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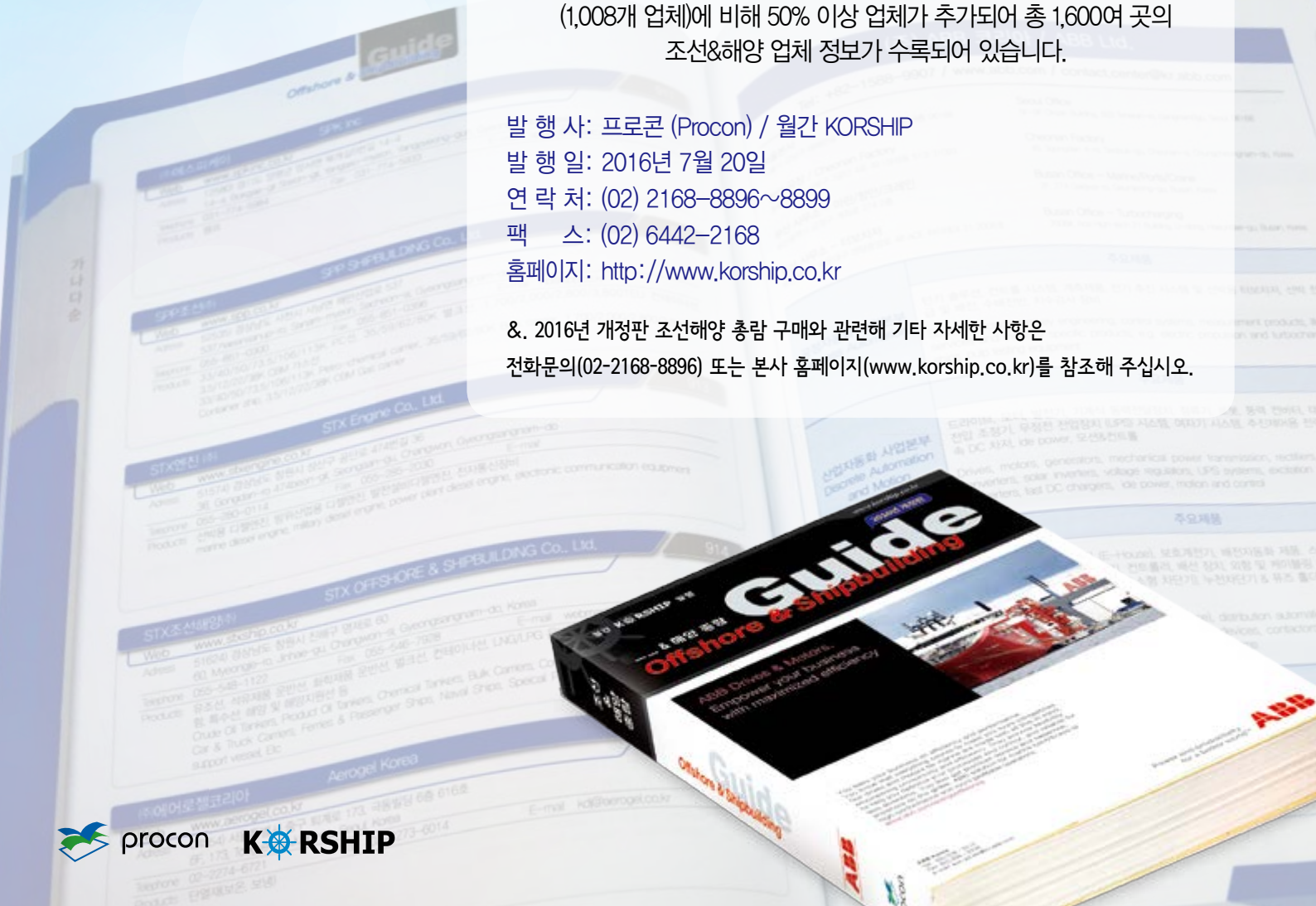

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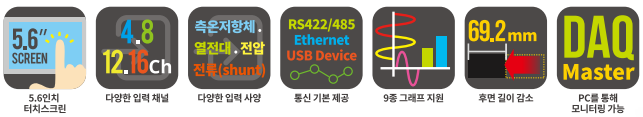

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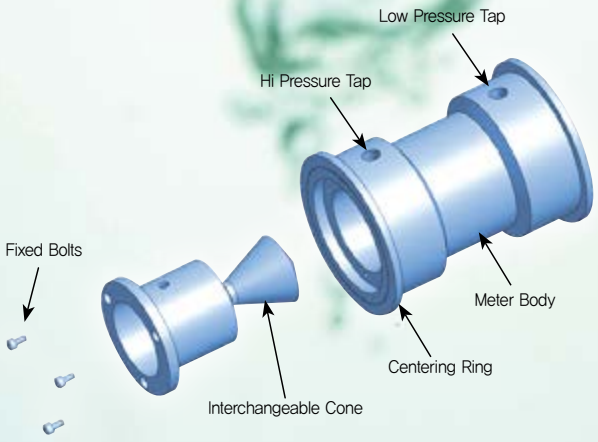
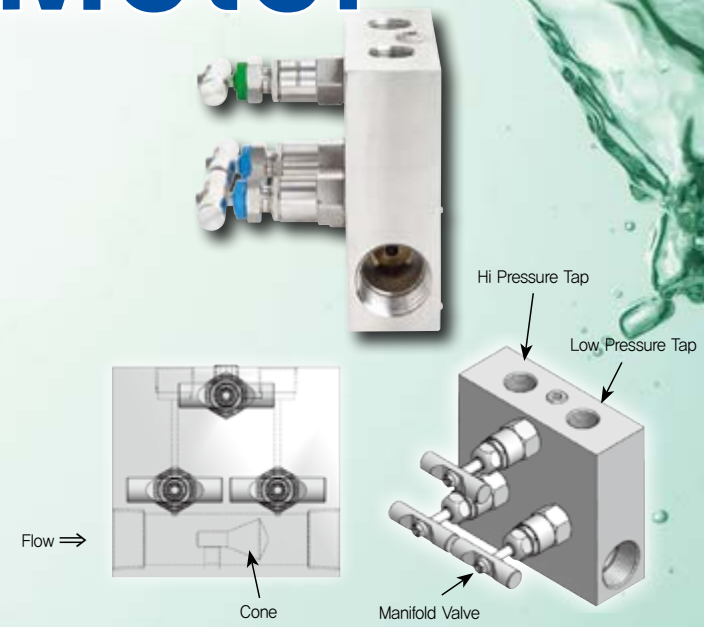
Cone Meter





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

DP HiCone Meter

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

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

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

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

HFV-WM

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

(특 허 : 제 10-0915088호)

IVCM

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

(특 허 : 제 10-0915089호)

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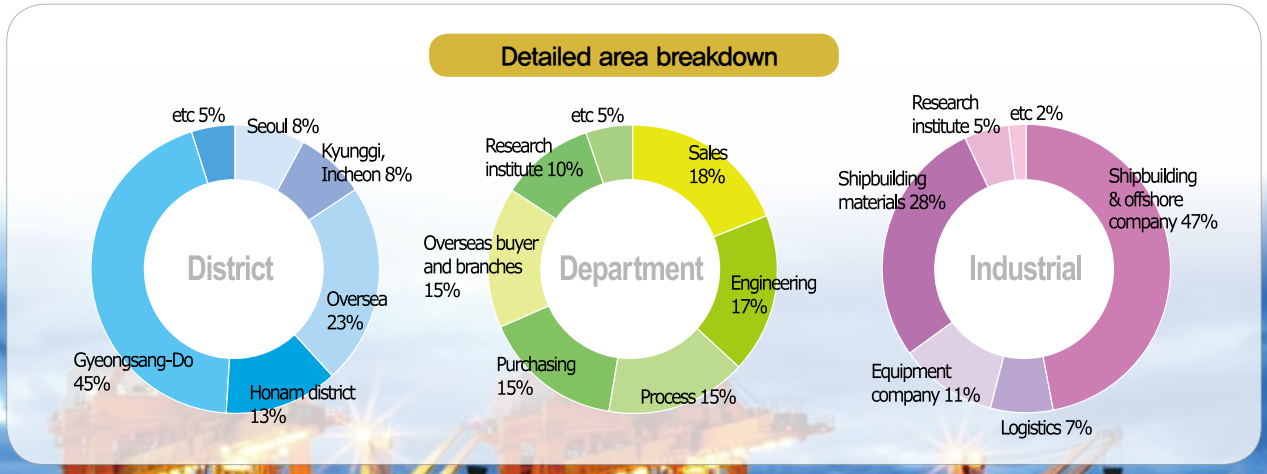

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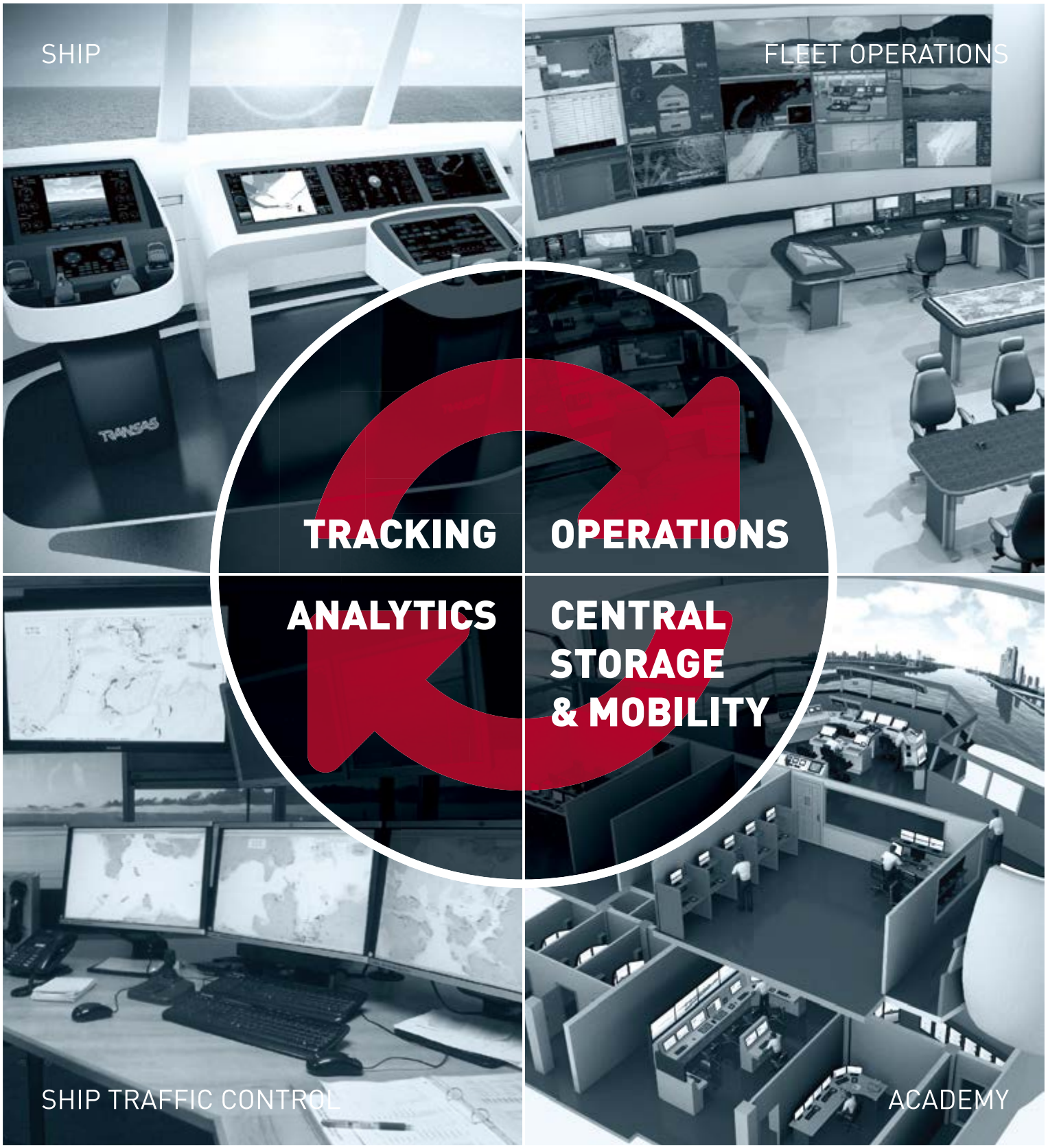

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DSME developed MCTIB, a high manganese steel LNG storage tank

Daewoo Shipbuilding & Marine Engineering (DSME) announced on June 8 that it completed the closed mock-up test, the final phase in the development of cryogenic high manganese steel LNG storage tank, thus making it ready for application to vessels.
MCTIB® (High Manganese steel Cargo Tank Independent Type-B), a LNG storage tank recently developed by DSME, uses high manganese steel developed jointly with POSCO, instead of conventional aluminum alloy.
Applying the high manganese steel, MCTIB® has advantages of excellent safety, high resistance to external impact, and optimization of space, compared to existing products that have been supplied exclusively by Japan. Additionally, MCTIB® reduces manufacturing costs by half to help boost cost competitiveness.
DSME launched the cryogenic high manganese steel & welding material development project in collaboration with POSCO and global ship owners in 2010 and successfully developed the high manganese in 2015 which represented culmination of the five-year research efforts. Subsequently, DSME developed a LNG storage tank applying high manganese steel and even completed a closed mock-up test.

