,066
China	1,544,000	15,969,350	15,265,950	248,470
Japan	171,900	1,051,800	2,942,000	7,600
Other	37,500	31,500	1,258,000	34,600
Ships Total	5,324,000	66,597,050	21,735,950	296,736

표 9. 국가별 2017년 선종별 수주량 추이
(옵션 포함 – 2017년 8월 31일 기준)

Division	Korea	China	Japan	Monthly Total
January	545.70	1,627.00	34.00	2,206.70
February	533.00	945.00	181.50	1,659.50
March	1,933.30	3,186.40	141.00	5,260.70
April	2,449.00	2,343.70	50.00	4,842.70
May	2,138.90	1,380.90	61.00	3,580.80
June	2,563.80	1,860.00	495.00	4,918.80
July	1,560.00	2,813.00	56.00	4,429.00
August	1,356.30	2,061.60	476.00	3,893.90
Total	13,080.00	16,217.60	1,494.50	30,792.10

표 10. 2017년 월별 한·중·일 신조선 추정 수주금액 (옵션 포함-Unit: US$-Million)

본 자료는 세계 조선소, 선주사, 리서치기관, Shipbrokers 및 해외 언론의 보도 자료 등을 근거로 작성된 것으로, 타 자료와는 상이할 수 있습니다.

How to save on cost, time and weight in FPSO, FLNG, Onshore & Offshore Facilities on Hydrocarbon Gas Detection Project?

Draeger Korea Co., Ltd.

Low levels of commodity prices have increased the emphasis on cost saving in many of the projects, be it onshore or offshore, or be it Greenfield or brownfield. With many project's cost, over-running by estimates significantly, any saving can help the bottom line & the viability of the project.

Where does the cost arise?

In a typical hydrocarbon gas detection project, the following cost are involved

- Gas Detectors
- Controllers
- Cables, Glands and Junction Boxes
- Cable trays & associated supports including mechanical & civil work
- Engineering of the system
- Installation cost of all the above
- Inspection, Commissioning & Testing of the system

What takes time?

- Design & Engineering
- Procurement of all equipment
- Fabrication of cable trays & associated structures
- Installation
- Testing & Commissioning

What are the implications of Cables on weight & practicality in Platforms, Vessels & Processing Plants?

Weight can be contributed by detectors & junction boxes, however the major contributor to weight is Cables & cable trays and associated supports. In brownfield projects, if existing cable trays are full, then duplication of trays have to be done; and it may become extremely challenging where space is also an issue (e.g. FPSO/FLNG).

With FPSO designs growing larger in size (approx 500 m long x 80m wide), average cable run for detectors can be approx. 500 m long. At weight of Steel Wired Armored cables at approx. 1Kg/meter, this adds up to approx. 0.5 tones per detector. This also implies that for approx. 400 hydrocarbon detectors, you have an approx. weight of 200 tonnes. Reduction of this weight and space of cable trays can make the instrument cable system less congested, easier to maintain. Less cables also mean less time and cost testing & maintaining them.

Though weight may not be an issue on many onshore facilities, space in existing cables trays can be an issue and may require additional cable trays. Trenching & removal of concrete for trenches to lay new cables can be a very expensive exercise in an existing plant that is operational and could decide if the project is economically practical or justifiable.

So what is the solution to save on cost, weight, space & time?

Wireless!, yes it can eliminate the need for extensive cable trays, cables, glands & junction boxes, while at the same time it reduces the time required for engineering, installation & testing to a fraction. With significantly increased project cost in most of the Oil & Gas sector and projects running over time & estimate, thus causing significant loss in revenue, Wireless can truly be the solution. Industrial wireless systems for instrumentation such as ISA 100 can provide reliable & guaranteed communication and allay any fears of the loss of signal strength & communications during operations. ISA100 Wireless solutions can be used in monitoring & detection applications including functional safety applications (SIS/SIF) that requires SIL2 integrity levels.

Draeger GasSecure GS01

GasSecure GS01 has a very fast 5 seconds response time and is the first truly wireless hydrocarbon gas detector with an approximate two year operating battery life and a reliability of SIL2 for the detector as well as for the wireless communication. SIL2 redundant wireless networks can easily be implemented using approved field wireless Access-points & SIL2 Gateways where needed. GS01 can help reduce cost of hydrocarbon gas detection projects by approx. 60-80% and cut Project time by 90-95%. GS01 detector is calibration free for life (unique MEMS technology) with bump testing interval of 2 years in SIL2 applications and the battery packs are field replaceable, thus saving time & money over the life-cycle of the product.

Coldharbour to unveil BWTS for big bulkers at Kormarine

Coldharbour Marine, a UK-based manufacturer of inert gas generators and ballast water treatment systems, is to launch a new version of its inert-gas based GLD™ treatment plant, designed specifically for large bulk carriers, at Kormarine, in October. The company's unique technology for bulk carriers is based on existing treatment systems for tankers and gas carriers but will be configured differently.

Coldharbour Marine

In a standard type Coldharbour BWT installation inert gas is sent to GLD (gas lift diffusion) units mounted inside the ballast tanks. There are challenges with this arrangement on bulkers insofar as the wing tanks and heavy ballast cargo tank arrangements do not lend themselves to this kind of installation.

The alternative, developed by Coldharbour in conjunction with several ship owners is to mount a bank of GLD units inside the machinery space and to then circulate water from/to the ballast tanks for treatment. The GLD process is unaffected by this change, but it means that tanks of any size and configuration can now be treated using the proven, reliable GLD process. As with the standard arrangement, treatment takes place during a section of the ballast voyage, rather than during uptake or discharge. No intake filtration is required. This guarantees that not only will the ballasting process be unaffected but also

Andrew Marshall,
Coldharbour Marine CEO

that the ballast water discharged at the load port will avoid the problems of organism regrowth during long ballast legs, thereby ensuring compliance with IMO/USCG discharge standards.

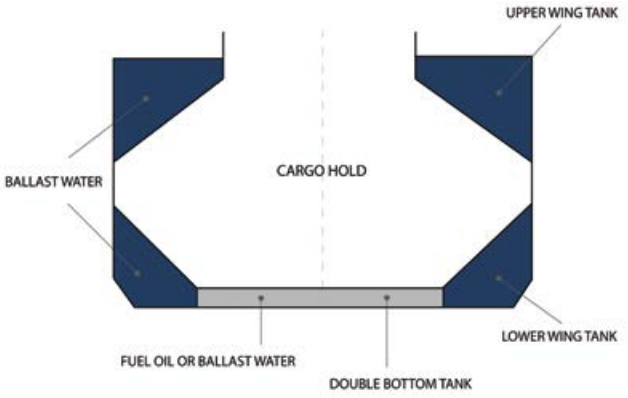
"A completely new system is essential for big bulk carriers, and in particular one which enables bulker operators to avoid operational delays, financial penalties and, in the worst case, possible off-hire periods due to BWTS issues," declared Andrew Marshall, Coldharbour Marine CEO. "That is why we have tailored our technology to meet the demands of these vessels. We are delighted to be unveiling this exciting development at Kormarine where we will be talking both to dry bulk operators and shipyards about our new technology which we believe breaks new ground."

"These large ships have very specific requirements because of the huge volumes of ballast they require and the nature of their ballast operations makes using other solutions challenging." Marshall explained. "With the ballast water convention coming into force, and Port State Control bodies gearing up to enforce the regulations, the financial penalties of making a poor choice of ballast water treatment installations, particularly for large bulk carriers, could be catastrophic."

During ballast voyages, bulk carriers need ballast water for stability but also to make sure that ships' propellers are properly immersed. Upper wing tanks are used, as well as lower wing tanks, because carrying ballast higher in the ship raises its centre of gravity for safe seakeeping.

Since the IMO's Ballast Water Convention lays down strict discharge standards, ballast water now shipped in upper wing tanks must be treated before it can be discharged. However, Marshall points out that there is no technology available today that can treat large volumes of ballast water as it is taken on board during and after cargo discharge whilst still guaranteeing that ballast water discharge standards will be met when the vessel arrives at the load port, probably at the end of a long voyage.

Marshall does not believe that the "re-growth" issue has been



properly addressed either by the IMO or US Coast Guard type approval processes. No treatment system is completely effective, he argues, so regrowth on longer voyages is inevitable. This is supported by the overwhelming body of scientific data. Therefore, Coldharbour's technology, optimised as it is for the large long haul vessels, employs a treatment process that takes place during a part of the voyage, rather than during uptake or discharge.

"The regrowth test for IMO is only five days after treatment, whilst the much vaunted USCG TA actually only tests for one day! Some of these large bulkers have ballast legs more than 10 days and in extremis as long as 42 days. Even if a relatively small number of marine organisms survive the initial treatment process, they will have plenty of dead organisms to feed on over a long ballast voyage," he commented. "If ballast water fails to meet the discharge standard, there will be delays and penalties, and possible long-term reputational damage.

"That's why we sat down to think about the particular challenges faced by the operators of these vessels, and we feel that the Kormarine arena will provide an ideal opportunity to talk about it. After all, most large bulkers are built either in South Korea or China, and Asia is the world's largest consumer of bulk cargoes, especially iron ore."

The ship science

Bulk carriers are designed and built principally for the carriage of dry commodities including iron ore, coal, grain, phosphates and bauxite. The majority of the fleet consists of ships in the so-called "handy-size", "handy-max" and "supra-max" categories ranging from 30-60,000 dwt. However, on long-haul routes, capesize vessels and even larger very large ore carriers are often deployed to move large volumes of dense cargoes, including iron ore and coal.

For these vessels, ballast water plays an essential role in their safe operation when they are not loaded. This is because ballast water is vital in ensuring a ship's stability and ultimately guaranteeing the safety of her structure and her crew. Large volumes are required to ensure hydrodynamic efficiency and full propeller immersion.

Iron ore is the single largest dry bulk cargo. It is very dense at approximately 2.5 tonnes/m^3 and relatively small volumes soon take a ship down to her maximum permissible draft. Alternate hold loading is frequently used as a technique to minimise longitudinal stress on a bulk carrier's hull girder, but when a vessel is not loaded, huge volumes of ballast are required for safe operation.

Satisfactory stability is essential in ensuring that a ship rights itself as it rolls in a seaway but it must be carefully controlled to prevent cargo shifting in the holds and excessive accelerations which cause discomfort for passengers and crew. A ship's GM, or metacentric height as it is known – the distance between its vertical centre of gravity and its metacentre – is the key element in making sure that a ship is stable. For this, a positive GM is required – in other words, a vessel's centre of gravity must always lie below her metacentre.

However, the size of the GM determines a ship's seakeeping characteristics. If it is too big, a large righting moment at small angles of heel will make the ship "stiff" and uncomfortable. Large accelerations can affect safety and cause damage to equipment and cargo. A smaller GM, on the other hand, gives a small righting moment which results in a "tender" ship – one which rolls more slowly without excessive accelerations.

Bulk carrier operators, therefore, like to use the upper wing tanks (see diagram), sometimes also known as upper hopper tanks, for ballasting purposes because this raises a ship's centre of gravity and reduces the GM. Traditionally, ballast water from these large tanks is released directly overboard without treatment. Now, the treatment, pumping, piping and power systems required to treat large volumes of ballast to comply with the IMO's Ballast Water Convention discharge standard pose a major economic and operational challenge for ship operators.

The issue is further complicated by the fact that most system technologies treat ballast water as it is pumped on board. No single system is completely effective, however, and large bulk carriers deployed on long-haul routes may be subject to "regrowth" during a ballast voyage. This could well mean that discharge standards at the next loading port cannot be met.

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The measurement requirement

The International Maritime Organization (IMO) set out the MARPOL Annex VI regulations aiming the control of the main air pollutants emitted by vessels. These regulations focus on the control and reduction of sulphur oxides (SOx) and nitrous oxide (NOx) emissions:

- Regulation 14 for control and monitoring of SOx emitted
- by the combustion of heavy fuel oils (HFO) engines
- Regulation 13, for control of NOx emitted by the combustion of diesel engines

SOx control guidelines are specified in the MEPC.259 (68). They apply in all Emission Control Areas (ECAs) starting January 1st 2015 on and will start in 2020 globally. In order to control the efficiency of Exhaust Gas Cleaning Systems (EGCS) and following MEPC.259 (68), measurement of SOx/CO_2 ratio is required.

The NOx Technical Code (NTC) 2008 contains conditions and processes for NOx emission control. It foresees continuous emission monitoring ("direct measurement") as method for ensuring NOx emission compliance, starting on January 1st 2016. Currently the main ECAs are the Baltic Sea, the North Sea, all the North American and Caribbean coastal areas.

The addition of new areas to current ECAs is under evaluation by IMO. Ship yards, ship owners and marine ECGS manufacturers need to equip vessels with continuous gas analyzers for Continuous Emission Monitoring (CEM) to measure:

- Nitrogen Oxides (NOx)
- Sulfur oxides (SOx)
- Carbon dioxide (CO_2)

Our offer

The GAA330-M is a CEM system designed to measure the gas pollutants SO_2, CO_2, and NOx, as specified in MARPOL Annex VI. The GAA330-M operates with both high- and low-sulfur fuels, no matter if you are operating outside or inside an ECA. ABB has the right gas analyzer portfolio to allow vessels to stay compliant with current and upcoming regulations. The GAA330-M uses an Infrared photometer for reporting the SO_2/CO_2 ratio as specified by MARPOL requirements.