MCTIB® has already obtained the approval of the U.S. ABS (American Bureau of Shipping) for basic design of fuel storage tank for 20,000 TEU class LNG-powered ultra-large containerships. Moreover, MCTIB® is expected to be also advantageous when it is applied to LNG shuttle carriers and LNG bunker carriers required to minimize restrictions on LNG cargo loading.
An official from DSME said, "MCTIB® is expected to help further sharpen competitive edge of DSME which has dominated global market for LNG carriers. International oil giants have already shown a considerable interest in MCTIB® which has been recently developed."
So far, DSME won orders for 153 LNG carriers, the largest number worldwide, out of which it has delivered 107 units and retains 43 units on its orderbook.

대우조선해양, 고망간강 LNG저장탱크 '맥티브' 개발

대우조선해양은 극저온용 고망간강 LNG저장탱크 개발의 최종단계인 실물 모형 테스트(Closed Mock-up Test)를 성공적으로 끝내고, 실제 선박에 적용하기 위한 최종준비를 마쳤다고 지난 6월 8일 밝혔다.
이번에 개발된 LNG저장탱크인 '맥티브(MCTIB®, High Manganese steel Cargo Tank Independent Type-B)'는 기존 알루미늄합금을 주로 사용하던 것에서 포스코와 공동개발한 고망간강을 사용한 것이 특징이다. 고망간강을 적용한 맥티브는 그간 일본에서 사실상 독점으로 공급해 온 제품에 비해 안전성이 우수하며, 외부충격에 강하고 공간을 최적화 할 수 있다. 뿐만 아니라, 제작에 필요한 비용이 절반수준으로 줄어 원가 경쟁력에도 기여하는 바가 크다.
대우조선해양은 포스코 및 글로벌 선급들과 함께 지난 2010년 '극저온용 고망간강재 및 용접재 공동개발 프로젝트'를 시작했으며, 5년여에 걸친 연구 끝에 지난 2015년 고망간강 개발에 성공했다. 이후 대우조선해양은 고망간강을 적용한 LNG저장탱크를 개발하고 실물 테스트까지 완료했다.
맥티브는 현재 20,000TEU급 LNG추진 초대형컨테이너선의 연료 저장탱크에 대한 기본설계 승인을 미국 선급 ABS로부터 이미 획득한 상태다. 또한 LNG 화물 적재에 제한을 최소화해야 하는 LNG셔틀운반선과 LNG벙커링선의 적용에도 유리할 것으로 분석된다.
대우조선해양 관계자는 "전세계 LNG운반선 시장을 석권한 대우조선해양의 경쟁력이 맥티브 개발 성공을 계기로 더욱 공고해 질 것으로 기대한다"며, "이미 글로벌 오일메이저들도 이번 개발에 상당한 관심을 보이고 있다"고 말했다.
한편 대우조선해양은 전세계 조선소 중 가장 많은 153척의 LNG운반선을 수주해 현재까지 107척을 인도, 46척의 수주잔량을 보유하고 있다.

HSHI and IMM private equity agree to Increase Pre-IPO

Hyundai Samho Heavy Industries (HSHI) announced on June 8 it and IMM Private Equity, a leading Korean private equity firm, agreed to increase the pre-IPO investment to KRW 400 billion.
In April this year, HSHI and IMM Private Equity signed an agreement under which, HSHI will issue 5.36 million new convertible preferred shares and IMM PE will pay 300 billion won in total to acquire the shares at 56,000 won per share.
It is reported that IMM PE suggested increasing the investment in view of an array of investment inquiries it got from institutional investors after the April pre-IPO investment

announcement. IMM PE that already secured 50 billion won plans to acquire additional 50 billion won by the end of June.
An official from IMM Private Equity said, "We see the shipbuilding industry hit the historical low, and now is heading toward recovery. Bearing that in mind, it seems natural that investors are showing interests in making investment in HSHI, a leading shipbuilder."
For the first three months this year, HSHI recorded 734.3 billion won in sales and 43 billion won in operating profits, posting profits for fifth consecutive quarters on a non-consolidated basis. Moreover, by the end of May this year HSHI clinched 15 ships worth $ 1 billion including the world's first four LNG-fueled 114,000 DWT ICE-Class IA aframax tankers from Sovcomflot.
Upon completing the 400 billion won pre-IPO investment, HSHI will lower its debt-to-equity ratio to 72.8%.

현대삼호중공업의 프리-IPO 투자 수요 몰려

현대중공업그룹은 현대삼호중공업이 국내 톱티어(Top-tier) 사모펀드인 IMM PE와 지난 4월 주요사항 합의서를 체결한 프리-IPO의 투자규모를 최대 4,000억원까지 확대하는데 합의했다고 지난 6월 8일 밝혔다.
이번 투자규모 확대는 연기금 등 기관투자자들의 요청을 받은 IMM PE가 추가투자를 적극 제안하면서 성사됐다. 지난 달 3,000억원 규모의 현대삼호중공업의 프리-IPO 투자 발표 이후 다수의 기관투자자들로부터 투자 문의가 쇄도했고, 이러한 요청을 수렴해 IMM PE가 프리-IPO의 투자규모 확대를 제안한 것이다.
IMM PE는 본계약이 체결되는 6월말까지 투자 문의를 해온 기관투자자들로부터 추가적으로 최대 1,000억원을 확보, 총 4,000억원 규모의 투자를 집행할 계획이다.
조선업황 회복을 반증하듯 현대삼호중공업의 실적과 수주도 눈에 띄게 개선되고 있다. 현대삼호중공업은 지난 1분기 개별기준 매출 7,343억원, 영업이익 430억원을 기록하며 5분기 연속 흑자를 이어갔다. 수주 역시 러시아 소브콤플로트(Sovcomflot)로부터 세계최초 LNG추진 대형 유조선을 수주하는 등 지난 5월까지 총 15척 10억 달러의 수주 실적을 달성했다.
이번 추가 투자유치로 최대 4,000억원 규모의 프리-IPO 계약이 체결되면 현대삼호중공업은 부채비율 72.8%로 업계 최고 수준의 재무건전성을 갖추게 된다.

KR refreshes corporate identity to reflect growing global influence

Korean Register (KR) has refreshed its logo to mark the organisation's renewed outward-facing international approach and its desire to add greater value to its customers' businesses, under new Chairman and CEO, Lee Jeong-Kie.
The new logo features the same 'KR' and retains the blue colour. However, the letters are now placed inside a circle to symbolise the organisation's will to create harmony by working to bring together the interests and needs of stakeholders across the maritime industry, and around the world.
Mr. Lee Jeong-Kie, Chairman and CEO of KR, said "The shipping and shipbuilding industries are facing unprecedented economic and technological challenges, and now - more than ever before - I want to ensure that our customers are placed first and at the centre of all our activities."
He added "We will deliver the highest quality service to our customers around the world, by enhancing our global management systems and expanding our worldwide expertise to meet their every need."
The new logo will be used on all KR certificates and survey reports as from 1 September 2017.

KR, 창립 57돌 맞아 새 비전 선포 및 로고 공개

창립 57주년을 맞는 한국선급(KR)이 새로운 비전 "더 나은 세상을 위한 최고의 서비스 제공 (Providing the best services, Creating a better world)"을 선포했다. 한국선급 이정기 회장은 "새 비전은 더 안전하고 깨끗한 세상을 만드는데 기여하기 위해 고객들에게 최고 수준의 선급서비스 제공을 약속하는 한국선급 전 임직원의 결의가 담겨있다"고 밝혔다.
신 비전과 더불어 한국선급은 새로운 로고도 발표했다. 14년 만에 변경되는 한국선급의 로고는 기존 로고의 변형을 최소화하여 대내외 혼선을 방지하고 미래지향적인 의미를 부여하는데 중점을 두었다. 이 로고는 한국선급의 선급으로서 균형자적 역할을 강조했으며, 타원형의 파란색 외형은 바다를 상징화하였고 정중앙에 사명을 배치함으로서 해양산업 생태계 안에서 선급의 중간자적 역할을 도식화했다.
한국선급 이정기 회장은 "정부검사권 개방 및 얼어붙은 해사경기로 인한 선급간 경쟁심화 등 올 한해 어려운 경영환경이 예상되지만 전 직원이 하나 되어 고객에게 최상의 서비스를 제공하고 새로운 미래를 위한 기업내실을 다지는데 최선을 다하겠다"고 말했다.
이 새로운 로고는 각종 증서, 보고서 등에 9월 1일부터 적용될 예정이다.

Dassault Systèmes Enhances its marine & offshore portfolio on the 3DEXPERIENCE platform

Dassault Systèmes announced on June 12, the signing of a definitive agreement to acquire AITAC BV, a Dutch company specialized in marine and offshore engineering software. With this acquisition, Dassault Systèmes will further strengthen its solutions designed to bring digital transformation to the marine and offshore industry by providing cutting-edge, industry-specific technologies for its 3DEXPERIENCE platform customers.

AITAC's Smart Drawings software application is used by shipyards and offshore companies to automate the creation of drawings from a master 3D model of a ship, platform or other structure designed using Dassault Systèmes' CATIA applications. This automation is based on rules and templates that account for marine-specific standards, behaviors and local requirements. Companies can significantly reduce the cost of drawings production, improve the quality of certification documents, and maximize the value of the master 3D model.

Dassault Systèmes will fully integrate the Smart Drawings application into its "Designed for Sea" and "Optimized Production for Sea" industry solution experiences based on the 3DEXPERIENCE platform, used by companies for the design, validation and manufacturing planning of marine and offshore projects.

As part of the deal, Dassault Systèmes also acquires 40 percent of AITAC's marine and offshore engineering office in Croatia, AITAC d.o.o., a provider of naval architecture and engineering services to major shipbuilders.

"We have always been passionate about transforming the way marine and offshore companies use 3D and we work hard to provide our customers with the best experience of a 3D master approach," said Marc Journeux, Co-director, AITAC. "Dassault Systèmes has always been a fantastic partner for us, and we truly believed this is the only company able to take this market to the next step. Now our team is excited to join Dassault Systèmes to accelerate the pace of innovation."

The marine and offshore industry has routinely relied on disconnected departments to produce traditional drawings managed as individual documents. Now, it is gradually moving to a single master 3D multidisciplinary model allowing digital continuity for marine projects, from initial concept to manufacturing and operations.

"For years, AITAC has been a software partner of Dassault Systèmes supporting its 3DEXPERIENCE platform customers and now we're taking this long and fruitful partnership to the next level," said Alain Houard, Vice President, Marine & Offshore Industry, Dassault Systèmes. "AITAC's long-term experience, expertise and team of naval architects and engineers will help us to extend our marine and offshore portfolio's capabilities and support customer deployment projects."

다쏘시스템, 3D익스피리언스 플랫폼의 조선해양 포트폴리오 강화

3D솔루션 및 제품수명주기(PLM), 스마트 팩토리 분야 글로벌 선도기업 다쏘시스템은 네덜란드의 조선해양 엔지니어링 소프트웨어 전문 기업 아이텍 BV(AITAC BV)와 최종 인수계약을 체결했다고 지난 6월 2일 발표했다.

이번 인수를 통해서 다쏘시스템은 조선해양 산업의 디지털 혁신을 촉진할 수 있는 3D익스피리언스 플랫폼을 제공할 수 있게 되었다. 아이텍의 스마트 드로잉스(Smart Drawings)는 다쏘시스템 카티아로 설계되는 선박, 플랫폼, 기타 구조물의 마스터 3D 모델 도면 제작을 자동화 하기 위해 조선 및 해양 전문 기업들이 사용하고 있는 소프트웨어 애플리케이션이다. 스마트 드로잉스는 조선해양 산업에 특화된 기준, 관례, 각 지역별 요구사항들에 맞는 규정 및 템플릿 등을 기반으로 하고 있어 기업들은 도면 제작 비용 절감, 인증 문서 품질 향상, 마스터 3D모델 가치 극대화 등의 혜택을 얻을 수 있다.

지금까지 조선해양 산업에서는 분리된 부서에서 개별적으로 관리 · 생산되는 전통적인 방식의 도면 제작에 의존하고 있는데, 이와 같은 애플리케이션은 해양프로젝트를 초기 개념 단계에서 제조 및 운영에 이르기까지 디지털 연속성이 가능한 단일 마스터 3D를 통해 통합적으로 관리할 수 있다.

다쏘시스템은 스마트 드로잉스를 조선해양 프로젝트의 설계, 검증, 제조, 기획 단계에서 활용되고 있는 다쏘시스템 3D익스피리언스 플랫폼 "디자인드 포 시(Designed for Sea)"와 "옵티마이즈드 프로덕션 포 시(Optimized Production for Sea)"에 완전히 통합시킬 예정이다. 아울러 다쏘시스템은 글로벌 주요 조선기업에 조선공학 및 엔지니어링 서비스를 제공하는 크로아티아에 위치한 아이텍의 조선해양 엔지니어링 회사 아이텍 d.o.o 지분 40%도 인수한다.

아이텍 공동 이사인 마크 조우르눅스(Marc Journeux)는 "아이텍은 조선해양 기업의 3D 활용 방식에 대한 혁신과 3D마스터 접근법을 통한 최상의 경험을 제공하기 위해 최선을 다하고 있다"며 "최고의 파트너이자 조선해양 산업을 한 단계 도약시킬 수 있는 유일한 기업인 다쏘시스템과 함께 혁신을 가속화할 수 있게 되어 기대가 크다"고 말했다.

다쏘시스템 조선해양 사업부 부사장인 알랑 후아르(Alain Houard)는 "수년간 다쏘시스템의 소프트웨어 파트너로써 3D익스피리언스 플랫폼 고객을 지원해 온 아이텍과 파트너십 강화를 통해 더 긴밀하게 협력할 수 있게 되어 기쁘다"며 "조선 및 엔지니어링에 대한 아이텍의 장기적인 경험, 전문성, 조직 구성은 다쏘시스템 조선해양 산업 포트폴리오 확장은 물론 다양한 관련 고객 프로젝트를 성공적으로 지원하는 데에 기여할 수 있을 것"이라고 말했다.

Emerson Completes Acquisition of MYNAH Technologies

Emerson announced it has completed the purchase of MYNAH Technologies, a long-time Emerson alliance partner and a leading provider of dynamic simulation and operator training software.

MYNAH's solutions enable plant engineers and technicians to test and improve process control strategies, and train plant operators, in offline, real-world scenarios before implementing them in live production. The addition of MYNAH will help support Emerson Automation Solutions and its Operational Certainty™ program designed to help industrial companies achieve top performance.

"Adding MYNAH's simulation software and expertise allows us to provide customers with more advanced process simulation and training solutions. This will help improve plant performance, safety and profitability by allowing them to fully optimize their human and automation resources," said Jamie Froedge, president, Process Systems and Solutions, Emerson Automation Solutions.

MYNAH's Mimic Simulation Software is currently in use at more than 1,400 sites across 68 countries in industries ranging from hydrocarbon production, refining, chemical, pharmaceutical and biotechnology. The company's portfolio also has integration solutions that connect Emerson's DeltaV™ distributed control system and its production improvement capabilities with additional plant systems, helping Emerson meet customer demands for more integration and related plant performance improvements.

"We are excited to join Emerson in delivering greater operational value to the process industries" said Martin Berutti, chief operating officer for MYNAH Technologies. "By leveraging Emerson's vast global network we can help more organizations deal with generational shift changes in the workplace, while improving the performance of industrial plants."

에머슨, MYNAH Technologies 인수

에머슨은 에머슨의 장기 파트너이자 동적 시뮬레이션 및 오퍼레이터 교육 소프트웨어의 선두적인 공급자인 MYNAH Technologies의 인수를 완료했다.

MYNAH의 솔루션은 플랜트 엔지니어 및 기술자가 프로세스 제어 전략을 시험 및 개선하고, 오프라인 상에서 실제 시나리오를 생산 환경에 적용하기 전에 플랜트 오퍼레이터들을 교육할 수 있다. MYNAH는 산업체들이 최고의 성과를 낼 수 있도록 돕는 에머슨 자동화 솔루션과 Operational Certainty™ 프로그램을 지원할 예정이다.

에머슨 자동화 솔루션 내 프로세스 시스템 및 솔루션의 사장인 제이미 프로잇지(Jamie Froedge)는 "MYNAH의 시뮬레이션 소프트웨어와 전문 지식을 추가하여 고객들에게 더욱 향상된 프로세스 시뮬레이션과 교육 솔루션을 제공할 수 있게 되었다. 이제 인적 및 자동화 자원을 최적화해 플랜트의 성능, 안전성 및 수익성을 향상할 수 있을 것"이라고 말했다.

MYNAH의 Mimic 시뮬레이션 소프트웨어(Mimic Simulation Software)는 현재 68개국에 걸쳐 1,400개 이상의 탄화수소 생산, 정제, 화학, 제학 및 생명공학까지 다양한 산업 현장에서 사용되고 있다. 제품의 포트폴리오에는 통합 솔루션도 포함되어 있는데 에머슨의 DeltaV™ 분산 제어 시스템과 생산 개선 능력이 추가 플랜트 시스템과 함께 연결되어 있다. 이로써 에머슨은 보다 업그레이드 된 통합성과 플랜트 성능의 개선을 향한 고객의 수요를 만족할 수 있게 되었다.

MYNAH Technologies의 CEO인 마틴 베루티(Martin Berutti)는 "에머슨과의 협력을 통해 공정 운영에 있어 더 큰 가치를 프로세스 업계에 제공할 수 있게 되어 기쁘게 생각한다"며 "에머슨의 방대한 글로벌 네트워크를 통해 더 많은 기업들이 작업 현장에서의 세대 교체 변화를 이끌고 산업 플랜트 성능을 향상할 수 있도록 지원할 것"이라고 말했다.

HSHI to expand business opportunities in Russia

Hyundai Samho Heavy Industries (HSHI), a shipbuilding affiliate of Hyundai Heavy Industries (HHI) Group, the world's largest shipbuilding group, announced on June 4 it signed a Technical Support Agreement (TSA) with Zvezda-Hyundai, a 49-51% joint venture established in May this year between HSHI and Zvezda, a Russian shipbuilding company.

Under the agreement, HSHI will provide a list of technical support including engineering, procurement and educational training needed in designing and building aframax class tankers capable of running on cooled natural

gas. HSHI will make sure that design documents correspond to the basic design of vessels to be built, which is later to be the capital of the joint venture.
The signing ceremony of the agreement held on June 2 at during St. Petersburg International Economic Forum (SPIEF) was attended by Ka Sam-hyun, president and CEO of Group Ship/Offshore Marketing Division of HHI; Igor Sechin CEO of Rosnef; Andrey Shishkin, vice president for Energy, Localization and Innovation of Rosnef; and Park Ro-byug, South Korea's ambassador to Russia.
An HSHI official said, "The establishment of Zvezda-Hyundai in May this year and the technical support agreement today will not only be another income generating source for us, but will also serve as an opportunity for us to expand business chances in Russia."
Including the recent order from Sovcomflot to build four 114,000 DWT VLCC this February, HHI Group has won a total of 94 ships from Russia to date.

현대삼호중공업,
러시아 합작회사 통해 시장 확대

현대삼호중공업은 지난 6월 2일 러시아 상트페테르부르크 국제경제포럼(SPIEF)에서 현대중공업 그룹선박해양영업본부 대표인 가삼현 사장, 러시아 국영석유회사인 로스네프트사의 이고르세친(Igor Sechin) CEO, 안드레이쉬시킨(Andrey Shishkin) 부사장, 박노벽 주러한국대사가 참석한 가운데 즈베즈다-현대와 기술지원협약(Technical Support Agreement)을 체결했다고 밝혔다.
이번 기술지원협약은 협약 당사자인 즈베즈다-현대가 현대삼호중공업으로부터 선박 건조에 필요한 설계와 구매, 인력, 교육 등 제반 서비스를 제공받는 것을 내용으로 하고 있다.
즈베즈다-현대는 현대삼호중공업과 러시아 극동조선본부 (FESRC) 산하 즈베즈다 조선이 각각 49%, 51% 비율로 출자해 설립한 선박 엔지니어링 합작회사로, 이와 관련해 현대삼호중공업 윤문균 사장과 즈베즈다조선 첼루이코 세르게이 이바노비치 (Tscheluiko Sergey Ivanovich) 사장이 지난 5월말 러시아 블라디보스토크에서 설립을 위한 등기 서명을 이미 마친 바 있다.
이번 협약에 따라 블라디보스토크 인근 볼쇼이 카멘지역에 위치한 즈베즈다조선은 현대삼호중공업과 즈베즈다-현대의 지원을 받아 2018년부터 아프라막스급 유조선을 건조할 예정이며, 이와 관련해 지난 5월 24일 즈베즈다조선 관계자들이 현대삼호중공업을 찾아 선박 건조 설비의 설치 및 선박용 기자재 구매 관련 방안을 논의하기도 했다.
현대삼호중공업 관계자는 "합작회사인 즈베즈다-현대 설립과, 이 합작회사와의 이번 기술지원협약 체결을 통해 새로운 수익원을 확보할 수 있게 되었으며, 대(對) 러시아 사업기회도 더욱 확대될 수 있을 것으로 기대한다"고 밝혔다.
현대중공업그룹은 지난 2월 현대삼호중공업이 러시아 국영선사 소브콤 플로트사로부터 114,000톤급 LNG추진 유조선 4척을 수주하는 등 지금까지 러시아에서 총 94척의 선박을 수주해왔다.

Maersk Line-MCC announce changes to leadership team in Singapore and Korea

Maersk Line and MCC announced changes to the Asia-Pacific management team on Jun 21. After 27 years within the A.P. Moller Maersk Group and most recently 9 years as CEO of MCC, Tim Wickmann announced he will be seeking opportunities outside the group. Bo Wegener, currently Maersk Line's South East Asia Managing Director, will assume the role of CEO of MCC. Rupesh Jain, currently Maersk Line's South Korea Country Manager, will relocate to Singapore and assume the role of South East Asia Managing Director. These changes will take effect from 1st August 2017.
"Tim has been the driving force behind MCC's unparalleled success, and under his leadership MCC has grown into the successful company it is today. We thank him for his great contributions to the A.P.Moller Maersk Group and wish him every success in his career ahead" said Robbert van Trooijen, Maersk Line's Asia-Pacific CEO.
"The appointment of Bo Wegener as MCC's new CEO makes me confident that MCC is in an exceptionally talented pair of hands. Since joining the A.P. Moller Maersk Group in 1995 Bo has distinguished himself in every role he has undertaken. Under his leadership I believe that MCC will continue to grow and succeed" said Mr. van Trooijen.
"MCC is an extremely well-run company with a talented team, a strong brand built on partnership and a unique intra-Asia understanding. I look forward to working with the customers and the team to build on that success. I wish Tim all the best for the next chapter in his career" said Bo Wegener, Maersk Line's South East Asia Managing Director.
"I am very proud of what I have achieved in my 27 years with the A.P. Moller Maersk Group, in particular the success of MCC during my recent nine years as CEO and I now look forward to trying something new in life. I am confident that Bo together with the


Bo Wegener, Maersk Line South East Asia Managing Director

talented MCC team will continue the successful path we are on and I look forward to following MCC's progress in the future" said Tim Wickmann, CEO of MCC.
Rupesh Jain, currently Maersk Line's South Korea Country Manager, will take up the role as Maersk Line's South East Asia Managing Director. "I am pleased to accept the role of Maersk Line's South East Asia Managing Director," said Mr. Jain. "South East Asia is emerging as one of the growth engines of the world's economy with a number of highly productive import and export nations."

머스크라인-MCC, 한국 및 싱가포르 등 아태지역 주요 경영진 임명

머스크라인(Maersk Line)과 MCC는 지난 6월 21일로 아태지역 주요 경영진 임명을 발표했다. 우선 A.P. 몰러 머스크 그룹에서 27년 간 근속하며 지난 9년간 해당 직위에 재직해 온 팀 위크맨(Tim Wickmann) MCC CEO는 사임 의사를 발표했다. 이에 따라 오는 8월 1일부터 보 웨그너(Bo Wegener) 머스크라인 동남아시아 사장이 MCC CEO 직무를 수행하며, 루페쉬 제인(Rupesh Jain) 머스크라인 한국사무소 대표는 싱가포르로 이동해 머스크라인 동남아시아 사장 직무를 수행하게 된다.
로버트 반 트루젠(Robbert van Trooijen) 머스크라인 아태지역 CEO는 "A.P 몰러 머스크(A.P. Moller-Maersk) 그룹 산하에서 MCC의 성장과 성공을 이끌어 온 팀 위크맨 CEO의 공로에 감사하며, 향후 그의 경력과 새로운 기회에 있어 성공을 기원한다"고 말했다. 덧붙여 그는 "보 웨그너 머스크라인 동남아시아 사장은 지난 1995년 A.P 몰러 머스크 그룹에 입사해 전 직무에서 탁월한 성과를 수행해 온 인재로, 신임 MCC CEO 부임과 함께 MCC의 성장과 성공을 주도할 것으로 확신한다"고 밝혔다.
보 웨그너 머스크라인 동남아시아 사장은 "MCC는 뛰어난 임직원들과 함께 경영 능력을 보유한 회사로, 아시아 역내 시장에 대한 독보적인 이해와 파트너십을 토대로 한 경쟁력 높은 브랜드를 소유하고 있다"며 "팀 위크맨 CEO의 향후 경력에 성공을 기원하며, 임직원 및 고객과 협력해 MCC의 성공을 이어갈 것"이라고 말했다.
팀 위크맨 MCC CEO는 "지난 27년간 A.P. 몰러-머스크 그룹의 임직원으로 남기게 된 업적과 특히 9년 동안의 MCC CEO 직에서 이룩한 회사의 성공을 자랑스럽게 여긴다"며 이제 새로운 기회와 도전을 기대하고 있다"며, "보 웨그너 사장 및 MCC 임직원들이 앞으로도 지속적인 성공을 이끌어 나갈 것이라 확신하며, 향후 MCC의 발전을 기대한다"고 말했다.
루페쉬 제인(Rupesh Jain) 현 머스크라인 한국사무소 대표는 이에 머스크라인 동남아시아 사장으로 승진할 예정이다. 루페쉬 제인(Rupesh Jain) 머스크라인 한국사무소 대표는 "머스크라인 동남아시아 사장직을 맡게 되어 영광"이라며 "동남아시아는 높은 생산성의 수출입국가가 많은 시장으로 세계 경제 동력으로 부상하고 있다"고 말했다.
한편 머스크라인과 MCC는 경영진 인사계획을 통해 보 웨그너 머스크라인 동남아시아 사장 및 루페쉬 제인 머스크라인 한국사무소 대표의 후임을 선임할 예정으로, 향후 새로 부임할 한국사무소 대표는 조만간 전임자와 온보딩 프로그램을 통해 인사 과정을 거친다.