NOx is monitored with an ultraviolet photometer (UV) which is the most practical approach. ABB photometers are manufactured and designed for best performance under harshest conditions with an installed base of more than 100.000 units in global industries.

ECAs
Possible future ECAs

System characteristics

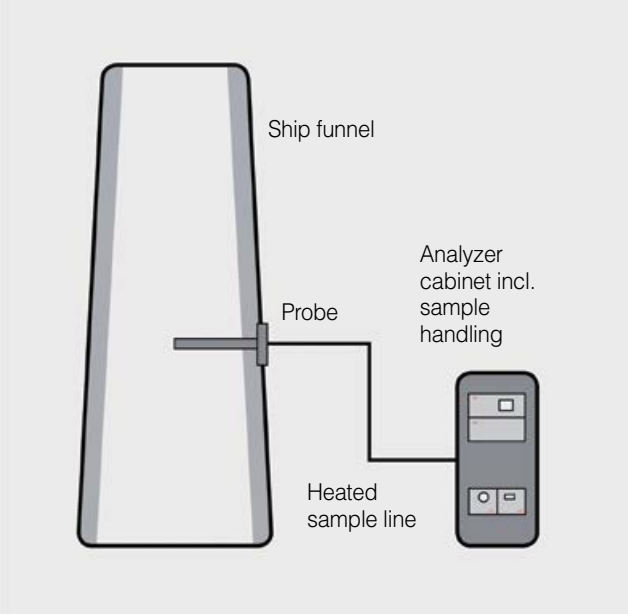
- Standalone cabinet with modular analyzer concept
- Standard measured gases: SO_2 and CO_2 Optional measured gases: NO and NO_2 (NOx)
- Rugged sample probe and heated sample line included
- Approved measuring technology and pneumatic system
- Digital communication including Ethernet TCP/IP and OPC server

Advantages of ABB

- Global ABB service capability – assistance and technical support is available worldwide
- Modular concept – new measuring modules for future pollutants can be added at any time
- Easy operation with reliable results – ABB analyzers with internal calibration cells, filled with reference gas
- Compliant to
  IMO MARPOL ANNEX 14 Res. MEPC 177 (58) (NTC)
  IMO MARPOL ANNEX 9 Res. MEPC.259 (68)
  IMO MARPOL ANNEX 5 Res. MEPC.103 (49)

Measurement of SOx/CO_2 ratio

The GAA330-M basic version is equipped with ABB's famous infrared photometer of Uras type. The Uras26 is the latest version of a rugged industrial photometer based on the Non Dispersive IR (NDIR) technology. NDIR is the referenced and recognized technology for monitoring SO_2/CO_2 ratio in MARPOL regulation. The Uras26 photometer allows the selective measurement of SO_2 and CO_2 with class lead-



ing accuracy. Internal calibration cells, containing a sealed reliable reference gas, simplify the regular adjustment of span points, without use of external test gas cylinders.
The ABB sampling technique is based on a dry and extractive approach, as reported in the MARPOL MEPC 177(58). The pneumatic system used with the Uras26 is approved and certified and it avoids equivalence tests and use of correction factors, making the measurement easy and straight forward.
The GAA330-M equipped with the Uras26 allows for advanced capabilities and calculation of SO_2 (ppm)/ CO_2 (Vol. %) ratio, as it is specified by the MARPOL MEPC 184(59). When using fuels with sulfur content higher than 0.1 Vol. % in ECAs, ships must abate SO_2 and keep SO_2/CO_2 ratio under control at the EGCS (Exhaust Gas Cleaning System).

Measurement of NOx

The GAA330-M can additionally be equipped with ABB's ultraviolet (UV) photometer of Limas type. The Limas11UV measures NO and NO_2 separately at the exit of the NOx abatement system, the engine's outlet or directly at the stack. The Non Dispersive UV technology has been specifically developed by ABB for NO and NO_2 analysis and offers operators a simplified approach with no need for auxiliary accessories.
Direct measurement of NOx (NOx = NO + NO_2) allows ships to operate engines with the highest flexibility, without time consuming engine re-certifications. An UV based photometer is the superior approach as its technology offers a comparable or better measuring quality than the CLD technology and it doesn't require unpractical and costly accessories such as ozone generator, catalytic converter and dilution systems.

We are on your wavelength

In selecting ABB you are choosing a partner who offers the best measurement solutions for your needs, enabling maximum return on your investment. As a globally operating company ABB knows about the crucial demands of international customers.
Providing the best technology, reliability and service, wherever you are, is ABB's daily business. World-wide available maintenance teams are trained and certified to support you with first-class service – just in time at your location. Benefit from our worldwide service network and fast support at any time and in any place. This ensures the fastest and best service capability, assistance and technical support world-wide.

Measurement made easy

ABB's Measurement Products business unit is among the world's leading manufacturer of continuous emission monitoring (CEM) systems. With thousands of experts around the world and high-performance technology, ABB's team is dedicated to make measurement easy for its customers.

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선내 점검 작업의 품질 향상 및 업무 개선을 위한 EMS

아즈빌㈜

선박의 안전 운항을 유지하기 위해서 매일 선내 순회 점검 작업이 실시되고 있다. 최근 선박의 고기능화가 진행되면서 탑재되는 계량기도 증가되었고, 고도화가 진행하고 있다. 이에 따른 선내 순회 점검 작업 역시 증가할 뿐만 아니라 복잡화되어 가며, 점검의 품질 유지가 고객의 과제로 떠오르고 있다.

이러한 과제를 해결하기 위해서 아즈빌은 종래 종이에 의존하는 페이퍼 점검을 대신할 수 있는 디지털 디바이스를 이용한 점검 작업과 그 효율성을 제안한다. EMS(Equipment Management System)는 아즈빌이 선박 및 육상에서의 광범위한 사업으로 구축한 노하우를 살려 선내 순회 점검 작업의 품질 향상에 공헌한다.

EMS는 감각적으로 사용하기 쉬운 범용 Android 타블렛을 채용, 시판품으로도 구입할 수 있기 때문에 초기의 도입 비용 절감이 가능하다. 사이즈는 주요 사이즈를 6인치 이하로 함으로써, 소형이면서 조작성이 좋아 경험이 많지 않은 작업자라도 조작을 쉽고 간단하게 할 수 있다. EMS는 영문판으로 대형선박 내 공통 언어인 영어로 효율적인 선내순회 점검 작업이 가능하다.

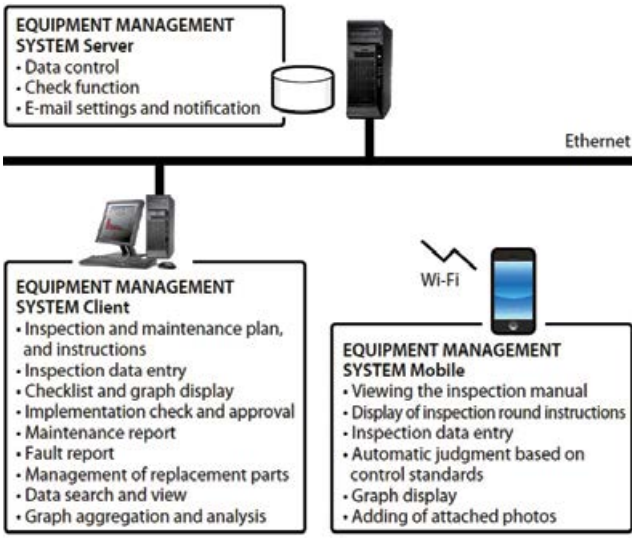

그림 1. 시스템 구성

- 정보 공유화의 계몽 – 계측 기록 데이터는 각 클라이언트 PC로 확인할 수 있으며, 트렌드 그래프도 표시가 가능하다. 또한 계측 값이 기록될 때마다 경향을 분석하고, 설비의 열화(노후화)를 판단할 수 있도록 지원한다.
- 확실한 보수점검의 실현 – 점검 예고 통지, 실시 내용 확인, 누설 통지에 의해 확실한 점검을 실현한다.
- 고장 복구 시간의 단축과 노하우의 계승 – 트러블 대응에 대한 노하우 축적과 활용이 가능하다. 과거 트러블 경험 기회가 적은 젊은 작업자에 대한 교육 자료 및 참고 이력 등으로 활용할 수 있다.
- 개선의 스피드 업 및 예방 보전 – 축적된 노하우를 다방면으로 해석할 수 있기 때문에 해석한 결과를 바탕으로 예방 보전 활동에 연결시킬 수 있다.

주요 특징은 다음과 같다:

– 일상 점검 지원: 일상 점검을 실시하고, 점검 데이터를 해석·설비 성능을 관리하는 것은 설비 고장에 대한 예방과 연결된다. 시스템화에 의해 일상 점검 업무의 효율적 실시를 지원하고, 보전 비용 저감, 관리 업무의 품질향상에 도움을 준다.

– 현장 휴대 단말에 의한 점검 기록: 점검 지시/입력은 현장 휴대단말로 한다. 담당자가 해야 할 점검 내용이 표시되고 기록할 수 있다. 규격판정/경향판정도 입력시에 행해진다. 점검 데이터도 온라인으로 수집할 수 있고, 순회 점검 항목으로서 간단히 집계된다.

– 정기 보수 지원: 적절한 정기보수를 통해 설비를 안정하게 운영할 수 있다.

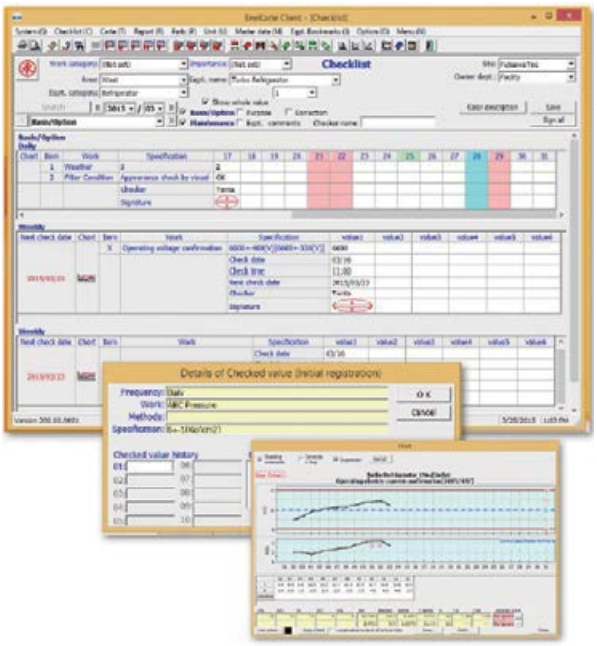

그림 2. Client Check List: 순회 점검 실적을 확인 및 입력하는 화면이다. 여기서 점검에 관한 보충 코멘트를 입력하는 것도 가능하다. 트렌드 그래프에 의한 트렌드 확인도 가능하다.

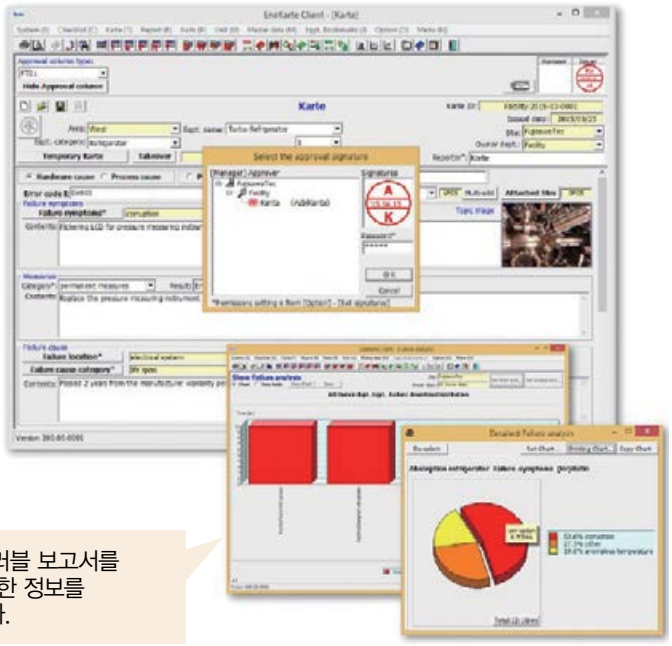

그림 3. Client Karte: 설비의 트러블 보고서를 입력하는 화면이다. 여기서 입력한 정보를 바탕으로 검색 및 해석할 수 있다.

– 전자문서화(paperless)에 의한 운용 지원: 워크 플로우를 포함한 모든 작업을 전자문서화(paperless) 할 수 있다.
– 사용자 권한 관리: 사용자마다 조작 가능한 권한의 범위를 정할 수 있고, 전자승인으로 축적된 중요한 데이터를 보호할 수 있다.
– Excel 파일 출력(옵션): 점검 실적을 정기적으로 Excel 파일로 출력할 수 있다. 그 파일의 자동인쇄 설정을 하면 고객별 리스트 작성도 가능하다.
– 설비 트러블 정보의 활용(옵션): 설비 트러블의 대처 이력이나 개조 이력을 실시간으로 열람할 수 있어 복구 시간 단축뿐만 아니라 트러블 대응 스킬 향상에 도움을 준다. 정지 요인의 분석이나 개선 계획에 의해 대책을 마련할 수 있다.

그림 4. 스마트 폰 화면: 순회 점검 항목의 표시 및 입력 화면이다. 수치입력, OK/NG 판정, 레벨 판정할 수 있다. 과거 데이터를 트렌드 그래프로 확인하면서 점검할 수도 있다.

* Microsoft, Windows, Windows Vista, Windows 7, Windows Server, Windows Mobile, ActiveSync, VisualBasic, Excel은 미국 Microsoft Corporation의 미국 및 기타 국가에 있어서 상표 또는 등록상표다.
* Intel, Intel Core 2 Duo는 미국(United States of America) 및 기타 국가에 있어서 인텔 코퍼레이션 또는 그 자회사의 상표 또는 등록상표다.
* Ethernet는 미국 제록스의 등록상표다.
* 기타 본문 중에 기재한 제품명, 기종명, 회사명, 로고는 각 회사의 상표 또는 등록상표다.

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선박 인테리어 최강 인프라 구축

– 조선업계의 강소기업 히든 챔피언!

㈜제이텍(www.Jeitek.co.kr)

㈜제이텍(JEITEK)은 20년간 유럽의 유명 조선기자재 업체들과의 기술교류를 통해 축적한 노하우를 바탕으로 2008년도 조선해양 시장에 출사표를 던졌다. 지금까지 선박용 주방장비와 진공식 변기 시스템을 3000척 이상 납품한 국내 1위의 기업이며, 특히 사업 다변화를 위해 2013년부터 본격적으로 시작한 선박인테리어 분야에서도 두각을 나타내고 있다. 선박인테리어 업계에서 ㈜제이텍의 위상은 나날이 높아지고 있는데, 이러한 성과는 높은 기술력이 뒷받침되었기 때문이다. 관련 분야에서 ㈜제이텍은 최고의 경험을 가진 설계, 시공기술자들을 국내에서 가장 많이 보유하고 있다. 현재 ㈜제이텍은 연 매출 350억 달성으로 국내 조선기자재 강소기업으로 자리매김했으며, 향후 최종 목표는 선박 인테리어의 '꽃'으로 불리는 크루즈선를 건조할 수 있는 인프라를 갖추는 것이다.

1988	㈜제이텍 설립
1994	㈜제트코리아 설립 (진공 변기 시스템)
1999	양산 공장 및 사무실 확장
2008	김해 가구제작 공장 합병 인수
2010	부산 센텀 기술센터 오픈
2011	밀양 공장 및 사무실 오픈
2013	인테리어팀 신설 및 업무 확장
2014	자체 브랜드 가구 개발(J.ZEN 1 & J.ZEN 2)
	3,000척 계약수주 달성
	인테리어 턴키 쇼룸 오픈(밀양 공장)
2016	스프레이 보온팀 신설 및 업무 확장(SpreFix)

㈜제이텍은 1988년 부산 중앙동에 무역회사로 설립되었고, 1999년 양산으로 본사를 옮긴 후 밀양을 거쳐 올해 초 부산으로 재진입했다. 2011년에는 3,400평 규모의 밀양공장을 신축했고, 현재는 설계, 제조, 시공 및 감리 등을 포함한 턴키 공사의 수주 역량을 확보했다. 특히 밀양공장 신축 후 회사의 능력을 단번에 보여주는 쇼룸에 10억 이상 투자해 국내외 바이어들의 주목을 받았다. 또한 국내 연구소, 중소 조선소와 협력해 여객선 및 초고속선 개발관련 정부 연구과제도 수행하고 있다.

Figure 1. Galley & Laundry Equipment

경쟁력 높은 다양한 선실 제품 생산

㈜제이텍은 선실 구역 내부의 거의 모든 장비 및 시스템 관련해서 해결사 역할을 하고 있다. 특히 선박 인테리어 설계 및 시공부터 – Spray type insulation, Deck covering, Galley & Laundry equipment, Galley hood, A–class roller shutter, Waste handling system, Vacuum toilet system, Push–fit drainage piping, Water mist fire extinguishing, Elevator & Escalator, HVAC, H–class sliding & hinged doors, Steel & Aluminum Furniture, Glazed partition & doors, Sauna unit, Gymnasium equipment and Medical & Workshop equipment 등 – 자체 생산 제품을 포함해 다양한 솔루션들을 제공하고 있다.

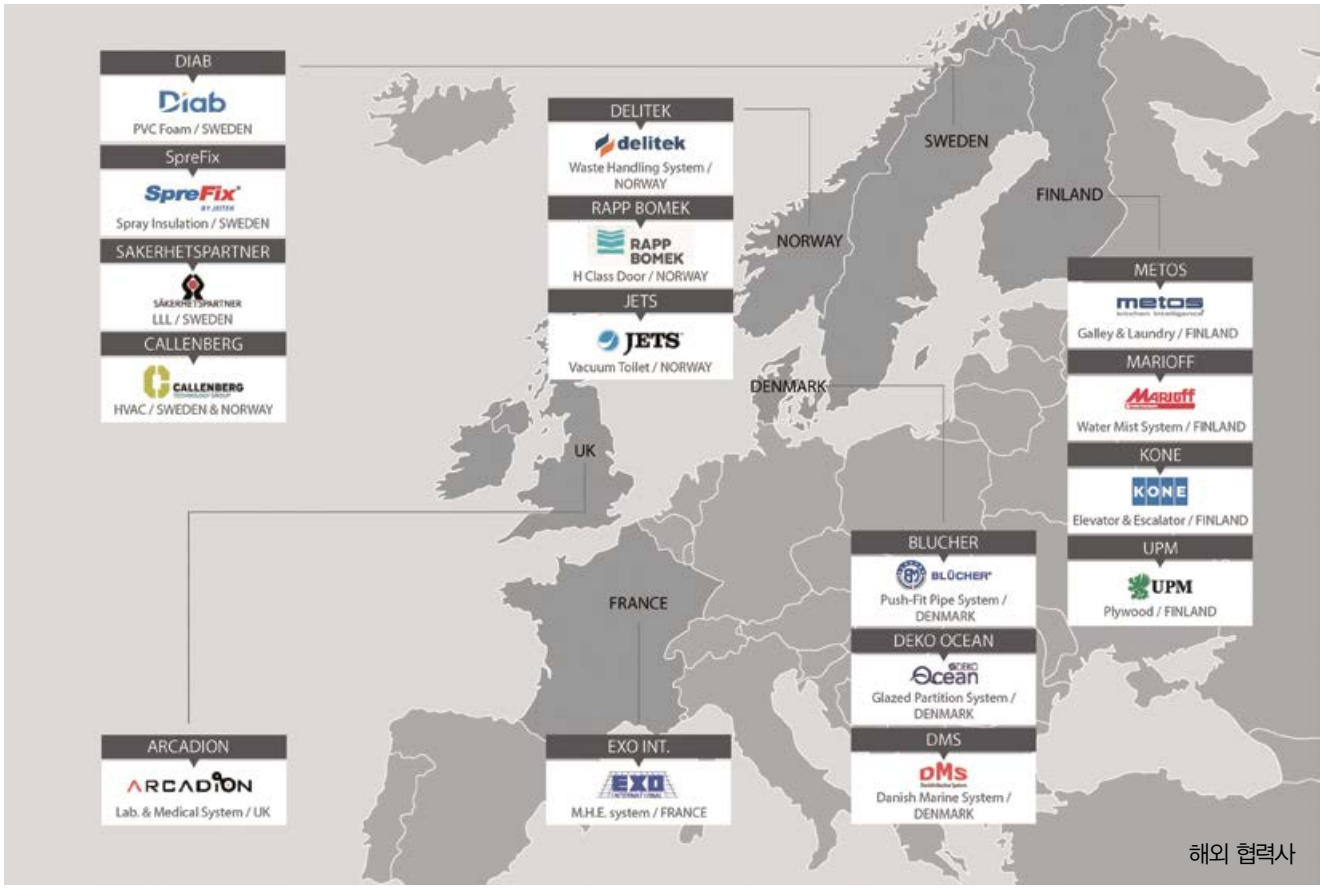


Figure 2. Vacuum Toilet

Figure 3. Waste Disposal & Waste Compactor

또한 고객의 주문 생산 형태로 공급되는 제품 종류만해도 50여 가지를 넘는데, 이는 단순히 제품 종류가 많은 것이 아니라, 선박의 선실 구역에 해당하는 제품만을 집중적으로 개발 및 생산한다는 것을 반증하는 것이기 때문에, 경쟁력과 전문성을 모두 확보했다고 평가할 수 있다.

Figure 4. Spray Insulation

㈜제이텍은 지난 2014년 자체 가구 브랜드인 'J.ZEN'을 개발했다. 'J.ZEN'은 선박용 조립식 가구로서 고객의 요구 사양에 맞춘 목재, 철재, 하니컴, 알루미늄 등 다양한 소재를 혼용할 수 있는 가구다. 이 제품의 주된 특징은 선박의 흔들림으로 인해 발생하는 안전사고를 방지함과 동시에 미적으로도 안정감을 주는 둥근 모서리, 소비자의 만족도를 최대로 이끌어 낼 수 있도록 다양하게 변형이 가능한 유연하고 세련된 디자인, 선박의 사용환경에 최적화된 견고성 등을 들 수 있다.

선박 주방부터 인테리어까지 턴키 수주

기존에는 조선소에 제품만 납품하고 조선소에서 설계, 시공, 감리, 시운전, 검사를 실시했으나 장비 제품에 대한 전문 기술이 부족해 특히 여러 해양 프로젝트에서 많은 문제점이 발생했다. 그래서 턴키 계약 형태로 바뀌면서 ㈜제이텍은 설계, 납품, 시공, 감리, 시운전,

Figure 5. Marine Furniture

검사까지 일괄 진행해 건조 일정을 준수하고, 선주들의 신뢰도 향상에 기여했다.

내년 회사 설립 30주년을 앞둔 ㈜제이텍은 끊임없는 도전정신과 불굴의 의지로 노력한 결과, 올해 초 한일카페리 인테리어 턴키 계약을 시작으로 부관페리호 인테리어 개조 공사 및 현대중공업에서 건조하는 뉴질랜드 해군 지원선의 선실 턴키 계약까지 수주했다. 지금의 ㈜제이텍이 있기까지 넘어야 할 관문도 많았지만, 이러한 실적을 달성할 수 있었던 원동력은 바로 기술력이었다.

㈜제이텍은 여기서 멈추지 않고 한발 더 나아가 크루즈선의 인테리어를 포함해 다양한 선박/선실 기자재를 종합적으로 제공할 수 있는 인프라 구축은 물론 선박 인테리어 분야에서 한국을 넘어 세계적인 업체로 발돋움하는 것이 목표다.

제2의 도약 위해 크루즈선 시장 '출사표'

박종찬 대표

㈜제이텍 박종찬 대표는 서울공대를 졸업하고 1978년 첫 직장 현대중공업 품질관리부에 입사해 조선공업과 인연을 맺었다. 이후 1982년부터 6년간 스웨덴 회사의 한국지사 부산사무소장을 맡은 후 1988년에 제이텍을 설립해 줄곧 선실 기자재 분야에 몸담고 있다.

선실 구역 내 Steel to Steel turn-key contract를 자체 기술력으로 완벽하게 할 수 있는 회사는 국내에서 ㈜제이텍이 유일하다. 다시 말하자면 개념 설계로부터 상세설계, 제품 구입 및 제작, 전 공정 시공 (보온 피복 작업, 판넬 설치, 장비 및 가구 설치, 최종 인테리어 작업까지), 장비 시운전, 선주 인수인계까지 완벽한 솔루션을 제공하고 있다.

박종찬 대표는 국내 최초 신조 여객선으로는 현대중공업에서 건조한 화객 혼용선으로 1988년 1월 인도가 되었는데, 그 당시 외국업체와 함께 납품을 하면서 언젠가 대형 여객선을 건조할 때 큰 기여를 하겠다는 뜻을 품었다.

박종찬 대표는 ㈜제이텍이 지금의 위치에서 한발 더 도약하기 위해서는 크루즈선과 같은 기술집약적이고 성장잠재력이 높은 분야로 사업 역량을 확대해 나가야 한다고 확신하고 있다. 그는 크루즈선 건조와 관련해 확고한 신념을 가지고 다음과 같이 전했다.

첫째, 크루즈선 건조 기회는 한국 조선소에 반드시 주어진다. ㈜제이텍은 이 분야에서 국내 최고의 기술력을 이미 확보했다. 크루즈선 건조시 요구되는 기술력의 약 90% 수준에 있어 나머지 10%는 앞으로 2018년말까지 약 2년 동안 투자를 통해 손에 쥘 수 있는 로드맵을 가지고 있다. 특히 부산의 중심 산업 중 하나인 조선산업은 굴뚝산업으로 생명을 다 한 것이 아니라 크루즈선 건조라는 부가가치가 큰 새로운 산업을 시작하지도 않은 면에서 보면 조선기자재업체들에게는 아직 행운의 기회가 남아 있다.