Collaboration Coral South FLNG Project in Mozambique

Korean's flagship credit agencies and companies joined their hands for the Coral South FLNG Project in Mozambique. The entities participating in the project are Korea Gas Corporation (KOGAS), Samsung Heavy Industries (SHI), the Export-Import Bank of Korea (Korea Eximbank) and Korea Trade Insurance Corporation (K-sure) as a sponsor, as a contractor, and as financial providers, respectively.
Korea Eximbank announced on June 1 that it would provide USD 1 billion in project financing for the Coral South FLNG Project, the largest gas field development project in Coral field, Area 4 located in offshore Mozambique.
KOGAS, which owns a 10% stake, participates in the project as one of the sponsors along with Eni, an Italian energy company; Exxon Mobil of the U.S.; and National Petroleum Corporation (CNPC) of China. The consortium of the project participated by SHI has been selected as an EPC contractor.
Korea Eximbank and K-sure decided to provide USD 1.8 billion (22.5% of total project costs or 36% of project finance) for the project, each supporting USD 1 billion and USD 0.8 billion, respectively. This financing provided by the two organizations is the first-ever PF extended to an FLNG project in the world. Attracting global attention, Korea Eximbank and K-sure played a leading role as financing providers with five Chinese Banks, ECAs of Italy and France, and other global financial institutions participating in the project.
This financing will set a foothold for Korean shipbuilding companies, which are currently going through hardships, to successfully win the bid.

In this project, KOGAS and its partner investors, such as Eni, CNPC, Portugal's Galp Energia (GALP) and Mozambique's Empresa Nacional de Hidrocarbonetos (ENH), will be in charge of developing and producing LNG from the Coral gas field in Area 4 and also build and manage the FLNG.
Back in 2007, KOGAS had discovered

some 85 TCF of gas in Area 4 with global natural resources development companies. With the financing, the project will finally allow KOGAS to produce and sell 3.37 million tons of LNG every year for 25 years starting from 2022 when this project is completed.

As the EPC contractor, SHI will utilize its know-how accumulated over many years to build the FLNG facility. Also, it is expected that the project will have an influence on employment expansion in Korea since SHI will build the vessel domestically with the participation of more than 1,000 Korean SMEs. SHI is expected to retain the employment totaling 2,300 people per annum, and acquire foreign currency as the rate of foreign exchange earnings is anticipated to exceed 70%.

The project is also forecasted to contribute to the development of related industries as maritime plant orders are likely to be secured in advance in the future when oil prices recover.

Korea Eximbank's official remarked, "As the first project in the world's biggest gas field in the century, the Coral South FLNG Project is soon to be implemented at a time when petroleum gas prices show signs of recovery. For this project, Korea Eximbank and K-sure played a key role in negotiations with stakeholders."

He added, "Despite an unprecedented drop in petroleum gas prices, Korea Eximbank continued to facilitate Korean companies' business. We will further strengthen its leading role in promoting natural gas development and maritime plant projects for Korean companies."

모잠비크 해상 대규모 가스전사업 삼위일체 협력

한국가스공사는 해외 가스전 사업주로, 삼성중공업은 대규모 FLNG 수주 계약자로, 한국수출입은행과 무역보험공사는 PF(Project Finance) 금융 제공자로 금융과 기업이 함께 협력함으로써 삼위일체를 이뤄냈다.

한국수출입은행은 세계 최대 규모의 가스전인 모잠비크 Area 4 광구의 최초 개발사업인 코랄 사우스 FLNG(Coral South FLNG) 사업에 총 10억 달러의 PF금융을 제공한다고 지난 6월 1일 밝혔다. 이 사업은 지분 10%를 보유한 한국가스공사(이하 '가스공사')가 이태리 eni, 미국 Exxon Mobil, 중국 CNPC 등과 함께 사업주로 참여하고, 특히 삼성중공업이 참여하는 컨소시엄이 FLNG를 수주했다.

한국수출입은행이 10억 달러, 무역보험공사가 8억 달러를 제공하는 18억 달러(총 FLNG 사업비 80억의 22.5%, PF금융의 36% 수준)는 FLNG에 대한 세계 최초의 PF 금융으로, 전세계 금융기관이 초미의 관심을 보이며 지켜보는 가운데 국내 수출신용기관이 주도적으로 이끌었다. 5개 중국 국영은행, 이태리 및 프랑스의 수출신용기관, 글로벌 금융회사 등이 참여했으며, 어려움을 겪고 있는 한국조선사가 본 사업을 성공적으로 수주할 수 있는 기반을 제공했다.

코랄 사우스 FLNG 사업은 가스공사가 이태리 eni, 중국 CNPC, 포르투갈 GALP, 모잠비크석유가스공사(ENH)와 공동으로 모잠비크 해상 가스전(Area 4) 중 코랄 사우스(Coral South) 지역을 개발하고 FLNG를 건설해 생산된 액화천연가스(LNG)를 장기 판매하는 프로젝트다.

마지막 단계에서 글로벌 오일 메이저인 미국의 Exxon Mobil이 신규 참여를 확정함으로써 사업이 한층 탄력을 받게 되었다. 한편, 한국가스공사는 지난 2007년 탐사 단계부터 글로벌 오일메이저들과의 협력을 통해 원시부존량 85TCF(Trillion Cubic Feet) 규모의 대규모 가스를 발견했다. 한국가스공사는 사업이 완료되는 2022년부터 25년간 연간 337만톤 규모의 LNG를 생산 및 판매할 계획이다.

또한, 삼성중공업이 수주한 FLNG는 삼성이 호주 Prelude에 이어 수주한 사업으로 그간의 축적된 노하우를 활용할 수 있고, 선체 국내 제작으로 1,000여개 중소기업의 참여에 따른 고용 확대와 더불어 자체적으로 연 인원 2300명의 고용유지 및 외화획득이 기대된다.

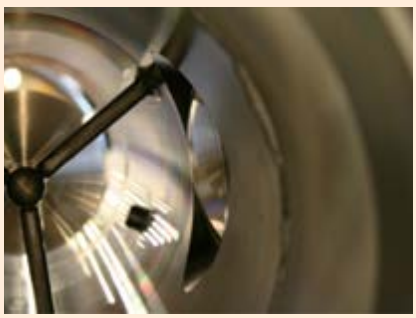
한국수출입은행 관계자는 "석유가스 가격이 일부 회복세를 보이는 시점에서 그 동안 무역보험공사는 타국 금융기관들과 함께 주도적으로 협상해 온 금세기 최대규모 가스전의 첫 번째 프로젝트가 본격적으로 가동될 예정"이라며, "우리는 유례없는 석유가스 가격 하락에도 기업 생존을 돕기 위한 조력자 역할을 충실히 해온 만큼 향후에도 사업성이 양호한 자원개발사업과 해양플랜트 수주 지원을 위해 선도적 역할을 더욱 강화하겠다"고 말했다.

Emerson launches new salinity system for increased flow assurance and to maximize oil & gas production

Emerson Automation Solutions launched the Roxar Salinity Measurement System for the sensitive, accurate and real-time measurement of saline water in gas production well streams at the Offshore Technology Conference (OTC) in Houston this week.

Through the new system, operators can instantly identify changes in the flow stream and the smallest amounts of saline water at never previously achieved levels of sensitivity. This enables the operator to take immediate remedial action to prevent threats to production, such as scaling, hydrate formation and corrosion. The onset of formation water and its salinity, if not controlled, can lead to well shutdowns and cost producers millions in unplanned shutdown time.

The system, which is a key element of the



Roxar Subsea Wetgas Meter and is based on microwave (MW) resonance technology, provides quantitative and qualitative real-time salinity measurements in many types of field conditions but, particularly, in the high gas volume fraction (GVF)/wet gas flows that characterize wet gas fields.

"With oil & gas wells being produced over a broader range of process conditions and water salinity and conductivity a key operational parameter for reservoir management and flow assurance, the timing for our new salinity system couldn't be better," said Patrick Babka, Vice President and General Manager Roxar at Emerson Automation Solutions. "Our new system will provide crucial decision-making information for the operator in identifying production threats; developing effective scale, corrosion and hydrate prevention strategies and improving chemical control; and maximizing oil & gas production and the field's economics."

The Roxar Salinity Measurement System has been designed as part of the Roxar Subsea Wetgas Meter, which provides individual flow rates of gas, condensate/oil and water. The salinity system consists of a salinity sensor mounted flush with the wall of the meter. The MW resonance technology ensures an instant response to changes to conductivity of the flow stream - in seconds not minutes - and the ability to measure water conductivity down to ± 0.1 S/m and up to 99.99% GVF and sensitivity in the range of ± 0,004 S/m. Small pockets of formation water leaking into the flow can therefore be detected instantaneously rather than in hours and days - something that no other technology has achieved to date.

Emerson conducted extensive testing of the new system internally and at the Colorado Experience Engineering Station (CEESI) in the United States based on a leading operator's specifications.

에머슨, 유량 안전성 향상과 오일&가스 유전의 생산량 극대화를 위한 염도 (Salinity) 시스템 출시

에머슨 오토메이션 솔루션즈는 지난 2017년 5월 미국 휴스턴에서 개최된 해양기술박람회(Offshore Technology Conference, OTC)에서 가스 유정의 유체 안에 섞여 있는 염수를 높은 민감도와 정확도를 가지고 실시간으로 측정할 수 있는 기술인 Roxar 염도측정시스템(Roxar Salinity Measurement System)을 발표했다.

이 시스템은 흐르고 있는 유체에 생기는 변화를 즉각적으로 인지하며, 이전 기술과는 비교할 수 없는 민감도로 아주 작은 양의 염수까지 감지할 수 있다. 이를 통해 초기에 교정조치를 취함으로써 스케일링, 수화물 생성, 부식 등과 같이 생산을 저해하는 상황이 발생하는 것을 사전에 방지할 수 있다. 지층 수나 염수를 초기에 제어하지 못할 경우 생산을 중단해야 할 수도 있으며, 계획되지 않은 중단 시간은 수백만 달러의 비용을 발생시키기도 한다.

특히 Roxar Subsea Wetgas Meter의 핵심 구성품으로서 MW(Microwave) 공명 기술을 기반으로 하며, 다양한 필드 환경, 특히 습성 가스 유전의 대표적인 특징인 가스 용적률(GVF, Gas Volume Fraction)이 높은 Wet Gas에 포함된 염분의 양과 질을 실시간으로 측정한다.

에머슨 오토메이션 솔루션즈의 Roxar 사업부 사장 패트릭 밥카(Patrick Babka)는 "오일 · 가스전의 공정 조건이 점점 더 다양해지고 있으며 염도와 점도가 유정 관리와 유량 안정성 측면에서 주요 변수로 역할을 하고 있는 지금이 새로운 염도 시스템을 출시하기에 가장 적절한 시기라고 생각한다"면서, "이번에 출시한 시스템은 생산에 부정적인 영향을 미치는 요소를 확인하고, 스케일링, 부식, 수화물 형성과 관련된 효과적인 대응 전략을 수립할 수 있다. 뿐만 아니라, 화학물질을 제어하는 등 운영과 관련된 의사결정에 반드시 필요한 중요한 정보를 제공해 줄 수 있으며, 오일 · 가스의 생산량과 이익을 극대화 시켜줄 수 있다"고 말했다.