하지만 크루즈선 분야는 조선소가 독자적으로 이끌어 갈 수 없으며 조선기자재업계가 자체 R&D를 통해 철저히 준비를 해야만 가능하다. 즉, 기자재업계가 준비되지 않으면 조선소에서 수주활동이 불가능하다. 조선산업 기술발전의 종착역은 크루즈선을 건조하는 것이다. 일단 첫 발을 디디면 20~30년 이상 엄청난 파급효과로 장기고용을 창출하는 산업으로 성장할 것이다.

Figure 6. Turnkey Contractor

둘째, 크루즈선 건조의 핵심은 공실 인테리어공사의 실력이다. 안타깝지만 현재 국내업계의 공실 인테리어 인프라 수준으로는 크루선 건조가 불가하다. 하지만 앞으로 선실기자재업계의 분발이 있으면 3~4년 내에는 가능하다는 점을 당사가 이 분야의 최전방에 있기 때문에 정확히 인지하고 있다. 육상 인테리어와 해상 인테리어는 일맥상통은 하지만 완전히 다른 분야이다.
육상 인테리어 실력이 뛰어난 일본에서 독일선주 Aida 크루즈선을 건조하면서 약 2조원의 적자가 발생한 것은 일본 내 해상 인테리어 전문회사 인프라가 부족했던 것이 주원인 중 하나였다. 공사스케줄에 쫓겨서 많은 숫자의 고임금 인테리어 시공작업자들을 유럽에서 장기간 고용했으니 엄청난 경비가 소요된 것이다. 미츠비씨 중공업의 선체 건조기술은 세계 톱 수준이지만 인테리어 시공에서 실패했다. ㈜제이텍은 실전경험을 위해 약 1억의 경비를 사용해서 대형 크루즈선 3척을 승선해서 책자를 제작했다. 일본 조선소 실패 결과를 타산지석의 교훈으로 삼았다.

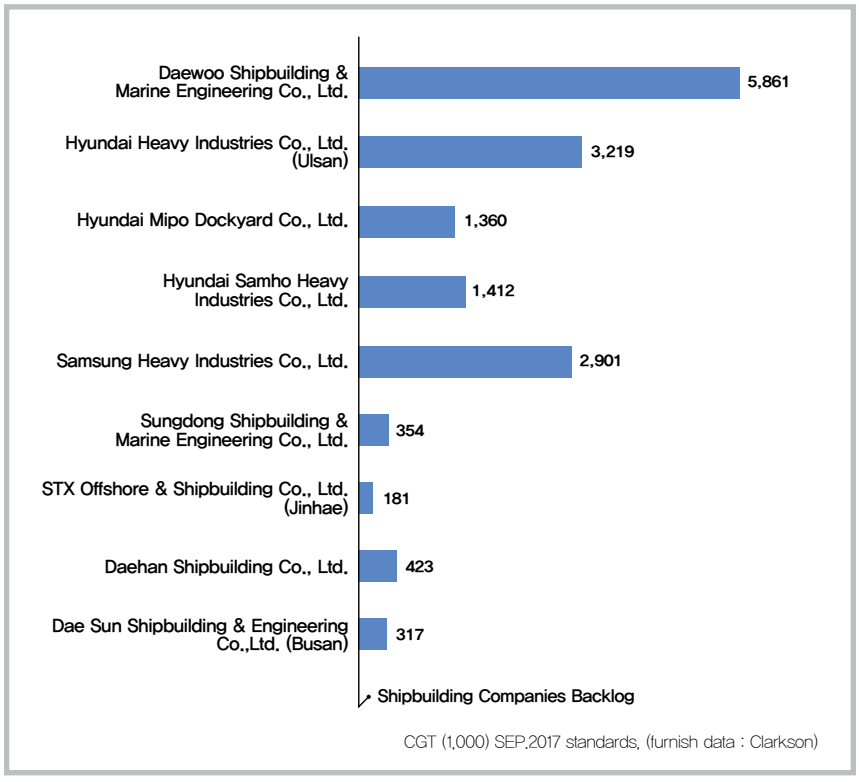
셋째, 크루즈선 건조의 경험을 간접적으로 쌓아야 한다. 중국은 최근 정부 주도의 강력한 재정적 뒷받침으로 중국 자체 크루즈선을 여러 척 동시에 건조하기 시작했다. 따라서 중국시장 진출을 가장 가까운 목표로 설정해야 한다. 중국 조선소에서 유럽 회사들과 경쟁해서 실력을 인정받아야 한다. 경쟁에서 이기지 못하면 우물 안의 개구리 실력이라고 보면 맞다. ㈜제이텍은 이미 몇 차례 중국 조선소와 미팅을 통해 축적한 기술력을 인정받아 정식으로 견적에 참여할 기회를 획득했다. 중국 자체 크루즈선은 한중일 3국 및 동남아시아 시장을 겨냥해 미국에 입항하지 않기 때문에 'USPHS RULE'을 적용받지 않는다. USPHS RULE을 적용 받는 세계 일주 가능한 대형 크루즈선의 이전 단계로 국내 기자재업계에서 도전해볼 수 있는 환경이다. 중국은 "실사구시" 일환으로 유럽 조선소가 거의 독점하는 중형 크루즈선 건조시장에 이미 진입했다.

넷째, 크루즈선 건조를 위한 기술명장을 키워야 한다. 재정적자로 인해 국내 대형 조선소들의 인력 감축으로 보유기술력이 줄어들어 기자재업계가 대신해서 기술력을 올려야 한다고 생각한다. 조선소를 퇴사한 기술자들을 고용하거나 장기 고용을 기반으로 자체 R&D를 통해 기술력을 키워야 한다. ㈜제이텍은 이 점에서 10년 전부터 장기 플랜으로 기술명장을 키우고 있다. 크루즈선 건조는 어느 나라가 더 많은 기술명장을 가지고 있느냐의 싸움이다. 현장에서 만나는 고도의 기술력을 가진 유럽명장(동구권 포함)들과 경쟁해서 이겨야 한다. 유럽 명장들도 시간의 흐름과 함께 쇠퇴할 것이 분명하므로 지금부터라도 기술명장을 키워야 한다.

다섯째, 앞으로 우리 조선 선실기자재업계의 자세는? 지금까지의 조선기자재업계는 대형조선소 중심으로 쏟아져 나오는 물량을 비교적 쉽게 수주했고 그러한 물량을 처리하는데 급급해서 R&D를 통한 기술개발에 소홀했던 점을 반성해야 한다. 일부 회사는 이미 세계 최고라는 자만심을 가졌다고 보는데 이는 외국업체들의 꾸준한 R&D를 도외시하는 잘못된 자세라고 본다. 국내시장의 규모로 인해 매출액은 세계 최고인 회사라는 점은 사실이지만 기술력은 세계 최고가 아닌 것을 어떻게 평가할 것인가? 기업은 기술력을 염두에 두지 않으면 일시적으로 히든 챔피언이 될 수도 있지만 그 영광의 시간은 짧다. 명실상부 기술력을 중요시하는 CEO들만 많아지면 제2의 번성기가 올 것이다. 10여년전 정부 주도로 시도했던 크루즈선 발전 마스터플랜은 사전 준비가 부족했기 때문에 실패로 끝났다고 생각한다. 지금부터는 정부 주도가 아닌 업계 자체 주도로 크루즈선을 대비한 협의체를 만들어야 한다고 생각한다.

Korean shipyards claimed global top spot in monthly new order intake in 3 months. According to Clarkson, new orders at Korean shipyards stood at 130,000 CGT (9 vessels) in August this year. Global order placement showed an one-third decrease to 510,000 CGT (33 vessels) from the previous month (157,000 CGT with 44 vessels). Chinese shipyards and Japanese shipyards took the second spot and third spot, respectively, with 110,000 CGT (7 vessels) and 40,000 CGT(2 vessels).

Cumulative global orders up to the previous month stood at 12.73 million CGT (489 vessels), increasing by 3.70 million CGT compared to the same period of the previous year (9.03 million CGT with 404 vessels). By country, Chinese shipyards claimed the top spot with 4.22 million CGT (195 vessels) and Korean shipyards took the second spot with 3.48 million CGT (104 vessels). Japanese shipyards took the third spot with 1.09 million CGT (58 vessels).



Price for ultra-large containership with a capacity of 16,000 TEU or higher, which is the flagship vessel of Korean shipyards, and newbuilding price for 174,000m^3 LNG carriers slid by USD 1 million apiece. Meanwhile, Clarkson Newbuilding Price Index hit 124 points in August, rising by 1 point in a month.

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: Hyundai Heavy Industries Co., Ltd.

SHI clinched an order for 2 shuttle tankers

Samsung Heavy Industries (SHI) announced on August 25 that it concluded a contract worth KRW 309.2 billion with Teekay, a Canada-based shipping company, to build 2 shuttle tankers. These vessels are scheduled for delivery by early 2020.

Shuttle tankers refer to oil tankers used to transport crude oil produced from offshore oil fields to onshore storage facilities. They are often deployed in oil fields located at the North Sea of Europe and off the coast of Eastern Canada and Brazil. Particularly, shuttle tankers are outfitted with state-of-art position control systems, such as dynamic positioning system, etc., to maintain certain position at the sea battered by high waves, gale and tidal current and to dock stably on oil production facilities.

Meanwhile, SHI has stood out in shuttle tanker segment based on its leading-edge technologies and extensive track records in shipbuilding.

삼성중공업, 셔틀탱커 2척 수주

삼성중공업은 캐나다 선사인 티케이(Teekay)로부터 한화로 3,092억원 규모의 셔틀탱커 2척 건조 계약을 체결했다고 지난 8월 25일 발표했다. 이들 선박은 2020년 초에 인도될 예정이다.

셔틀탱커는 해상 유전에서 생산한 원유를 선적해 육상의 저장기지로 실어 나르는 역할을 하는 유조선을 말한다. 유럽의 북해와 캐나다 동부, 브라질 해상 유전지대에 주로 투입되고 있다. 특히 셔틀탱커는 높은 파도와 바람, 조류의 영향을 받는 해상에서 일정한 위치를 유지하며 원유생산설비에 안정적으로 접안할 수 있도록 다이나믹 포지셔닝 시스템 등 첨단 위치제어 장비를 탑재하는 것이 특징이다.

한편 삼성중공업은 앞선 기술력과 오랜 건조 경험을 바탕으로 셔틀탱커 수주 시장에서 두각을 나타내고 있다.

DSME won an order from Hyundai Merchant Marine for 5 VLCCs

Daewoo Shipbuilding & Marine Engineering (DSME) announced on September 4 that it won an order worth approximately USD 420 million from the nation's largest shipping company Hyundai Merchant Marine for 5 units of 300,000-ton VLCCs (Very Large Crude Carriers). This order came in about 5 months after DSME executed the LOI (Letter of Intent) for construction of 5 VLCCs (5 optional vessels) last April. Moreover, this contract includes an option for up to 5 additional vessels, raising expectation for subsequent orders in the period ahead.

Measuring 336m in length and 60m in width, these vessels are the next-generation eco-friendly vessels meeting the requirements of environmental regulations set forth by the IMO(International Maritime Organization) and incorporate the latest technologies of DSME such as high-efficiency engine and fuel-saving technology. They will be built at Okpo shipyard on Geoje Island and delivered by 2019.

In 2011, 5 units of large-scale containerships with a capacity of 13,000 TEU, the nation's largest, were ordered by Hyundai Merchant Marine to DSME. In 2013, DSME and Hyundai Merchant Marine joined hands in the construction of 6 units of 10,000 TEU

containerships ordered by Zodiac and chartered out to Hyundai Merchant Marine, which reflected strong relationship of trust between both companies.
An official from DSME said, "Domestic and overseas ship owners are showing unlimited trust in the shipbuilding capability and technologies of DSME. We will reciprocate the trust of ship owners with delivery of the best vessels."
The latest contract brings total value of vessels ordered with DSME to USD 1.75 billion with 18 vessels including 2 LNG carriers, 14 VLCCs, and 2 special-purpose vessels.

대우조선해양, 현대상선으로부터 초대형유조선 5척 수주

대우조선해양은 국내 최대해운사인 현대상선으로부터 30만톤급 규모의 초대형유조선(VLCC) 5척을 약 4억 2000만 달러에 수주했다고 지난 9월 4일 밝혔다. 이는 지난 4월 초대형유조선 5척(옵션 5척에 대한 건조의향서를 체결한 뒤 약 5개월만에 본계약을 체결하게 된 것이다. 이와 함께 이번 계약에는 최대 5척을 추가로 발주할 수 있는 옵션이 포함되어 있어, 향후 추가 계약도 기대된다.

이번에 수주한 선박은 길이 336미터, 너비 60미터 규모로, 국제해사기구(IMO)의 환경규제 기준에 충족하는 차세대 친환경선박으로 고효율 엔진과 최신 연료절감 기술 등 대우조선해양의 최신 기술이 적용된다. 이 선박들은 거제 옥포조선소에서 건조돼 오는 2019년까지 모두 인도될 예정이다.
현대상선은 지난 2011년 국내 해운사가 운영하는 컨테이너선 중 가장 큰 13,000TEU급 대형 컨테이너선 5척을 대우조선해양에 발주한바 있으며, 지난 2013년에도 조디악이 발주하고 현대상선이 용선한 10,000TEU급 컨테이너선 6척도 대우조선해양과 함께 프로젝트를 진행하는 등 깊은 신뢰 관계를 이어오고 있다.
대우조선해양 관계자는 "국내외 선주들이 대우조선해양의 건조능력과 기술력에 대해서 무한한 신뢰를 보내고 있다"며"선주들의 신뢰에 보답하기 위해서 최고의 선박을 건조해 인도하겠다"고 말했다.
한편 대우조선해양은 올해 현재까지 LNG선 2척, VLCC 14척, 특수선 2척 등 총 18척 17억5000만 달러 상당의 선박을 수주하고 있다.

HMD secured an order from Bahri 4 bulk carriers

Hyundai Mipo Dockyard (HMD) inked a contract with Saudi Arabia's state-owned shipping company Bahri to build 4 units of 81,000 DWT bulk carriers. This contract is valued at USD 120 million (approximately KRW 135 billion) and is expected to bring much-awaited respite to HMD struggling amid workforce downsizing in the shipbuilding segment of Hyundai Heavy Industries due to a plunge in order backlog.
These vessels will be built at Hyundai-Vinashin Shipyard in Vietnam and delivered to Bahri by 2020. Bahri plans to operate those vessels for export and import of grains such as barley, wheat, and corn.
For Hyundai-Vinashin Shipyard which has focused on MR (Medium Range) tankers, the latest order for bulk carriers came 4 years after it received an order from Greece-based Atlantic Bulk Carrier for 3 units of 62,000 DWT bulk carriers in 2013. Meanwhile, HMD has been moving aggressively to clinch new orders with a focus on MR tankers this year.

현대미포조선, 바흐리로부터 벌크선 4척 수주

현대미포조선은 사우디아라비아 국영 해운사 바흐리(Bahri)로부터 81,000DWT급 벌크선 4척에 대한 건조계약을 체결했다. 수주 규모는 1억2000만 달러(약 1,350억원)로, 현재 수주잔량 부족으로 현대중공업 조선부문 유휴인력 구조조정에 나서는 등 어려운 시기에 거둔 쾌거다.

이번에 수주한 선박은 베트남 현대-비나신 조선소에서 건조된 후 오는 2020년까지 바흐리에 인도될 예정이며, 바흐리는 보리 · 밀 · 옥수수 등 곡물 수출입 사업에 활용할 계획인 것으로 전해졌다.
현대-비나신 조선소는 그 동안 MR(Medium Range) 탱커 위주로 선박 수주 및 건조에 주력해왔으며, 이번 벌크선 수주는 4년 만이다. 현대-비나신 조선소는 지난 2013년 그리스 선사인 아틀란틱벌크캐리어(Atlantic Bulk Carrier)로부터 62,000DWT급 벌크선 3척을 수주가 마지막이었다. 한편 현대미포조선은 올해 들어 MR 탱커 위주로 적극적인 선박 수주에 나서고 있다.

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

2016	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

*Note : Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until Sept 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 & Submarine 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

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

Korean shipyards pull themselves out of doldrums by winning oil tanker orders

- 3 domestic shipbuilding heavyweights with unrivalled competitiveness for new orders

All of the 3 domestic shipbuilding heavyweights booked new orders, raising expectation for a turnaround in shipbuilding market. Samsung Heavy Industries (SHI) recently received an order from the Russia's state-owned Sovcomflot (SCF) for 1 unit of 42,000 DWT shuttle tanker while Daewoo Shipbuilding & Marine Engineering (DSME) is expected to win an order from Hyundai Merchant Marine for 5 VLCCs (5 optional vessels) soon. Hyundai Heavy Industries (HHI) is currently negotiating with the client on the effectiveness of the option in the Suezmax-class oil tanker contract signed last May.
All of the 3 domestic shipbuilding heavyweights need to obtain additional orders to meet their annual new order target. In the second half of this year, they are expected to focus on clinching new orders for high value-added vessels such as LNG carriers, ultra-large containerships, eco-ships, etc.

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-http://wwww.hbc-korea.co.kr, http://www.hbc-radiomatic.com

DAEWOO SHIPBUILDING & MARINE ENGINEERING CO., LTD.

• Address : 85, Da-dong, Jung-gu, Seoul, Korea • Tel : +82-2-2129-0114 • Fax : +82-2-2129-0077~8 • http://www.dsme.co.kr

• Products : *LNG Carriers, LNG-RVs, LNG-FPSOs/FSRUs, LPG Carriers, LPG-FPSOs, ULCCs, VLCCs, Suezmax/Aframax/Panamax Tankers, Shuttle/Chemical Tankers, Product Carriers, Containerships, Capesize/ Kamsarmax/ Supramax Bulk Carriers, Ore Carriers, VLOCs, Ro-Ro Ships, PCTCs, Passenger Car Ferries, FPSOs, FSOs, FPUs, Drill Ships, Semi-Submersible Drilling Rigs, Fixed Platforms, Submarines, Submarine Rescue Vessels AUVs, Destroyers, Battle Ships*

HYUNDAI HEAVY INDUSTRIES CO., LTD.

• Address : 1, Jeonha-dong, Dong-gu, Ulsan, Korea • Tel : +82-52-202-2114 • Fax : +82-52-202-3470 • http://www.hhi.co.kr

• Products : *Bulk Carriers, Containerships, Tankers, VLCCs, Product Carriers, Multi-purpose Cargo Ships, OBO Carriers, Pure Car Carriers, LPG Carriers, Ro-Ro Ships, Chemical Tankers, Offshore Rigs/Barges, LNG Carriers, Passenger Ships, Drill Ships, Special & Naval Ships, FPSO, FSO, Semi-submersible Drilling Rig, Other Vessels*

SAMSUNG HEAVY INDUSTRIES CO., LTD.

• Address : 1321-15, Seocho-Dong, Seocho-Gu, Seoul, Korea • Tel : +82-2-3458-7312 • Fax : +82-2-3458-7319 • http://www.shi.samsung.co.kr

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

HYUNDAI SAMHO HEAVY INDUSTRIES CO., LTD.

• Address : 1700, Yongdong-ri, Samho-eup, Yeongam-gun, Jeollanam-do, Korea • Tel : +82-61-460-2114 • Fax : +82-61-460-3701

• http://www.hshi.co.kr

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

HYUNDAI MIPO DOCKYARD CO., LTD.

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

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

SUNGDONG Shipbuilding & Marine Engineering CO., LTD.

• Address : 940, Gongdan-ro, Gwangdo-myeon, Tongyeong-si, Gyeongsangnam-do, 53006, South Korea

• Tel : +82-55-647-7435/7415 • Fax : +82-55-647-5065 • http://www.isungdong.com

• Products : *Crude Oil Tankers, Product Carriers, Chemical Tankers, Shuttle Tankers, Container Carriers, Bulk Carriers, FSO*

HANJIN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.

• Address : 29, 5-ga, Bongnae-dong, Yeongdo-gu, Busan, Korea • Tel : +82-51-410-3240 • Fax : +82-51-410-8477 • http://www.hanjinsc.com

• Products : *Container Carriers, Product/Chemical/Crude Oil Tankers, LNG/LPG Carriers, Cable Ships, Supply Boats, Semi-Submersible Drilling Rigs, Dredgers, Navel Ships, Special Purpose Ships, Bulk Carriers*

DAESUN SHIPBUILDING & ENGINEERING CO., LTD.

• Address : 12, 4-ga, Bongrae-dong, Yeongdo-gu, Busan, Korea • Tel : +82-51-419-5090~1 • Fax : +82-51-416-7965 • http://www.daesunship.co.kr

• Products : *Container Ships, Bulk Carriers, Tankers, MPC & General Cargo Ships, Gas Carriers, Ro/Ro ships, Tug Boats, Fishing Boats/Vessels, Special Purpose Vessels*

KOMEA (Korea Marine Equipment Association)
Member List

AMIR Marine Co., Ltd.
Location : YEONGDO-GU, BUSAN
Website : www.amir.co.kr
Main Products : Piston Ring
TEL : +82 51 413 9600

AMS Co., Ltd.
Location : HAEUNDAE-GU, BUSAN
Website : www.albatros.co.kr
Main Products : Unit Toilet/Wall & Celling Panel, Heat Exchangers (Plate Shell & Tube), etc.
TEL : +82 51 293 1035

A-TECH
Location : GANGSEO-GU, BUSAN
Website : www.atech2004.co.kr
Main Products : Small davit, Air motor, Air winch
TEL : +82 51 832 0723

BC TAECHANG IND. Corp.
Location : JUNG-GU, BUSAN
Website : www.bcinternational.co.kr
Main Products : Ultimate solution for onboard crew maintenance, Deck scaling machine
TEL : +82 51 442 6191

Bethel Engineering Co., Ltd.
Location : NAMYANGJU-SI, GYEONGGI
Website : www.nmg.kr
Main Products : Magic Grating (Steel grating)
TEL : +82 31 593 2712

B-I INDUSTRIAL Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.b-i.co.kr
Main Products : Fire Detection System, Gas Detection System, Navigation Watch Alarm System, Moisture Detection System
TEL : +82 51 441 5670

BIP INDUSTRIES Co., Ltd.
Location : GEUNJEONG-GU, BUSAN
Website : www.bn-bip.com
Main Products : Wall panel, Ceiling panel, Bathroom unit, Cabin unit, Floating floor, TLQ, Marine furniture, Marine door, etc.
TEL : +82 51 519 2000

BOGO Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.bogoco.co.kr
Main Products : Telephone system, Lighting fixture
TEL : +82 51 294 7771

BO MYUNG METAL Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.bmmetal.co.kr
Main Products : Cooper & Cooper-Alloy Pipes & Plates, Fittings, Flanges
TEL : +82 51 266 4101

Bumhan Industries Co., Ltd.
Location : CHANGWON, GYUNGNAM
Website : www.bumhan.com
Main Products : Air compressor, N2 generator, High pressure control valve
TEL : +82 55 251 6070

BY CONTROLS, Inc.
Location : GIMHAE-SI, GYUNGNAM
Website : www.bycontrols.com
Main Products : Watertight door, Pilot door, Hydaulic hatch, etc.
TEL : +82 55 345 6110

BYT Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.byhd.co.kr
Main Products : HARDWARE, OUTFITTING, MARINE OUTFITTING, NEW PRODUCTS
TEL : +82 51 974 5000

CENTURY Corp.
Location : YANGSAN-SI, GYUNGNAM
Website : www.capeind.com
Main Products : Cylinder liner, Man B&W Sulzer (Wartsila) Type www.capeind.com YANGSAN-SI, GYUNGNAM
TEL : +82 55 370 1234

CHK Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.chkj.co.kr
Main Products : Ref. container socket, Juction box
TEL : +82 51 831 9500

ChungSol Marine Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.chungsolmarine.co.kr
Main Products : Window wiper, Straight line type, Clear view screen, Window, Door, Hatch
TEL : +82 51 832 2226

ChungSong Industry Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.koweld.co.kr
Main Products : Welding auto carriage, LWS, etc.
TEL : +82 55 329 9500

CMR KOREA Co., Ltd.
Location : KUMJUNG-GU, BUSAN
Website : www.cmrkorea.com
Main Products : Marine telephone system, Public address system, Communal aerial system, Marine CCTV system, Marine clock system, Anemometer system, Rudder angle indicator system, Temperature sensor, Pressure sensor
TEL : +82 51 521 2883

Dae Chang Metal Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.dcm.co.kr
Main Products : Propeller boss, Chain wheel cam, Dummy ring, Valve body, etc.
TEL : +82 51 264 0831

Dae Heung Cooler Co., Ltd.
Location : POCHEON-SI, GYEONGGI
Website : www.cooler.co.kr
Main Products : Heat exchanger
TEL : +82 31 532 9667

DAE KWANG IND Co., Ltd.
Location : GANGSEO-GU, BUSAN
Main Products : SUS PIPE FITTING FLANGE
TEL : +82 51 831 5886

Daechun Industrial Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.daechun.co.kr
Main Products : Multi-core tube, Stainless steel tube
TEL : +82 55 345 2288

DAEHA Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.daehatech.co.kr
Main Products : Hydraulic Pressure Testing Equipment, Cylinder, Pump, Torque Wrench
TEL : +82 51 326 1870

DAEJIN SAT Co., Ltd.
Location : ULJU-GUN, ULSAN
Website : www.daejinsat.com
Main Products : Ceiling panel
TEL : +82 52 225 2361

DAEJUNG Co., Ltd.
Location : SASANG-GU, BUSAN
Website : www.daejung.net
Main Products : Fiber Rope, Pet/PP Mat, Sports Net
TEL : +82 51 304 2511