Roxar 염도측정시스템은 유체에 포함되어 있는 가스와 오일 그리고 물의 유량을 각각 측정해주는 Roxar Subsea Wetgas Meter 제품의 일환으로 설계됐다. MW 공명 기술로 인해 흐르는 유체의 전도도가 변할 경우 몇 분이 아닌 몇 초 내에 거의 즉각적으로 반응하고 수분의 전도도를 GVF 99.9%까지 최하 ± 0.1 S/m까지 측정하며 민감도는 ± 0.004 S/m이다. 다시 말해 세계 최초로 유량으로 흘러 들어가는 지층수를 몇 시간이나 몇 일이 걸린 후에 감지하는 것이 아니라 거의 즉각적으로 감지하다.

에머슨은 업계를 주도하고 있는 한 고객의 요구 사항에 따라 다양한 부분의 시험을 내부적으로 실시했으며, 미국의 CEESI(Colorado Experience Engineering Station)에서도 다양한 시험을 실시했다.

New ABB Ability™ Collaborative Operation Centers achieve '24/7 office hours' principle for the shipping industry

Ship owners and operators can now contact ABB's experts during daytime working hours, no matter when assistance is sought, after the opening of a new ABB Ability Collaborative Operations Center in Florida. The Center will remotely monitor hundreds of ships around globe and will work in conjunction with similar facilities in Asia and Europe. The Centers (formerly known as Integrated Operations Centers) monitor data sent by vessels, allowing ABB to work with customers in the event of equipment failure or routine maintenance.

ABB is also opening an additional

Collaborative Operations Center in Genoa, Italy, which will have an emphasis on automation systems as well as its regular duties to customers. The expansion of the Collaborative Operations Centers consolidates ABB's position as one of the leading proponents of digital solutions in the maritime industry.

The Collaborative Operations Centers collate data that can then be shared on a common platform with customers to troubleshoot problems. When a critical alarm is triggered onboard a vessel, the lights in the Collaborative Operations Center turn red and engineers immediately start to resolve the issue. The opening of the Center in Florida means that no matter when an ABB engineer is dealing with a case they will be working during their daytime.

"Leveraging the data produced by ships is not aspirational for ABB, this is something we are doing already" said Juha Koskela, Managing Director of ABB's marine and ports business. "The opening of these two additional Collaborative Operations Centers is an indication that ABB is leading the digitalization race in shipping and we are bringing the benefits of big data analysis to our customers."

ABB is already remotely monitoring more than 700 ships and aims to raise that number to 3 000 by 2020. The two new centers are now part of a roster of Collaborative Operation Centers that includes Singapore, Billingstad (Norway), Helsinki (Finland) and Dalfsen (Netherlands) - all of which are dedicated to shipping.

In addition to serving the maintenance needs of ships, ABB's marine software also provides real time support for ship masters operating their vessels. For example, ABB's marine software can combine weather forecasts with vessel and load data to create a polar chart to assist the captain when plotting a course.

Shell launches next generation trunk piston engine oils

Shell Marine has unveiled next generation Shell Argina and Shell Gadinia trunk piston oils for the medium-speed engine market, confirming the success of a two-year quest to meet simultaneous market challenges posed to ship owners by technology advances and squeezed costs.

With shipping investment opportunities scarce and competition intense, owners face pressures 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 medium speed market.

Newer generation engines are designed for better fuel economy and lower operating costs, achieved by higher brake mean effective pressure and higher operating temperatures.

"These characteristics pose a challenge for trunk piston engine oils, increasing the risk of rapid BN depletion and increased viscosity," explained Marcus Schaerer, Shell Marine Global Marketing Manager. "The new Shell Argina and Shell Gadinia oils 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."

The Shell Argina range includes four grades: the BN20 Shell Argina S2 for residual, blended and distillate 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.

Meanwhile, Shell Gadinia S3 is a new addition to the existing standard and anti-lacquer Gadinia variants, and has been developed to control oil consumption in modern engines burning distillate fuels. "New and modern engines are designed to achieve higher efficiencies, lower emissions and lower operating costs," said Schaerer.

Shell Gadinia S3 has a comprehensive set of non-engine approvals for a wide range of non-engine shipboard applications, to provide a single long-term lubricant solution for smaller vessels working in the most severe operating conditions.

Marcus Schaerer, Shell Marine Global Marketing Manager

Exhaustive in-engine trials at Shell's Marine and Power Innovation Centre in Hamburg confirm Shell Argina and Shell Gadinia as oils that 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.

Navico announces acquisition of Naviop™

Navico announced the finalization of an agreement to acquire Naviop™, a global leader in marine monitoring and control systems.

Providing the integration framework to capture data from all boating systems, Naviop creates a digital ecosystem on boats outfitted with Simrad, Lowrance and B&G marine electronics, with the multifunction display serving as the hub for complete system control and information - all designed to enhance boater awareness and enjoyment.

"We are pleased to welcome Naviop to the Navico family," said Leif Ottosson, Navico CEO. "For years, auto manufacturers have provided consumers with a complete integration solution at their fingertips, and we, as a marine industry have fallen behind the curve to provide the same level of convenience and control. With Naviop, we have taken a step forward to provide a comprehensive system-integration package for the boatbuilding market - a position that is already well-received with many of our boatbuilding customers. Most importantly, these fully integrated marine-electronics systems will enhance the boating experience by making it easier to be an owner and by increasing enjoyment on the water."

Navico will, through this acquisition, take a further step in shifting the idea of a central multifunction display to an integrated cloud-connected information system. Naviop's success to date comes from its origin in industrial automation and is the result of continuous research and the development of new high-tech products and systems, and real-world system implementations. Flexible and reliable, Naviop systems are able to work as an integration hub as well as a digital switching solution meeting many international industrial standards and can manage everything from air conditioning and engines to diesel generator units and stabilization systems.

New contract will help speed spill response times

BIMCO and International Spill Control Organisation (ISCO) have launched two new spill response contracts to make the task of arranging clean-up services following a spill incident significantly easier to negotiate in an emergency.

The two standard contracts are a first for spill response contractors. One is tailored for international use and the other is specifically for use in the United States and both are available free of charge from www.bimco.org.

The contracts have been written by a group of experts from BIMCO, ISCO, the International Group of P&I Clubs, the International Salvage Union and the Spill Control Association of America. Other partners, including ITOPF (International Tanker Owners Pollution Federation) and individual response contractors, also contributed.

Tony Paulson, West of England P&I Club, who led the drafting team, said "Until now, no single standard contract for the hire of specialised spill response services and equipment has been available. Harmonised terms and conditions will help speed the process of getting essential spill response equipment on site as soon as possible".

Matthew Sommerville, ISCO added "Timing is critical for a successful response. To avoid delay, the contract lets the parties sign and mobilise the response while negotiations continue on rates and charges. This means that the contracts can be negotiated in a matter of minutes and personnel and equipment can get to work immediately".

The two contracts, RESPONSECON and US RESPONSECON, contracts are designed for spill incidents and enable those involved to obtain clean-up services and hire specialised personnel and equipment without delay.

The terms and conditions are set out in standard clauses with accompanying annexes for the different parties to insert detailed descriptions of the required services and rates for personnel and equipment.

World's first class developed electronic certificate service "ClassNK e-Certificate" begins operations

ClassNK will commence operation of the world's first comprehensive electronic certificate service for classification and statutory certificates from 15 June 2017. The service, ClassNK e-Certificate, will first be made available to Liberian-flagged vessels on the ClassNK register exclusively.

ClassNK e-Certificate is the result of an innovative project aimed at reducing the workload on board and at shore by minimizing potential clerical errors and time-loss associated with paper burden. Based on the standards stipulated in IMO's 'Guidelines for the use of electronic certificates (FAL.5/Circ.39/Rev.2)' released in April 2016, the system enables secure transmission of certificates from ship to shore and vice versa. Most importantly, the system includes an online function to determine the validity of certificates and that they have not been falsified or tampered with.

ClassNK began trials on the system in October 2016 in cooperation with the Liberian Registry and shipping companies. In April 2017, the Liberian Registry confirmed that ClassNK e-Certificate met the requirements of the IMO Guidelines, and granted ClassNK authorization as the first Recognized Organization to issue electronic certificates to Liberian-flagged vessels on its behalf.

Speaking on the occasion, Tetsuya Hayashi, Director of ClassNK's Survey Operations Division, said "With the successful completion of operational trials, and authorization from the Liberian Registry, ClassNK has become the world's first classification society to provide a comprehensive system for electronic certificates. We plan to expand the availability of this innovative service to even more vessels on our register in the near future in order to meet the growing needs of the industry."

ACO Marine supplies 100th Clarimar waste water system

ACO Marine has supplied its 100th Clarimar MF wastewater treatment system in a development that confirms market acceptance of a new technology introduced little more than two years' ago.

ACO Chile will supply the 100th unit, a Clarimar MF-3, for retrofit installation to Lautaro (ATF-67), a 1973-built 58.3m tugboat operated by the Armada de Chile. The contract marks a breakthrough for ACO Marine in Chile's naval and commercial maritime sectors.

Alexandre Fouquet, Business Development Manager, ACO Spa, said "The order is an important development for ACO Marine in the Chilean shipping industry. This contract, secured through our agent Altair SA, is a good start for ACO Marine products in this area."

Juan E. Lynch, Managing Director, Altair SA, said "As a major supplier of equipment to the Chilean maritime market for over 25 years, we have obtained approval from the Maritime Authority DGTM to supply ACO Marine's Clarimar MF range of black and grey water treatment plants to the Naval sector."

Commenting on the market acceptance of the new Clarimar MF, ACO Marine managing director Mark Beavis, said "That a new wastewater treatment system can penetrate what is an already established market in just two-and-a-half years is testament to the ability of ACO Marine's engineering team to design a system capable of meeting market demand for a smaller, safer and cost-effective wastewater treatment solution."

ACO Chile will supply the 100th unit, a Clarimar MF-3, for retrofit installation to Lautaro (ATF-67), a 1973-built 58.3m tugboat operated by the Armada de Chile.

The biological-type ACO Clarimar MF system and its pollution-preventing "bio-sword" innovation were officially introduced during Hamburg's SMM exhibition, in September 2014.

"We needed to develop a wastewater treatment concept that was not only smaller, safer and more cost-effective than our competitors, but also a system that provided a physical barrier against pollution and illegal, or accidental, discharges. That is exactly what we have achieved with the Clarimar MF," said Beavis.

While the Clarimar MF is available in various sizes to meet the differing capacity requirements of all commercial vessel segments, the supply of its 100th unit to a tugboat is indicative of a new and important market sector for ACO Marine.

ABB doubles voltage level of special wind turbine transformer

ABB announced its latest innovation in transformer technology, with the introduction of a 66 kilovolts (kV) WindSTAR transformer that can fit into the tower of a wind turbine. This will enable a new generation of powerful offshore wind turbines to operate at a world record voltage of 66 kV, twice the existing 33 kV level. The boost in voltage level will significantly reduce losses and make the wind generation systems more efficient. It also brings lifecycle benefits and cost-efficiency gains.

As an initial success, ABB has delivered five new WindSTAR transformers to MHI Vestas Offshore Wind, to be deployed at the world's first 66 kV offshore wind farm in the UK. The Blyth Offshore Demonstrator (BOD) is a 41.5 megawatt (MW), five-turbine wind farm, located off the coast of Blyth in Northumberland, with the capacity to deliver clean power to 34,000 homes.

As a follow-up order, ABB will supply another 11 such transformers to be deployed in large-scale offshore wind turbines at the European Offshore Wind Deployment Centre. This offshore wind test and demonstration facility, is located about 2.4 km off the coast of Aberdeen Bay, will incorporate a 92.4-MW offshore wind power plant with capacity to meet the annual electricity demand of nearly 80,000 homes.

"ABB's latest 66 kV WindSTAR transformers bear testimony to our spirit of pioneering innovation and commitment to customer focus" said Markus Heimbach, Managing Director of ABB's Transformers business, a part of the company's Power Grids division. "The development facilitates the integration of offshore wind energy bringing, clean power to the people and reinforcing our position as a partner of choice for enabling a stronger, smarter and greener grid."

ABB offers a complete range of power and distribution transformers designed for reliability, durability and efficiency. ABB is a major global transformer manufacturer, offering both liquid-filled and dry-type transformers and transformer services that deliver complete lifecycle support, including replacement parts and components.

ABS approval of Novel concept advances gas development

ABS has granted Approval in Principle (AIP) for a floating LNG power plant and Floating Storage and Regasification Unit (FSRU) design concept developed by Japan's Chiyoda Corporation,

"As the energy mix shifts and global demand for gas increases, concepts like this will reshape how energy is supplied," said ABS Vice President for Global Gas Solutions Patrick Janssens. "By working closely with Chiyoda, we were able to help them prove the feasibility of this novel and innovative concept."

This concept offers a new approach to delivering new sources of power to remote areas of the world. The conceptual design is based on existing LNG carriers which are converted into floating power plants with small (~72 MW) to medium (~400 MW) scale power generation capabilities. In reviewing Chiyoda's floating LNG power plant concept, ABS applied its relevant Rules and Guides to confirm that the conceptual design meets the intent of applicable class requirements.