DAEJUNG VALVE Co., Ltd.
Location : DALSEO-GU, DAEGU
Website : www.djvalves.com
Main Products : Butterfly Valves, Oil Field flow-line components, Control Valves, Actuators, Special Valves
TEL : +82 53 584 2276

Daemmstoff Industrie Korea Ltd.
Location : SAHA-GU, BUSAN
Website : www.daemmstoff.com
Main Products : KVM SEALING COMPOUND, MANGANA TETAINING COMPOUND (PUTTY, FIRE STOP, PANDA-90, etc.)
TEL : +82 51 261 7073

Daeyang Electric Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.daeyang.co.kr
Main Products : Lighting fixtures, Instruments, SAUV, UUV
TEL : +82 51 200 5221

DAEYANG INSTRUMENT. Co., Ltd.
Location : SAHA-GU, BUSAN
Website : http://dic.daeyang.co.kr/08_affiliate/affiliate_01.php
Main Products : Precision instruments - Anemometer, Rudder angle indicator, etc.
TEL : +82 51 200 5212

DaiHan Anchor Chain MFG. Co., Ltd.
Location : NAM-GU, INCHEON
Website : www.dhac.co.kr
Main Products : Anchor chain, Offshore mooring stud, etc.
TEL : +82 32 862 0091

DHMC Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.dhmc-rudder.com
Main Products : Rudder, Block, etc.
TEL : +82 55 346 3663

DECKWIN. Co.
Location : YEONGDO-GU, BUSAN
Website : www.deckwin.com
Main Products : Cable winch, Windlass, Mooring Winch, Capstan etc.
TEL : +82 51 405 7890

DINGJIN MPTECH
Location : GIMHAE-SI, GYUNGNAM
Main Products : Part for Marine Engine, Shaft System
TEL : +82 55 720 7000

DK Tech Corporation
Location : GIMHAE-SI, GYUNGNAM
Website : www.dklok.com
Main Products : Instrumentation fitting & valve
TEL : +82 55 338 0114

DMC Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.dongnam-crane.co.kr
Main Products : Offshore crane, Deck cranes, Floating cranes
TEL : +82 55 720 3000

DNP Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.dnpco.kr
Main Products : Accommodation system
TEL : +82 51 831 4551

Dong Hae M-Tech Co., Ltd.
Location : SEO-GU, INCHEON
Website : www.east-sea.co.kr
Main Products : Grab bucket, Orange grab, Motor grab, Wood grab, etc.
TEL : +82 32 583 8061

Dong Kang M-Tech Co., Ltd.
Location : GANGNAM-GU, SEOUL
Website : www.dkmtech.com

Main Products : Water jet, Night navigator
TEL : +82 2 553 0181

Dong Woo Machinery & Engineering Co., Ltd.
Location : CHANGWON, GYUNGNAM
Main Products : Engine room overhead crane, F.O hose handling davit, etc.
TEL : +82 55 295 3261

Dong-A Valve Ind. Co.
Location : GANGSEO-GU, BUSAN
Website : www.donga-valve.com
Main Products : Manufactured low & high pressure valves, Flap check (duo-check) valve, etc.
TEL : +82 51 831 1500

Dongbang Marine Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.dbmarine.co.kr
Main Products : MARINE FIRE DETECTION & ALARM SYSTEM, MARINE FIRE EXTINGUISHING SYSTEM
TEL : +82 51 205 1585

DONGHWA ENTEC
Location : GANGSEO-GU, BUSAN
Website : www.dh.co.kr
Main Products : Heat exchanger, Plate cooler, etc.
TEL : +82 51 970 1000

DongHwa Pneutec Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.dhkomp.co.kr
Main Products : Air/gas compressor
TEL : +82 51 974 4800

D-I Industrial. Co., Ltd.
Location : JINJU-SI, GYEONGNAM
Website : www.d-i.co.kr
Main Products : Marine Transmission, Power Take off, Steering System
TEL : +82 55 760 5500

DooSan Engine Co., Ltd.
Location : CHANGWON, GYUNGNAM
Website : www.doosanengine.com
Main Products : Marine diesel engine, Diesel engines for power generation
TEL : +82 55 260 6000

DRB Holding Co., Ltd.
Location : YEUNGDEUNGPO-GU, SEOUL
Website : www.drbworld.com
Main Products : Marine rubber fender, Industrial rubber sealing & gasket, Industrial rubber track, Rubber damper
TEL : +82 2 2168 9133

ELSCOM Inc.
Location : SASANG-GU, BUSAN
Website : www.elscom.co.kr
Main Products : Explosion-Proof Products, Distribution Board Components, Solar Cable/PV JB
TEL : +82 51 329 8990

Emerson Process Management Korea Ltd.
Location : SEONGNAM-SI, GYEONGGI
Website : www.emersonprocess.co.kr
Main Products : Pressure, Temperature, Level, Analytical & Flow Measurenet, Valves, Tank radar level guaging, etc.
TEL : +82 2 3438 4600

ENTECH (Engineering & Technology Co., Ltd.)
Location : CHANGWON-SI, GYEONGNAM
Website : www.tkhic.com
Main Products : Engine Bed/Frame box, Crane Pedestal, Tubular (SAW Pipe), Air Reservoir, Jacket, Pile, Wind Tower
TEL : +82 70 4628 8844

ESAB SeAH Corp.
Location : CHANGWON, GYUNGNAM
Website : www.esab.co.kr
Main Products : Flux cored wire
TEL : +82 55 289 8111

Flutek, Ltd.
Location : SEONGSAN-GU, GYEONGNAM
Website : www.flutek.co.kr
Main Products : Axial piston pumps, Axial piston motors & reduction gear, Electro-hydraulic steering gear, Deck machinery, Staffa motor, ECO servo
TEL : +82 55 570 5800

FRIEND Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.thefriend.co.kr
Main Products : Engine valve spindle, Cable tray
TEL : +82 51 974 7911

GASTRON Co., Ltd.
Location : GUNPO-SI, GYEONGGI
Website : www.gastron.com
Main Products : Installation-Type Detector, Portable Gas Detector, Acid Leak Detecting Paint, Alarm Signalling
TEL : +82 31 490 0800

G.S HIGH-TECHER Co., Ltd.
Location : MIRYANG-SI, GYENGNAM
Website : http://gshightecher.koreasme.com
Main Products : Air vent head, Convex coupling
TEL : +82 51 832 0456

GENERAL MARINE BUSINESS
Location : NAM-GU, INCHEON
Website : www.gmbmarine.com
Main Products : Marine system (ship shore comm. system, emergency shutdown system, etc.), Defense Eng. (Control & monitoring system integration, etc.),Manufacturing & services (new shipbuilding, module production)
TEL : +82 52 270 3500

GESKO Co., Ltd.
Location : GANGSEO-GU, BUSAN
Main Products : CNG Transportation&Refilling, Fire Fighting system, Engineering for Fire fighting system & Ballast treatment system, Annual inspection
TEL : +82 51 973 9913

GS-Hydro Korea Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.gshydro.com
Main Products:Flare flange system, Retaining ring system
TEL : +82 51 266 8221

TECH FLOWER Co., Ltd.
Location : SASANG-GU, BUSAN
Website : www.haean21.com
Main Products : Marine crane, Deck machinery
TEL : +82 51 320 8222

Haewon Ind. Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.haewon.net
Main Products : Water seal, Inflatable/mating ring
TEL : +82 51 831 4600

Halla Industrial Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.hallaiq.co.kr
Main Products : Non seal canned motor pump, Gear pump
TEL : +82 51 264 2201

Han Jo Co., Ltd.
Location : YOUNGDO-GU, BUSAN
Website : www.hanjoms.co.kr
Main Products : Lubication oil filter, Fuel oil filter, Filter elements
TEL : +82 51 414 7201

Hankook Flexible Co.
Location : SASANG-GU, BUSAN
Website : www.hkflex.com
Main Products : Metalic flexible hose, Metallic expansion joint, Manufacturing of Metalic flexible hose assemblies
TEL : +82 51 508 6291

HanKuk Miboo Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.hankukmiboo.co.kr
Main Products : Spiral duct, Cold chamber, Deck covering, Level
TEL : +82 51 263 3621

HANLAIMS Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.hanlaims.com
Main Products : Instruments (Level gauge/Level switch) Tank remote sounding system/Cargo monitoring system, valve
TEL : +82 51 601 7016

HANSHIN ELECTRONICS Co., Ltd.
Location : YOUNGDO-GU, BUSAN
Website : www.ehanshin.com
Main Products : Public address sys., Telephone sys.
TEL : +82 51 412 5551

HANSUN ENGINEERING Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.slok.co.kr
Main Products : Instrument Tube Fittings, Instrument Valves, Filters, Condensate Pot
TEL : +82 51 899 6700

HEARTMAN Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.heartman.co.kr
Main Products : Fuel injection nozzle for marine diesel engine, Fuel injection plunger ass'y for marine diesel engine
TEL : +82 51 264 8826

HI AIR KOREA Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.hiairkorea.co.kr
Main Products : Air handling unit, Spot cooler, Refrigeration condensing unit, Fire damper, Provision refrigeration plant, MGO cooling system, Packaged air conditioner, Ventilation fan, Spiral duct
TEL : +82 55 340 5000

Hi Tech Co., Ltd.
Location : GYUNGJU-SI, GYUNGBUK
Main Products : T-Bar, Gas Protect Plate
TEL : +82 54 776 5310

HOSEUNG ENTERPRISE Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.hosent.co.kr
Main Products : Sewage Treatment System, Plasma Bilge Separator, E/R Package Unit, Tank Package Unit, Ventilator
TEL : +82 51 831 2233

HODU INDUSTRIAL Co.
Location : GANGSEO-GU, BUSAN
Website : www.hoducompany.com
Main Products : Catering furniture, Galley hood W/fire fighting, Galley E/Q (Deep fat fryer/Cooking range, etc.)
TEL : +82 51 271 3342

Hy-Lok Corporation
Location : GANGSEO-GU, BUSAN
Website : www.hy-lok.com
Main Products : Tube fitting & valve, Double lock & bleed valve, Cryogenic valve
TEL : +82 51 970 0800

HYUNDAI HEAVY INDUSTRIES Co., Ltd.
Location : DONG-GU, ULSAN
Website : www.hhi.co.kr
Main Products : Marine diesel engine & machinery w
TEL : +82 52 202 7291

Hyundai Elevator Co., Ltd.
Location : ICHEON-SI, GYEONGGI
Website : www.hyundaielevator.co.kr
Main Products : Lifts (elevator, escalator, moving walk), Logistics automation system, Parking system (automobiles, bicycles), SOC infrastructure systems (platform screen door, automatic folding canopy, gap zero, etc.)
TEL : +82 31 644 5114

Hyundai Fitting Co., Ltd.
Location : GIJANG-GUN, BUSAN
Website : www.hdfco.co.kr
Main Products : Flange
TEL : +82 51 831 0891

HLB Co., Ltd.
Location : ULJU-GUN, ULSAN
Website : www.hdboat.com
Main Products:Lifeboat , GRP rigid-type rescue boat
TEL : +82 52 240 3500

Hyundai Marine Machinery Co., Ltd.
Location : SEO-GU, INCHEON-SI
Website : www.hmmco.co.kr
Main Products : W.O. incinerator, Aux/blower, F.D fan
TEL : +82 32 583 0671

HYUNDAI WELDING Co., Ltd.
Location : GANGNAM-GU, SEOUL
Website : www.hyundaiwelding.com
Main Products : Covered electrode arc welding consumables, Sub-merged arc welding flux & wire, Soild wire arc welding consumables, Flux cored wire, MIG TIG arc welding consumables, Welding machines
TEL : +82 2 6230 6883

I.M.E. CORPORATION
Location : GIMHAE-SI, GYUNGNAM
Website : www.promarine21.com
Main Products : Engine valve spindle & seat
TEL : +82 55 346 1127

ILJIN AND Co., Ltd.
Location : GIJANG-GUN, BUSAN
Website : www.iljinamst.co.kr
Main Products : Fire detection system, Gas detection system, Emission monitoring system, Water spray & cargo spray system, etc.
TEL : +82 51 755 6191

ILSHIN ENGINEERING Co., Ltd.
Location : SIHEONG-SI, DYEONGGI
Website : www.ilshineng.com
Main Products : Chemical equipment and Tanks
TEL : +82 31 499 4502

ILSUEUNG Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.ilseung.co.kr
Main Products : Sewage Treatment plant, Fresh water generator, Oil purifier
TEL : +82 51 831 4110

IL-SUNG IND. Co.
Location : SASANG-GU, BUSAN
Website : www.ilsunghs.co.kr
Main Products : Hot water calorifier, Silencer (For M/E, G/E, fan), Mist eliminator, Washable
TEL : +82 51 312 4056

International Machine Tool Co.
Location : SASANG-GU, BUSAN
Website : www.clampimt.com
Main Products : Vertical clamp, Horizontal clamp, etc.
TEL : +82 51 314 2038

INTRA PRECISION MANUFACTURE Co., Ltd.
Location : DONG-GU, BUSAN
Website : www.intraspare.co.kr
Main Products : PISTON CROWN, CYLINDER LINER, CYLINDER COVER, PISTON SKIRT, WATER JACKET
TEL : +82 51 466 4635

JHK Inc.
Location : YANGSAN-SI, GYUNGNAM
Main Products : Container fittings, Lashing fittings
TEL : +82 55 346 2225

JINSEONG LINER & PISTON
Location : DAEDEOK-GU, DAEJEON
Website : www.jinseong.com
Main Products : Cylinder liner, Piston
TEL : +82 42 931 8558

JONGHAP MACHINERY Co.
Location : YANGSAN-SI, GYUNGNAM
Website : http://jonghap.biz
Main Products : Sewage treatment plant, T-bar auto welding machine
TEL : +82 55 370 2600

JUNG GONG IND. Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.jung-gong.com
Main Products : Marine window, Fire-resistant window, Marine wiper, Clear view screen,
TEL : +82 51 261 2911

JUNG-A MARINE
Location : GANGSEO-GU, BUSAN
Website : www.jung-a.co.kr
Main Products : Accommodation ladder, Pilot slant ladder, Wiper, CVS, Sunscreen davit,
TEL : +82 51 970 6420

JUNGSAN ENTERPRISE Co., Ltd.
Location : ULJU-GUN, ULSAN
Website : www.jungsan.com
Main Products : Marine engine parts
TEL : +82 52 254 3290

K.C. Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.iccp-mgps.com
Main Products : Impressed current cathodic protection (I.C.C.P) system, Anti-fouling system (M.G.P.S), Shaft earthing device
TEL : +82 51 831 7720

Kangrim Heavy Industries Co., Ltd.
Location : CHANGWON, GYUNGNAM
Website : www.kangrim.com
Main Products : Marine boiler, Plant, LPG tank
TEL : +82 55 269 7700

Kangrim Insulation Co., Ltd.
Location : GIJANG-GUN, BUSAN
Website : www.kangrim.com
Main Products : Tank, Pipe insulation, Cold provision store
TEL : +82 51 200 6000

Keonchang Industry Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.keonchang.co.kr
Main Products : TOP CHARGING EQUIPMENT, HOPPER & CONVEYER, SIDE GUIDE ASS'Y
TEL : +82 51 203 0161

Keum Yong Machinery Co., Ltd.
Location : BUK-GU, DAEGU
Website : www.beumyong.com
Main Products : Exh. valve complete with spindle
TEL : +82 53 382 9044

Key Sung Metal Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.deysungmetal.com
Main Products : Marine valve
TEL : +82 51 831 3391

Keystone Valve (Korea)
Location : ANSEONG-SI, GYEONGGI
Website : www.keystonekorea.com
Main Products : All kinds of valves for offshore and shipbuilding
TEL : +82 51 604 4000

KHAN Co., Ltd.
Location : GEOJE-SI, GYEONGNAM
Website : www.khan-offshore.com
Main Products : Engineering services, Sea-trial & commissioning service, Facility for fabricaton, Modification
TEL : +82 55 639 7600

Kion Printing & Packaging Inc.
Location : GIMHAE-SI, GYUNGNAM
Website : www.kiwon.com
Main Products : Marine equipment & vacuum system
TEL : +82 55 313 9913

KOC ELECTRIC Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.kocelec.com
Main Products : H/V transformer (ATEX, WATER COOLED TYPE), UPS (Uninterruptible Power Supply), Bus way/Bus duct
TEL : +82 51 970 6302

Kokaco Co., Ltd.
Location : YOUNGDO-GU, BUSAN
Website : www.kokaco.com
Main Products : Exhaust Valve Spindle&Bottom Piece Grinding Machine
TEL : +82 51 403 4114

Komeco Co., Ltd.
Location : GIJANG-GUN, BUSAN
Website : www.komeco.net
Main Products : Tacho sys., Electronic equip.
TEL : +82 51 724 5070

Kongsberg Maritime Korea Ltd.
Location : GIJANG-GUN, BUSAN
Website : www.km.kongsberg.com
Main Products : Alarm monitoring system, Cargo monitoring system, Offshore technology
TEL : +82 51 749 8600

KOREA FILTER Co., Ltd.
Location : GIJANG-GUN, BUSAN
Website : www.korea-filter.co.kr
Main Products : STRAINER, OIL FILTER, AIR FILTER, AUTO STRAINER
TEL : +82 51 727 8360

KOTO Technical Co.
Location : SAHA-GU, BUSAN
Website : http://kotofft.com
Main Products : Maintain & repair items (all hydraulic systems, Adjust alignment, centering)
TEL : +82 51 417 8501

KORVAL Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.korval.co.kr
Main Products : Control Valves, Regulating Valves, Heat Sensor, Shut-Off Valves
TEL : +82 51 790 9700

KSP Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.kspvalve.com
Main Products : Exhaust valve complete, Exhaust valve spindle
TEL : +82 51 831 6274

KSV (Korea Special Valve) Co., Ltd.
Location : YOUNGDO-GU, BUSAN
Website : www.ksv-valve.co.kr
Main Products : Valve spindle and Valve seat for marine diesel engine
TEL : +82 51 415 4466

KTE Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.kte.co.kr
Main Products : High voltage swichboard, Side thruster, Low voltage swichboard, Side thruster control system, Group starter panel, Alarm monitoring system, Electric equipment, etc.
TEL : +82 51 265 0255

Kuk Dong Elecom Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.kukdongelecom.com
Main Products : Lighting fixture
TEL : +82 51 266 0050

KTMI Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.saejinintech.com
Main Products : Emergency towing system
TEL : +82 51 971 9911

KUKDONG ELECTRIC Co., Ltd.
Location : JINCHEON-GUN, CHUNGBUK
Website : www.nexans.co.kr
Main Products : WIRE All kinds of cables for offshore and shipbuilding including JIS, BS, IEC, DIN, IEEE, etc.
TEL : +82 2 2140 3064

KUMGOKSTEEL INDUSTRY. Co., Ltd.
Location : SEO-GU, INCHEON
Website : www.kgsi.co.kr
Main Products : Steel Gratings, Manhole Covers and Steel Products
TEL : +82 32 564 6759

Kum Kang Precision Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.kkmarine.co.kr
Main Products : Marine valve, valve for engine, air reservoir tank
TEL : +82 51 262 4894

KANGNAM JEVISCO Co., Ltd.
Location : BUSANJIN-GU, BUSAN
Website : www.jevisco.com
Main Products : Shop primer, Anti-corrosive coatings, Anti-fouling coatings, etc.
TEL : +82 51 892 4221

Kwanglim Marine Tech. Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.klmt.co.kr
Main Products : Steel Door, Hull Apteher Blank, Radar Mast, Hi-Pressure Water Mist Fire Fighting System
TEL : +82 51 313 0055

KWANG SAN Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.kwangsan.com
Main Products : AIR VENT HEAD, EXP. JOINT, HEATING COIL, AIR VENT HEAD, EXP. JOINT, HEATING COIL, PIPE SPOOL, ETC.
TEL : +82 51 974 6316

Kwang Seong Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.ikwangsung.com
Main Products : PIPE CABLE HANGER, SPARE PART SEAT, ETC.
TEL : +82 55 338 2271

Kyung Eun Ceramics Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.ke-ceramics.com
Main Products : Ceramic packing
TEL : +82 55 345 7761

Kyungjin Shipping Co., Ltd.
Location : CHANGWON-SI, GYEONGNAM
Website : www.kyungjinshipping.com
Main Products : Exports & Imports of Marine Equipment, Shipping Agent Service, Shipbroking Service, Trading
TEL : +82 55 224 4383

Kyungsung Industry Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.e-clamp.com
Main Products : LNG carrier sus corner & anchor strips & Pipe clamp, etc.
TEL : +82 51 831 4960

LDC-KOREA Co., Ltd.
Location : HAEUNDAE-GU, BUSAN
Main Products : Traders (Marine Equipment), Ship Repair
TEL : +82 51 266 4037

Leeyoung Industrial Machinery Co., Ltd.
Location : ULJU-GUN, ULSAN
Website : www.leeyoung.co.kr
Main Products : Lashing bridge, T-bulkhead block, Covered-block, Engine casing & funnel, Upper deck & module unit, etc.
TEL : +82 52 231 5800

LHE Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.lhe.co.kr
Main Products : Plate heat exchanger, Fresh water generator
TEL : +82 55 340 0625

LS Cable & System
Location : ANYANG-SI, GYEONGGI
Website : www.lscns.com
Main Products : Power cable, Marine & offshore cable, Telecom cable, SUBMARINE CABLE, WINDSOL, SUPERCONDUCTIVITY
TEL : +82 51 310 6781

LUXCO Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.luxco.co.kr
Main Products : Electrical equipment for internal combustion engines, Magnetic products, etc.
TEL : +82 51 260 1300

MIN SUNG Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.minsung.co.kr
Main Products : Steel outfitting, Access hatch, Swing away hatch, Cable tray, Electric cable box, etc.
TEL : +82 51 305 8862

Mirae Industries Co., Ltd.
Location : HAMAN-GUN, GYEONGNAM
Website : www.miraewinch.com
Main Products : Winch, Chain Stopper, Capstan
TEL : +82 55 587 8520

MODERN INTECH Co., Ltd.
Location : SASANG-GU, BUSAN
Website : www.mo-dern.com
Main Products : Fire retardant curtain, Mattress, Upholstery furniture, Fire retardant fabric, Carpet, Rubber flooring
TEL : +82 51 325 0260

MRC (Marine Radio Co., Ltd.)
Location : YOUNGDO-GU, BUSAN
Website : www.mrckorea.com
Main Products : Public address system, Auto telephone sys.
TEL : +82 51 414 7891

MSL Compressor Co., Ltd.
Location : POCHEON-SI, GYEONGGI
Website : www.mslcomp.com
Main Products : Breathing air compressor
TEL : +82 31 541 7000

Mt.H Control Valves Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.mth.co.kr
Main Products : Main starting valve, Crankcase relief valve, Cyogenic safety valves & control valve
TEL : +82 51 974 8800

NK Co., Ltd.
Location:SAHA-GU, BUSAN
Website:www.nkcf.com
Main Products:Ballast water treatment sys., CO_2 sys.
TEL:+82 51 200 0152

NOW Co., Ltd.
Location : YANGSAN-SI, GYEONGNAM
Website : http://nowcan.co.kr
Main Products : Duct, Damper, Fitting, Piston, Ring, Cylinder
TEL : +82 55 387 4811

ONNURIPLAN Co., Ltd.
Location : BUCHEON-SI, GYEONGGI
Website : www.onnuriplan.com
Main Products : Dust & Gas Masks, Sanitary Mask Covers, etc.
TEL : +82 32 681 7780

Oriental Precision & Engineering Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.opco.co.kr
Main Products : Crane, Windlass & Mooring Winch, Life Boat Davit
TEL : +82 51 202 0101

OSCG Co., Ltd.
Location : SASANG-GU, BUSAN
Website : www.oscg.net
Main Products : Cable gland and accessories, GRP junction box
TEL : +82 51 305 3910

OTS Co., Ltd.
Location : SUNCHEON-SI, JEONNAM
Website : www.otshi.co.kr
Main Products : Crane, Winch, A-Frame
TEL : +82 61 724 4100

PANASIA Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.worldpanasia.com
Main Products : Ballast water treatment system/level instrument, Seawater coarse filtration/ Emission gas control system, Engineering services
TEL : +82 51 831 1010

Pie Plus Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.piplus.co.kr
Main Products : Crankshaft, Rudder stock, Motor shaft
TEL : +82 51 831 9338

PROSAVE Co., Ltd.
Location : GIMHAE-SI, GYEONGNAM
Website : www.prosave.co.kr
Main Products : Crankcase Explosion Relief Valve, Smart High Velocity Pressure/ Vacuum Relief Valve, Air Release & Vacuum Breaker Valve
TEL : +82 55 313 3511

S&W Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.snwcorp.com
Main Products : Cam/cam shaft, Valve/seat ring, Engine bolts/ nuts, Bolts
TEL : +82 51 205 7411

S. A. M-Tech
Location : NAMDONG-GU, INCHEO
Website : www.samartkr.com
Main Products : Engine control lever, Engine control cable, Hydraulic steering system, Stern drive, Helm pump, Cylinder, etc.
TEL : +82 32 815 3614

SG Safety Corp.
Location : PYEONGTAEK-SI, GYEONGGI
Website : www.sgsafety.net
Main Products : Inflatable rubber products, Ship ballast water treatment system, Life rafts, Speed boats, River boats, Fishing boats, Water tanks, High-speed boats
TEL : +82 31 651 3012

SAMGONG Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.sam-gong.co.kr
Main Products : Oil purifier, Ship window, Ship accommodation ladder, Cathodic protection system, Elevator type tower gangway, Ship ballast water treatment system, Quick release mooring hook & road monitoring system
TEL : +82 51 200 3040

Samin Information System Co., Ltd.
Location : HAEUNDAE-GU, BUSAN
Website : www.saminis.com
Main Products : EcoInspection, Ecoserver Package
TEL : +82 70 7771 2104

SAMKUN CENTURY Co., Ltd.
Location : MIRYANG-SI, GYEONGNAM
Website : www.samkunok.com
Main Products : F.W. supply unit, BWTS, PE coating, Paint
TEL : +82 70 4034 0226