"By applying ABS' robust guidance, we were able to develop a concept that meets operational demands and advances safety," said Chiyoda Corporation Project Manager Toyomitsu Kanai.

"By basing this concept on existing LNG carriers, we are able to reduce constructions costs and shorten delivery times. We look forward to developing this concept further and expanding the LNG value chain to new markets."

Recognizing the changing landscape and increased industry focus on gas, ABS launched its Global Gas Solutions team in 2013 to support industry in developing gas-related projects. The ABS Global Gas Solutions team provides industry leadership, offering guidance in liquefied natural gas (LNG) floating structures and systems, gas fuel systems and equipment, gas carriers, and regulatory and statutory requirements.

ABS has extensive experience with the full scope of gas-related assets and has been the classification society of choice for some of the most advanced gas carriers in service.

Wilhelmsen enhancing ship management with Big Data

Wilhelmsen Ship Management (WSM) has been deploying various digital reporting systems onboard as part of its ship management operations. With our existing data framework, digitization is no stranger to us.
All vessels managed by WSM are analyzed with a business intelligence tool. This tool extracts information from the data warehouse, consolidates reports and creates analysis for decision making.
Carl Schou, President of Wilhelmsen Ship Management, said "We have moved from traditional management through alerts and reports to digital dashboards. Today, with big data we can perform statistical analysis and develop more dimensions of visualized reporting. It is our aim to fully utilize this tool to assist owners in reducing operating cost, improving vessel performance and achieving their green initiatives."
A dedicated team based in the Kuala Lumpur, Malaysia, has been relentlessly building and implementing effective analytics strategies. Going forward, WSM plans to increase their big data utilization in forecasting and scenario planning.
Internet of Things (IoT) is also high on the agenda and WSM sees it as a very near possibility as we already have the right foundation to seamlessly capture and analyze IoT information into meaningful insights.

조선해양플랜트협회, 한국조선소안전표준화 컨퍼런스 성황리 개최

한국조선해양플랜트협회(KOSHIPA)는 지난 6월 20일 부경대학교(부산)에서 한국조선소안전표준화(KSSS, Korean Shipyard Safety Standardization) 컨퍼런스를 성공적으로 개최했다고 밝혔다. 이날 행사에는 정부 관계자 및 국내 조선3사, 글로벌 오일메이저를 비롯한 63개 기업/기관 등에서 약 180여명이 참석했다.
이 컨퍼런스는 실제 산업 현장의 KSSS 표준 적용을 위한 사례 공유를 목적으로 개최됐다. 컨퍼런스에 참석한 조선 3사 안전관리담당 관계자들은 각 사별 실시계획 및 진행현황, 안전관리 현황에 대한 정보를 공유했다.
이 자리에서 고용노동부 부산북부지청 오만석 지청장은 "KSSS가 우리나라 조선산업 현장에서 안전수준을 향상시켰다"며, "이를 계기로 한국조선소의 안전관리 지침이 확립되기를 바란다"고 말했다.

쉘 데이비드 커민스(David Cummins) 부사장은 "한국의 조선사가 생산성과 수익성을 높여 국제적인 경쟁력을 제고하려면 무엇보다 산업 전반에 안전을 중시하는 문화가 정착되는 것이 중요하다"며, 조선소의 안전기준 표준화와 현장 적용의 중요성을 강조했다.
한편, KSSS는 2014년 3월 비계표준 개발을 시작으로 지난해 12월까지 개발이 완료된 총 7개의 표준으로, 국내 대형 조선 3사, 글로벌 오일메이저, 선주사 등 총 33개 기관 및 업체가 자발적으로 참여하고 있는 프로젝트이다. 조선소 작업현장에 향상된 단일 안전 표준 적용과 통일된 교육훈련 데이터 베이스 구축 등을 통해 조선소 HSE(보건, 안전, 환경) 관리체계 및 안전문화 구현을 목표로 하고 있다.

한국수출입은행, 모잠비크 가스전 사업에 10억 달러 투자

한국수출입은행은 모잠비크 Area 4 광구인 코랄 사우스 FLNG(Coral South FLNG) 사업에 10억 달러를 지원하는 내용의 금융계약을 체결했다고 지난 6월 27일 밝혔다.
한국수출입은행 등 8개 기관으로 구성된 대주단은 이번 프로젝트 사업주인 이탈리아 eni 및 한국가스공사 등과 모잠비크 가스전 개발을 위한 총 50억 달러 규모의 PF(Project Finance) 금융계약서에 서명했다.
이번 사업은 가스공사가 글로벌 오일메이저인 이탈리아 eni 및 미국 Exxon Mobil, 중국 CNPC, 포르투갈 GALP, 모잠비크 석유가스공사(ENH)와 공동으로 모잠비크 해상 가스전(Area 4) 중 코랄 사우스(Coral South) 지역을 개발하고 FLNG를 건설하여 생산된 액화천연가스(LNG)를 장기 판매하는 프로젝트다.

한국가스공사, 미국 사빈 패스 LNG 인수

한국가스공사는 지난 6월 25일 미국 루이지애나주에 위치한 사빈 패스(Sabine Pass) LNG 수출터미널에서 미국 셰니어 에너지(Cheniere Energy)와 공동으로 LNG 인수식을 거행했다.

한국가스공사는 미국 셰일가스 혁명 초기인 지난 2012년 사빈 패스와 장기 LNG 매매계약을 체결했으며, 이 계약에 따라 2017년부터 2036년까지 20년 동안 연간 280만 톤의 LNG를 수입하게 됐다. 최초의 미국산 LNG는 전용 국적선(74,000톤급)으로 수송되어 오는 7월 한국가스공사 통영인수기지에 하역될 예정이다.

한국가스공사의 미국산 LNG 수입 규모는 연간 약 10억 달러로 추산되고 있으며, 기존 중동 중심의 LNG 공급선을 다변화함으로써 국내 천연가스 공급 안정성 강화에 기여하는 한편, 한미간 무역수지 불균형 해소 및 협력관계 증진에도 도움이 될 것으로 전망된다.

또한, 도착지가 제한된 일반적인 LNG 계약과 달리 미국산 LNG는 구매자가 계약물량 전체를 자율적으로 처분할 수 있어, 국내 천연가스 수급상황 급변시 수급조절 수단으로 활용이 가능하다.

한편 한국가스공사는 지난 2015년 사빈 패스 계약물량의 수송을 위해 국내 2개 조선사에 총 6척의 신규 선박을 발주했으며, 해당 선박의 운영은 국내 3개 해운사가 전담한다.

슈나이더 일렉트릭, 산업별 맞춤형 정전 사고 방지 솔루션 제공

슈나이더 일렉트릭 코리아는 급증하는 정전 사고에 대비해 산업별로 최적화된 정전 방지 솔루션을 제공하는 데에 박차를 가할 계획이라고 지난 6월 26일 밝혔다.

슈나이더 일렉트릭은 수배전 전력설비의 고장으로 인해 정전 사고가 늘어나고 이로 인해 피해가 크다는 점을 감안해 유지보수 서비스를 적극적으로 확장하고 있다. 어드밴티지 서비스 플랜(Advantage Service Plans)은 슈나이더 일렉트릭의 유지보수 부문에서의 우수한 기술력과 전문성을 보여준다. 정기적인 예방 점검뿐만 아니라 고차원 진단예측 유지보수를 통해 갑작스럽게 발생하는 시스템 오류 및 중단을 방지하여 안전하고 신뢰할 수 있는 에너지를 공급한다.

어드밴티지 서비스 플랜은 정기적인 예방점검, 진단 예측점검 그리고 수리점검으로 구성되어 있다. 정기적인 예방점검(Preventive maintenance)은 전력 기기를 규칙적으로 점검하여 추후에 발생할 수 있는 고장 및 에러를 예측하여 보완하는 서비스이다. 진단 예측점검(Predictive maintenance)은 기기에 대한 정밀한 평가를 통해 발생 가능한 사고를 사전에 감지해 사용자에게 사고를 예방할 수 있는 대책을 제시한다.

뿐만 아니라 슈나이더 일렉트릭은 무정전 전원 공급장치(UPS)를 통해 대형 산업 시설, 데이터센터와 비즈니스 핵심 애플리케이션에 안정적으로 전원을 공급한다. 정전이 발생하거나 전력이 불안정하게 공급되는 상황에서 UPS를 통하여 안전하고 효율적으로 전기를 사용할 수 있도록 지원한다. 슈나이더 일렉트릭의 대표적인 UPS로 갤럭시VX(Galaxy VX), 스마트 UPS(Smart-UPS) 제품군, 시메트라 PX(Symmetra PX)가 있다. 올해 1월에 출시한 갤럭시VX는 대용량 3상 무정전 전원 공급장치(UPS)로 대형 산업 시설과 데이터센터에 주로 적용된다.

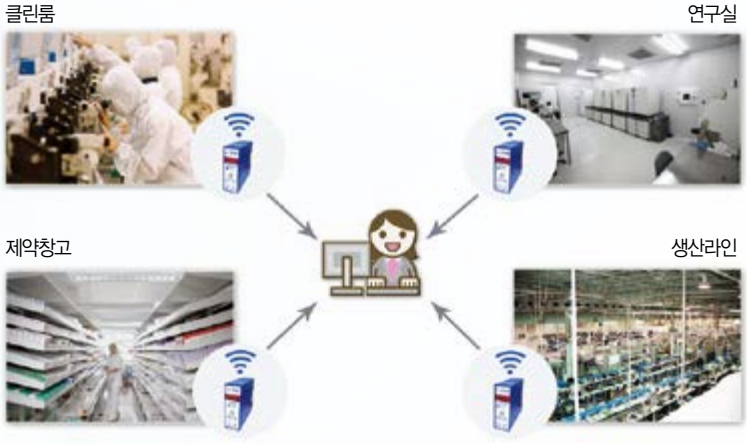
슈나이더 일렉트릭 코리아 관계자는 "UPS나 유지보수 서비스에 초기 투자를 한다면, 정전으로 인해 발생하는 막대한 손실을 막아 결과적으로 안정적인 비즈니스 운영을 이룰 수 있다"며, "앞으로 '라이프 이즈 온' 비전에 따라 고객들이 보다 안전하고 신뢰할 수 있으며 효율적으로 에너지를 사용할 수 있도록 UPS 등 우수한 에너지 관리 솔루션을 제공하는데 최선을 다하겠다"고 말했다.

FULL-MULTI SLIM STYLE CONVERTER JC8000

온도 센서로부터 제공받은 값이 JC8000을 통해 기록계와 지시계 및 냉동창고 제어 시스템으로 빠르고 정확하게 전달되어 집니다.

무선 대형 지시계

RF 무선 통신 기능을 통해 어느곳에서든 중앙 제어 장치와 값을 주고 받는 것이 가능합니다.



제약회사에서 JC8000 활용 시 이처럼 분리 된 여러장소로부터 입력 값을 편리하게 받을 수 있습니다.

JY CNS JOOYOUNG CONTROL&SYSTEM 주영씨앤에스(주)

FULL-MULTI SLIM STYLE CONVERTER JC8000

공간절약이 용이한
'슬림형 스타일'

오차범위 **0.05%** 이내의
매우 뛰어난 정확도

ISM밴드(**2.4Ghz**)를 사용하는
RF기능을 탑재하여 자사의
제품들끼리는 **무선연동**이 가능

TC 13가지 RTD 11가지 그 외 4가지
신호가 입력 가능한 **'풀멀티형 컨버터'**

응답속도가 빠르고
안정적(galvanic-ISO)인 신호전달이 가능

스위치를 이용한 손 쉬운 **입력모드**
변환 입력저항이 필요없음.
ex) **mA→volt**

손쉬운 설정부터 POWER 유저를 위한
정밀한 세부설정까지 사용자 편의 위주의
메뉴 설정

JC8000의 적용

로 드 셀

초음파 레벨

유 량

JY CNS
JOOYOUNG CONTROL&SYSTEM
주영씨앤에스㈜

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www.totalgauge.co.kr / www.unicell.co.kr

Heightening expectation for a turnaround in shipbuilding market

- New order placement on steady increase
- Newbuilding order placement rose 36% in the first quarter

Newbuilding orders placed in the world increased by 36.6% year-on-year to reach 3.37 million CGT in the first quarter of this year. In addition, orders placed in April alone stood at only 850,000 CGT (34 vessels), but surged to 1.66 million CGT (50 vessels) in May, which suggests a gradual turnaround in shipbuilding market conditions. Meanwhile, volumes of vessels built in the first quarter of this year remained only about one-third of order volume, giving rise to grave concern towards dwindling order backlog.

According to data published by the Export-Import Bank of Korea (Korea Eximbank), volumes of vessels built in the world during the first quarter of this year slid 8.5% year-on-year to 9.9 million CGT, while volumes of vessels built at Korean shipyards fell 19.6% year-on-year to 3.09 million CGT in the same period. Volumes of vessels built at Japanese shipyards plunged 34.4% to 1.79 million CGT while those of vessels built at Chinese shipyards rose 19.2% to 4.02 million CGT. Japanese shipyards have shown relatively slower pace of shipbuilding activities, unlike the previous year. By contrast, shipbuilding activities at Chinese shipyards have gathered pace after slowing down in the midst of restructuring.