SAMYANG METAL IND. Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.cuniship.com
Main Products : flanges, fittings
TEL : 82 51 266 6655

Samyoung Machinery Co., Ltd.
Location : GONGJU-SI, CHUNGNAM
Website : www.sym.co.kr
Main Products : Cylinder head, Cylinder liner, Piston & carrier, etc.
TEL : +82 41 840 3000

Samyoung M-TEK Co., Ltd.
Location : HAMAN-GUN, GYEONGNAM
Website : www.symtek.co.kr
Main Products : MBS, Chain wheel, Cylinder cover, etc.
TEL : +82 55 589 7000

SAMYUNG ENC Co., Ltd.
Location : YOUNGDO-GU, BUSAN
Website : www.samyungenc.com
Main Products : AIS/GMDSS radio equip, etc.
TEL : +82 51 601 5555

Sandong Metal Industry Co., Ltd.
Location : GUMI-SI, GYEONGBUK
Website : www.smi-sdhitec.com
Main Products : Manifold, Plug valve, Choke valve, Integral Fittings
TEL : +82 54 472 8311

Saracom Co., Ltd.
Location : YEONGDO-GU, BUSAN
Website : www.saracom.net
Main Products : GMDSS equipment
TEL : +82 51 600 9000

Scana Korea Hydraulic Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.scana.co.kr
Main Products : Actuators, HPU and local control panel, Offloading systems/winches and mooring system/turret/swivel, etc.
TEL : +82 55 343 9007

SEJIN IND Co., Ltd.
Location : CHANGWON, GYUNGNAM
Website : www.sejin89.co.kr
Main Products : Tank top unit, Module unit, Purifier unit, Supply unit, etc.
TEL : +82 55 239 4700

Seobu Electric Ind. Co., Ltd.
Location : SAHA-GU, BUSAN
Main Products : Ground Monitor
TEL : +82 51 264 0670

SEOUL ELECTRIC CABLE Co., Ltd.
Location : UMSUONG-GUN, CHUNGBUK
Website : www.seoulcable.com
Main Products : Offshore & shipboard cables
TEL : +82 43 879 7200

Seun Electric Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.seunelectric.co.kr
Main Products : Battery charger, Alarm sys.
TEL : +82 51 208 4641

SEWON INDUSTRIES Ltd.
Location : HAMAN-GUN, GYEONGNAM
Website : www.sewon-ind.com
Main Products : High velocity P/V valve, Air vent head, Expansion joint, Flame arrester / Breather valve
TEL : +82 55 580 7200

SHINHAN HEAVY INDUSTRIES Co., Ltd.
Location : ULJU-GUN, ULSAN
Website : www.shinhanheavy.co.kr
Main Products : Deckhouse, Rudder
TEL : +82 52 240 5000

Shin Heung ENG Co.
Location : GANGSEO-GU, BUSAN
Website : www.shinheungeng.co.kr
Main Products : Curtain, Upholstery, Sofa & Chair, Mattress, Carpet, Roller blind
TEL : +82 51 817 6455

Shin Myung Tech Co., Ltd.
Location : YANGSAN-SI, GYUNGNAM
Website : www.smdavit.com
Main Products : Air motor, Winch, Davit, Crane, Reel, Capstan, Pump, etc.
TEL : +82 55 363 7091

Shin Sung eng Co., Ltd.
Location : GANGSEO-GU, SEOUL
Website : www.ishinsung.com
Main Products : Air Con. Plant, Ref. Plant
TEL : +82 2 2600 9602

Shin Yeong Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.sy-ind.com
Main Products : Manhole, Access hatch
TEL : +82 55 346 0034

Shin-A Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.shina-ent.com
Main Products : Navigational/communication equip.
TEL : +82 51 204 6221

Shin-A Metal Tech Co., Ltd.
Location : BUK-GU, ULSAN
Website : www.shinametal.com
Main Products : Engine metal bearing, Bearings for medium & small engines, Main bearing shells, Segment & segment holder, Guide shoe, Top & bottom end bearing, Mesta bearing
TEL : +82 52 298 2100

Shindong Digitech Co., Ltd.
Location : YEOUNGDO-GU, BUSAN
Website : www.shindong.com
Main Products : Navigation & communication, Internal communication equipment
TEL : +82 51 461 5141

Shinshin Machinery Co., Ltd.
Location : GIJANG-GUN, BUSAN
Website : www.sspump.com
Main Products : VID (Cooling F.W & S.W pump), EHC (Volute casting centrifugal pump), NLG (External gear pump)
TEL : +82 51 713 0000

Silla Metal Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.sillametal.com
Main Products : Fixed pitch propeller (FPP), Controllable pitch propeller (CPP, Shafting, Stern equipment)
TEL : +82 51 831 5991

Simulation Tech Inc.
Location : GEUMCHEON-GO, SEOUL
Website : www.simulationtech.co.kr
Main Products : Voyage data recorder
TEL : +82 2 3281 0960

SKMARINTEC Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.skmarintec.co.kr
Main Products : Electrolytic Sewage Processing Eqiupment
TEL : +82 55 314 4620

SMECO Co., Ltd.
Location : YEONGI-GUN, CHUNGNAM
Website : www.smecopiston.com
Main Products : Piston, Piston liner
TEL : +82 44 864 3030

SMS Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.sms-marinesystem.com
Main Products : Hatch cover, Lashing bridge, Ro-Ro equipment, Hydro door
TEL : +82 51 290 1000

CAPE INDUSTRY Ltd.
Location : YANGSAN-SI, GYUNGNAM
Website : www.capeind.com
Main Products : Cylinder Liner
TEL : +82 55 370 1234

SPECS Corporation
Location : BUNDANG-GU, SEONGNAM
Website : www.specs.co.kr
Main Products : Oil Mist Detection System for Engine Room (AOMD), Oil Mist Detection System for Diesel Engine (COMD), Shaft Torque Power RPM Meter (TPM), etc.
TEL : +82 31 706 5211

STACO Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.staco.co.kr
Main Products : Wall & ceiling panel, Unit toilet
TEL : +82 51 831 7000

STACO CHALMERS Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.staco.co.kr
Main Products : Unit Cabin, Unit Toilet, Marine Door
TEL : +82 51 831 7000

STX Engine Co., Ltd.
Location : CHANGWON, GYUNGNAM
Website : www.stxengine.co.kr
Main Products : Marine diesel engine, Military diesel engine, power plant diesel engine, electronic communication equipment
TEL : +82 55 280 0114

STX Heavy Industries Co., Ltd.
Location : CHANGWON, GYUNGNAM
Website : www.stxhi.co.kr
Main Products : Turbocharger, Diesel engine parts, Industrial components, Shipuilding machinery, Cargo pump system, Casting parts
TEL : +82 55 280 0700

Suh Han Ind. Co., Ltd.
Location : SAHA-GU, BUSAN
Website : wwww.suhhani.co.kr
Main Products : Cable tray and duct, Hot dip galvanizing, Ship window
TEL : +82 51 204 1920

SUNBO INDUSTRIES Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.sunboind.co.kr
Main Products : Package module unit, Tank top unit, E/R block, etc.
TEL:+82 51 260 5551

Sung Jin Geotec Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.sgtkor.com
Main Products : Ship block, Fin tube, Header pipe
TEL : +82 52 228 5801

Sung Kwang Bend Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.skbend.com
Main Products : Butt welding pipe fittings
TEL : +82 51 330 0200

Sung Mi Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.sung-mi.co.kr
Main Products : Door frame, Wall panel, Ceiling panel, Door hardware, Unit toilet
TEL : +82 55 329 1117

SUNG SIN INDUSTRIES Co., Ltd.
Location : GYEONGJU-SI, GYEONGBUK
Website : http://sungsin.koreasme.com
Main Products : Hatch coaming, T-Block, Water mist catcher, Water separator, Louver
TEL : +82 54 776 6441

Sungil SIM Co., Ltd.
Locatio : GANGSEO-GU, BUSAN
Website : www.sungilsim.com
Main Products : Pipe bending, Pipe spool, Marine Engine, Gas turbine
TEL : +82 51 831 8800

Suro Propeller & Machinery Co.
Location : YOUNGDO-GU, BUSAN
Website : www.suropump.co.kr
Main Products : Propeller, Propeller shaft
TEL : +82 51 415 0445

T.K. Corporation Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.tkbend.co.kr
Main Products : Butt-welding fittings, Forged fittings, Flanges
TEL : +82 51 831 6600

TAE KWANG Co., Ltd.
Location : GANGSEO-GU, BUSAN
Website : www.tkbend.co.kr
Main Products : Pipe Fittings, Fitting & Valve
TEL : +82 51 831 6550

TAE YOUNG TRADING Ltd.
Location : NOWON-GU, SEOUL
Website : www.marine-matarial.com
Main Products : Receptacles & wire accessories, Flood light, Deck light, Reflector lamps, HRF mercury lamps, Sodium lamps, Marine electrical equipment
TEL : +82 2 2272 1960

Taekyung Heavy Industries Co., Ltd.
Location : CHANGWON-SI, GYUNGNAM
Website : www.tkhic.com
Main Products : Engine Bed/Frame Box, Air Receiver/Gas ReceiverSteel Outfittings, Tubular(SAW Pipe), etc.
TEL : +82 70 4628 8844

TANKTECH Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.tanktech.co.kr
Main Products : Water-mist fire fighting system for engine room and accommodation, LNG fuel tank system, Offshore steel structure
TEL : +82 51 979 1600

TechMarine S/W Co., Ltd.
Location : DONG-GU, BUSAN
Website : www.techmarine.net
Main Products : Loading computer program, CAOS, Stowage program, LOFOS, LMS
TEL : +82 51 467 7003

Techcross Inc.
Location : GANGSEO-GU, BUSAN
Website : www.techcross.com
Main Products : Ballast water management system
TEL : +82 51 603 3500

TETRADYNE
Location : GURO-GU, SEOUL
Website : www.tetradyne.co.kr
Main Products : Marine Monitor, Marine Panel PC
TEL : +82 2 323 4972

TMC Co., Ltd.
Location : CHEONAN-SI, CHUNGNAM
Website : www.tmc-cable.com
Main Products : Marine cables, Oil & rig cables, Onshore cables, Special cables, Optical fiber cables
TEL : +82 41 589 6500

TOPSAFE Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.topsafe.co.kr
Main Products : High-velocity pressure vacuum valve, Breather valve, Flame arrestor, Emergency vent cover, Detonation flame arrestor
TEL : +82 55 338 9986

TTS INTERNATIONAL Corp.
Location : GANGSEO-GU, BUSAN
Website : www.ttsi.co.kr
Main Products : Cuni Pipe, Cuni Flange, Cuni Fitting
TEL : +82 51 832 9977

VISER Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Website : www.viser.co.kr
Main Products : PHE GASKET, Valve seat, Dust packing, etc.
TEL : +82 55 346 5575

WARTSILA ACCOMMODATION SYSTEMS KOREA, Inc.
Location : GOSEONG-GUN, GYEONGNAM
Website : www.waskorea.co.kr
Main Products : Unit toilet, Unit cabin, Wall panel, Ceiling panel
TEL : +82 55 673 7315

WhaYoung Co., Ltd.
Location : MIRYANG-SI, GYUNGNAM
Website : www.whayoung.co.kr
Main Products : Fuel pump ass'y for ship engine
TEL : +82 55 359 1100

WONIL Co., Ltd.
Location : MASAN-SI, GYEONGNAM
Website : www.ms-wonil.com
Main Products : Cylinder cover, Common rail unit, Silencer, Spraying plate, Rotor shaft
TEL : +82 55 253 1500

Woo Chang Ind. Co., Ltd.
Location : GIMHAE-SI, GYUNGNAM
Main Products : Weather-tight steel door, Louver vent, Steel window box, Mooring fitting
TEL : +82 55 337 1651

WOOJOO M & E Co., Ltd.
Location : SAHA-GU, BUSAN
Website : www.wjme.com
Main Products : Exp. junction box, Warning alarm, etc.
TEL : +82 51 264 9130

Yoo Won Industry Ltd.
Location : SAHA-GU, BUSAN
Website : www.yoowonind.com
Main Products : Steering gear, Filter, Deck M/C
TEL : +82 51 205 8541

You Jeon Industry Co., Ltd.
Location : CHANGWON, GYUNGNAM
Main Products : Marine engine parts, Engine bed
TEL : +82 55 297 2121

YoungkWang Machine Co., Ltd.
Location : GYEONGJU-SI, GYEONGBUK
Website : www.ykmc.com
Main Products : Skid unit, Pressure vessel, Heat exchanger
TEL : +82 54 776 6456

Younglim Timber Co., Ltd.
Location : NAMDONG-GU, INCHEON
Website : www.younglim.com
Main Products : Wood Fire Retardant, Flooring Board, Furniture, Wood for Interiors
TEL : +82 32 811 9051

YOUNGIL PRECISION Co., Ltd.
Location : HAMAN-GUN, GYEONGNAM
Website : http://youngilco.kr
Main Products : Valvetrain components for all kinds of 4-Stroke Diesel Engine's
TEL : +82 55 585 2915

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