As of late May, Korea took top spot worldwide in terms of cumulative orders with 2.07 million CGT (57 vessels), followed by China with 1.84 million CGT (101 vessels), Italy with 740,000 CGT (8 vessels), Finland with 670,000 CGT (4 vessels), and Japan with 380,000 CGT (18 vessels).

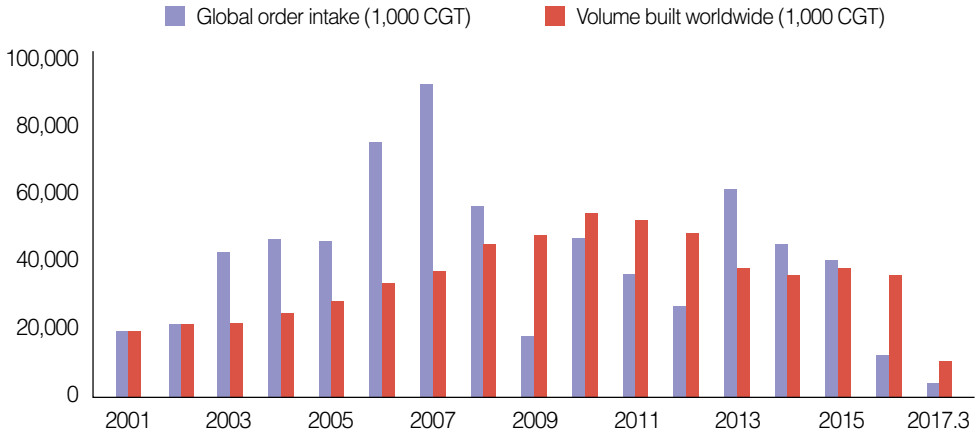

Figure 1. Global newbuilding orders and volumes built (Source: Clarkson)

Global shipbuilding industry showed stronger performance in the first quarter of 2017, compared to the same period of the previous year, but still remains sluggish. New orders placed worldwide in the first quarter increased by 36.6% year-on-year to 3.74 million CGT. Value of new orders rose 57.2% year-on-year to USD 12.02 billion. Meanwhile, global volumes of vessels built in the same period slid 8.5% year-on-year to 9.9 million CGT. Quantity and value of new orders increased after falling to an all-time low last year. However, both Quantity and value of new orders fell to about one-third of volumes of vessels built in the same period, resulting in severe order drought. Factors contributing to such weak performance include the diminishing demand for eco-ship amid sustained low oil prices, downturn in maritime shipping market due to overcapacity, cost overrun facing the ship owners as a result of enforcement of stringent environmental regulations.

Newbuilding price index on the rise

By ship type, 7 cruise ships were ordered in the first quarter which witnessed strong growth in new orders, comprising 27% of all new orders in terms of CGT (Compensated Gross Tonnage) which is higher than the previous year's level. In particular, Finland and Italy stood out in Europe.

New orders plummeted in the market for most types of commercial vessels, excluding cruises ships. New orders for ultra-large ore carriers were placed by China in the same period of the previous year. In the first quarter, only 12 small and medium-sized bulk carriers were ordered while no Capesize bulk carrier was ordered. Consequently, share of new orders at Chinese shipyards and Japanese shipyards for bulk carrier fell to 28.5% and 4.7%, respectively. Even the share of new orders placed domestically plunged in China.

In tanker segment, 12 VLCCs (Very Large crude Carriers), 13 MR tankers and 10 LR tankers were ordered. The order quantity was higher than expected, considering, for example, that 5 LNG carriers were already ordered in the first quarter which is one-fourth of annual average of 20 units.

In the meantime, only 8 small and medium-size containerships were ordered amid severe order drought that continued from last year. In offshore plant segment mired in severe order drought for drillship and FPSO (Floating Production Storage and Offloading), only 2 FSRUs (Floating Storage Re-gasification Units) were ordered which nonetheless shows a gradual improvement from the previous year in which no FSRU was ordered.

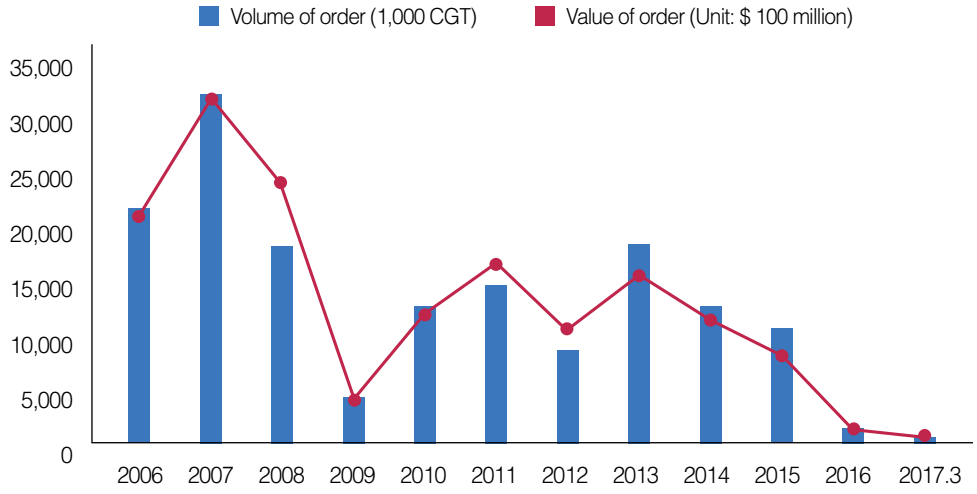

Figure 2. Trends of volume of orders at domestic shipyards (Source: Clarkson)

Clarkson's newbuilding price index has risen for 2 consecutive months from 122 points in March to 122 points in April and 123 points in May, raising expectation for rebound. In particular, the price index of bulk carriers is expected to turn upward for the first time in about 3 years after May 2014, which may signify global economic recovery.

Order quantity jumped 348.8% year-on-year

New newbuilding orders at Korean shipyards showed noticeable improvement in the first quarter of 2017, compared to the same period of the previous period, but still remain flat. According to Clarkson, new newbuilding orders received by Korean shipyards increased by 348.8% year-on-year to 894,000 CGT (22 vessels) in the first quarter and the value of new orders at Korean shipyards more than tripled year-on-year to about USD 2.2 billion in the same period. Volumes of vessels built at Korean shipyards declined 19.6% year-on-year to 3.09 million CGT in the first quarter. The shipbuilding volumes have been declining gradually due to slump in new orders since 2015. In the same period, China claimed the top spot with 1.07 million CGT (58 vessels) in new orders, but the value of orders at Chinese shipyards remained lower than that of orders at Korean shipyards which added mostly high value-added large vessels to their orderbooks. By country, new orders at Italian shipyards and Finnish shipyards stood at 610,000 CGT (6 vessels) and 330,000 CGT(2 vessels), respectively, Meanwhile, new orders at Japanese shipyards amounted to 180,000 CGT (8 vessels), plunging from the previous year's level.

Market share of Korea, China, and Japan has also changed as a result. Korean shipyards carved out 7.3% share of global market in the first quarter of the previous year, trailing behind Chinese shipyards (51.1%) and Japanese shipyards (9.4%). This year, Korean shipyards have captured 23.9%

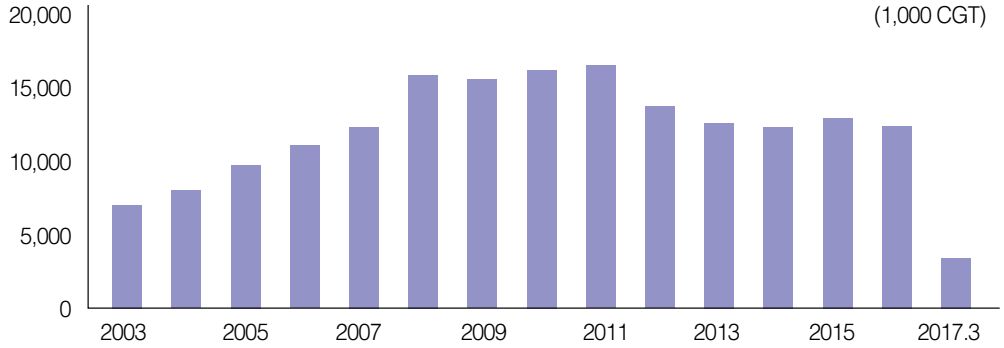

Figure 3. Trends of shipbuilding volumes in domestic shipbuilding industry (Source: Clarkson)

Focus on high value-added vessels, including tankers and LNG carriers

Korean shipyards have seen that new orders for 3 types of vessels, namely, oil tankers, product carriers, and LNG carriers, comprised 85% this year. Oil tanker market is witnessing an increase in new order placement amid the rise in cargo traffic on the back of low oil prices. Although orders for LNG carriers have decreased slightly since last year, the market outlook is bright due to expansion of shale gas production in North America and development of offshore oil fields in Australia and East Africa. Meanwhile, Clarkson forecasted that the quantity of large-scale LNG carriers to be added to orderbooks will reach 14 units this year and rise from the following year, reaching 36 units on annual average by 2025.

Hyundai Heavy Industries (HHI), the largest among Korea's 3 shipbuilding giants, added 10 vessels (including the orders received by Hyundai Samho Heavy Industries) to its orderbook, including 4 VLCCs (Very Large Crude Carriers), 1 LNG carrier, 1 LNG-FSRU (Floating Storage Regasification Unit), and 4 medium-sized oil tankers. Daewoo Shipbuilding & Marine Engineering (DSME) added 4 vessels (worth USD 520 million) to its orderbook, including 2 LNG carriers and 2 VLCCs. Meanwhile, Samsung Heavy Industries (SHI) received orders for 2 vessels (worth USD 230 million), including 1 FPU (Floating Production Unit) and 1 LNG-FSRU.

Although Korea's 3 shipbuilding giants have showed significant improvement in new order intake compared to the previous year, their combined new orders fall short of one-third of shipbuilding volumes, and consequently, the anxiety over thin orderbook remains persistent. In particular, order backlog was diminished by 11.4% compared to the beginning of the year. As of early April, order backlog stood at 17.67 million CGT, 11.4% down from the level set in the beginning of the year, which is estimated to be about 1.3 years of work. Exports of vessels (including offshore plants) in the first quarter of this year slid 11.3% year-on-year to USD 7.05 billion with exports continuing its downward trend.

share of global market which is more than three-fold increase, trailing closely behind Chinese rivals that have garnered 28.5% share. Meanwhile, Japanese shipyards have seen their market share sliding to 4.7% which is half of the level set in the first quarter of last year.

Turnaround in shipbuilding market

Signs of change have been detected in shipbuilding industry which has seen no order placement except for oil tankers. New orders for bulk carrier started flowing in, and order placement has resumed even for containerships after complete order drought that gripped the segment for 2 years. In oil tanker segment, prices of most types of pre-owned vessels have increased. The resale price of 300,000 DWT VLCC (Very Large Crude Carrier) slid from USD 105 million to USD 82 million apiece in September 2015 and rebounded to USD 85 million in May. The price for 5-year old pre-owned VLCC with a capacity of 300,000 DWT fell from USD 84 million to USD 62 million apiece in July 2015 before rebounding to USD 65 million per unit, an increase by USD 3 million. In

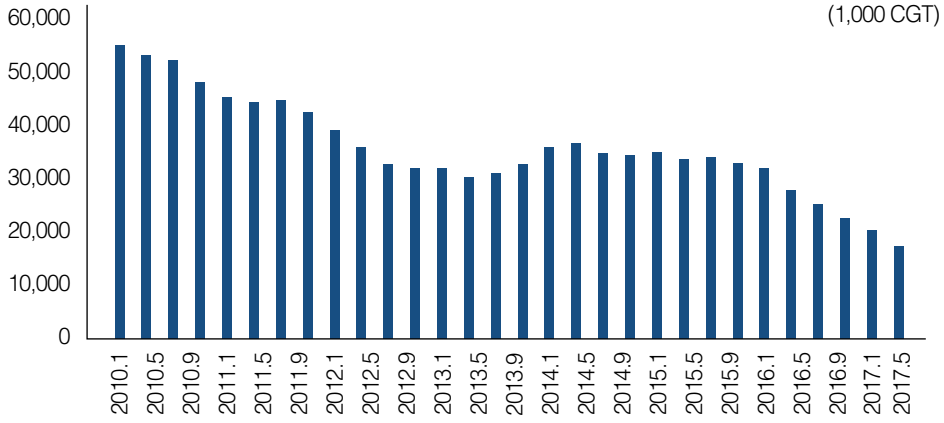

Figure 4. Trends of order backlog in domestic shipbuilding industry (Source: Clarkson)

addition, ship prices have been rising all the way up to May, including small-to-medium oil tankers and product carriers such as Suez-max, Apramax, and Panamax class vessels.
The shipbuilding industry pundits note that ship prices rebounding in almost 3 years after 2014 signify a turnaround. Usually, ship prices rise when order placement increases. Shipping companies are placing new orders as ship prices which recently hit the bottom are likely to increase. Recent rise in prices of raw materials, such as steel plates, have also influenced the increase in ship prices.

· Global economic recovery

The recovery in bulk carrier segment is likely to hinge on volumes of scrapped vessels and global economic recovery. In the bulk carrier segment, average BDI (Baltic Dry Index) hit 945.2 in the first quarter, jumping 163.7% from the same period of the previous year which saw the weakest performance in the history of shipbuilding industry. The rebound in bulk carrier segment is considered to have gathered pace in the first quarter on the back of slight increase in global trade volume. The BDI index once exceeded 1,300 during the first quarter, but still remains far below the level required for stable income flow to shipping companies.

· Decline in oil tanker freight rates

In tanker segment, the growth of demand for maritime cargo traffic of crude oil has slowed down to 1% which is the level recorded in previous years. Vessels ordered during the period of declining oil prices in 2014 are scheduled for delivery from this year. As oil tankers deployed for maritime storage are returning to some markets, concern has been mounting towards glut of supply in oil tanker shipping market. Under those circumstances, oil tanker freight rates have turned downward. VLCC freight rates between Ras Tanura in Saudi Arabia and Rotterdam in the Netherlands fell 0.4% year-on-year. In the meantime, VLCC freight rates between Bonny Off in Nigeria and Ningbo in China dipped by 2.2%, while Suez-max class freight rates between Saudi Arabia and Trieste in Italy dropped 8.9%.

· Increase in containership cargo traffic

As major global ship owners, such as Maersk, MSC, and Evergreen, are predicting a rebound in containership freight rates from this year, cargo traffic has increased since the

Rebound in order backlog of Korean shipyards

The combined order backlog of Korean shipyards has been on the rise in 20 months, spurred by VLCC orders. Korean shipyards, including Hyundai Heavy Industries (HHI), swept most orders for VLCCs placed worldwide this year, proving their competitiveness. According to Clarkson, the order backlog of Korean shipbuilding industry stood at 17,496,000 CGT (404 vessels), as of early June. That is a slight increase compared to 17,339,361 CGT (401 vessels) and represents an upward trend for the first time since October 2015 (32,559,116 CGT). Korean shipyards made a clean sweep of 27 VLCCs ordered globally this year.

The 3 shipbuilding affiliates (Hyundai Heavy Industries, Hyundai Samho Heavy Industries, and Hyundai Mipo Dockyard) of Hyundai Heavy Industries Group secured orders for 14 VLCCs until last May. Samsung Heavy Industries (SHI) won orders for 8 VLCCs thus far. SHI received an order from Singapore-based BW Group for 4 VLCCs and another order from Greece-based shipping company Capital Maritime for 4 VLCCs.

Daewoo Shipbuilding & Marine Engineering (DSME) won orders for 5 VLCCs thus far, including 3 units of ultra-large 318,000-ton oil tanker worth approximately USD 250 million (about KRW 280 billion) ordered by Maran Tankers, a subsidiary of Angelicoussis Group, the largest shipping company of Greece. The subsequent increase in VLCC orders is attributable to an increase in refinery plant investment, including the expansion of refinery-related factories in Southeast Asian countries such as Indonesia. Global shipping companies have placed orders at Korean shipyards on the back of the upturn in the demand for oil tankers carrying the crude oil from oil-producing countries to those factories.

beginning of this year, raising expectations for new order placement. Meanwhile, France-based shipping company CMA CGM recently launched a bid for 6 units of ultra-large containerships, each with a capacity of 20,000 TEU (3 optional vessels). The projected price is USD 160 million apiece, totaling USD 1.4 billion if the option is exercised.

In the first quarter of this year, containership freight rates still

remained low due to the rising demand for maritime transportation spurred by the rise in cargo traffic and adjustment of supply which arises from scrapping of vessels, but are showing signs of rebound.

According to the shipping industry, maritime container cargo traffic is expected to comprise about 4% to 5% in 2017 as global trade volume increases. Although containerships ordered in massive quantity during 2015 are scheduled for delivery this year, the supply will be controlled by vessel scrapping and overall capacity is expected to grow by less than 3%.

Crucial turnaround in shipping market conditions

The global shipbuilding market conditions have not improved significantly compared to the previous last year that witnessed severe recession. However, ship prices have stopped falling and even started to rise for some types of vessels, raising expectations for a rebound in the future. However, there is a heightened concern that full recovery in shipbuilding industry is still difficult to anticipate.

Above all, the supply glut of vessels has remained unresolved. According to UBS, a global investment bank (IB), only 70% of the world's vessels actually operate at the sea. The remaining 30% are tied to ports or docks because they do not have any cargo to carry. The fact that shipbuilding supply growth (3-5%, YoY) has outpaced the demand growth (1-3%) over the last 3 years (from 2014 to 2016) still remains a concern.

Reference

'Shipbuilding & Shipping Market Conditions in Q1 2017' published by the Export-Import Bank of Korea

DSME delivered an ultra-large fixed offshore plant

Daewoo Shipbuilding & Marine Engineering (DSME) sailed an offshore plant worth USD 2.7 billion out to sea, accelerating the pace of production process stabilization and business normalization.

DSME announced on June 12 that it successfully delivered a fixed offshore plant ordered by Statoil, a multinational energy company, in 2012. The facility is a large-scale project worth USD 2.7 billion in deposit alone. In fact, this contract worth at USD 1.8 billion at its execution in 2012 rose value to USD 2.7 billion after alterations of design and specification. As a result, DSME successfully delivered its second batch out of 5 offshore plants scheduled for delivery this year. Subsequent production schedule is expected to proceed without disruption in the period ahead.

A fixed offshore plant built by DSME set sail in a barge for the North Sea continental shelf in the U.K. for installation.

As a superstructure for crude oil production, this offshore plant delivered recently to Statoil, which weighs approximately 40,000 tons and can produce about 2.5 million barrels of crude oil per month. That is equivalent to the amount consumed daily in whole country. In particular, this facility was constructed in such a way that stable production can be ensured even in cold and harsh marine conditions of the North Sea and will be installed on the North Sea continental shelf of the U.K. Offshore plants operating under harsh natural conditions in North Sea are required to meet the most stringent environmental and quality standards.

An official from Statoil said, “We are pleased to take delivery of high quality facility despite frequent design alterations. We hope that we can partner with DSME in future projects.” In June last year, DSME successfully delivered a fixed offshore plant worth USD 1.1 billion ordered by the same company that also expressed thanks.

An official from DSME said, “With successful delivery of offshore plants last year and this year, we have regained the pride and confidence to some extent. The trust of client has become even stronger through both projects and is likely to have a positive impact on our sales activities for future projects.”

DSME has seen a decline in its new order intake since last year, which has eroded its sales. However, it has improved profitability based on labor cost reduction, short-term stabilization of offshore plant processes, etc. Registering KRW 291.8 billion in operating income in the first quarter, DSME made a turnaround from the deficit of KRW 38.1 billion recorded in the same period of the previous year. Meanwhile, DSME reported KRW 2 trillion and 784 billion in sales which represents a 20.1% decrease from KRW 3 trillion and 482.9 billion recorded in the corresponding period of last year. Currently, DSME has an order backlog of 10 units of offshore plants (2 production facilities and 8 drillships), out of which 3 offshore plants are planned to be delivered by October as scheduled.

ABB delivers DolWin2 offshore wind connection

ABB has successfully commissioned and handed over the DolWin2 offshore wind transmission link to the Dutch-German transmission system operator TenneT.

DolWin2 is the third offshore wind connection project that ABB has executed for TenneT in Germany's North Sea, following BorWin1 and DolWin1. The high voltage direct current (HVDC) link connects offshore wind farms to the mainland grid, and has the capacity to supply more than a million households with renewable energy. DolWin2 supports Germany's "Energiewende" roadmap, which aims to generate more than 6.5 gigawatts (GW) of offshore wind power by 2020, and 15 GW by 2030.

"We are very pleased to have successfully commissioned and handed over the DolWin2 project and would like to thank TenneT for their continuing trust and cooperation," said Claudio Facchin, President of ABB's Power Grids division.

"HVDC is the technology of choice for reliably and efficiently transmitting large amounts of power over long distances with minimal losses. It is ideal for integrating remote renewable energy into the power grid and plays a key role in making ABB partner of choice for enabling a stronger, smarter and greener grid, in line with our Next Level strategy."

The 916 megawatt (MW) link deploys ABB's HVDC Light®, Voltage Source Converter (VSC) based technology and includes a 320 kilovolt (kV) converter station positioned on a platform about 45 km offshore. The station connects up to three offshore wind farms to the mainland power grid in Germany.

For ABB, the project scope included the design, supply, installation and commissioning of the compact offshore and onshore converter stations as well as the subsea and underground cable systems.

ABB pioneered VSC-based HVDC Light technology 20 years ago and is today the market leader, having delivered 19 of the 25 VSC HVDC projects commissioned around the world. In the upper range, the technology now reaches ±640 kV and can deliver 3,000 MW – enough electricity to power several million households, enabling power transmission over 2,000 kilometers.

The system design enables compact converter stations – a big benefit in applications like offshore wind and interconnections.

Cobham Delivers 50,000th SAILOR FleetBroadband Terminal

Ten years after the launch of Inmarsat FleetBroadband, SAILOR terminals continue to deliver a vital link between ship and shore.

Cobham SATCOM has marked a major milestone for its market leading Inmarsat FleetBroadband hardware portfolio, with delivery of the 50,000th SAILOR FleetBroadband terminal. Launched in parallel with Inmarsat's then game-changing L-band maritime satcom service in 2007, SAILOR FleetBroadband has played a major role in enabling safety and efficiency improvements on board merchant ship and fishing vessels, while proving a popular choice for keeping ocean going yachts and motorboats connected globally.

Cobham SATCOM's 50,000th FleetBroadband terminal, a SAILOR 250 FleetBroadband was delivered to Matt George, Vice President Global Maritime Sales at Network Innovations, in Miami on 24 April 2017. The SAILOR 250 FleetBroadband with its 30 cm reflector dish was launched alongside the flagship SAILOR 500 FleetBroadband, with a 50 cm reflector in 2007. Within just two years, Cobham had shipped 10,000 terminals. SAILOR 150 FleetBroadband, with a 15 cm reflector followed in 2009, helping to bring FleetBroadband to an even wider user-base. This was extended further in 2015, with the launch of the SAILOR Fleet One terminal, which is based on the same market leading technology as SAILOR FleetBroadband terminals and aimed more at private users and smaller fishing boats.

"We're delighted to have shipped so many SAILOR Fleet-Broad band terminals, which help thousands of vessels stay safe and connected to shore," said Casper Jensen, Senior Vice President, Cobham SATCOM. "Despite being introduced nearly a decade ago, SAILOR FleetBroadband continues to be an important part of our maritime satcom antenna portfolio, alongside our line of SAILOR VSAT Ku and Ka-band terminals, which offer the same high reliability and feature rich operation for all widebeam and spotbeam VSAT services, including Inmarsat's new Fleet Xpress."

"Over the last ten years, FleetBroadband has become an industry standard for vessels requiring reliable IP connectivity and voice communication globally," said Ronald Spithout, President, Inmarsat Maritime. "As a service launch partner and a principal ground infrastructure developer for the network, Cobham has played a vital role in this success and it is a fantastic achievement."

Easy installation and high-reliability in even the most extreme maritime environments has helped to position SAILOR FleetBroadband as the best-selling Inmarsat FleetBroadband terminals by far. While SAILOR Fleet Broadband was quickly established as the leading FleetBroadband platform on launch, Cobham has continued to develop its portfolio to ensure full compatibility with additional features from Inmarsat, including the Multi-Voice Service, which adds up to nine simultaneous voice lines to a single terminal.

Cobham also introduced the SAILOR 3771 Alarm Panel for SAILOR Fleet Broadband systems, which provides Voice Distress Calling with full priority access in ship-shore and shore-ship communication.

Bureau Veritas approvals help propel floating offshore wind sector

Latest design approval granted to DCNS Energies' foundation for floating offshore wind turbines (FOWTs) is validation for upcoming projects in France, the USA and beyond

Bureau Veritas has issued a Preliminary Design Approval for a Floating Offshore Wind Turbine (FOWT) foundation designed by DCNS Energies. The floating foundation is based on a semi-submersible floater, designed to be competitive, adapted to mass production, easily towable, connectable and dis-connectable, and adaptable to site conditions & local industrial environments. This approval was provided as part of the General Electric (ex-Alstom) and DCNS Energies Sea Reed project, a FOWT product development initiative supported by ADEME, the French Environment and Energy Management Agency.

Matthieu de Tugny, COO, Senior Vice-President and Head of Offshore, Bureau Veritas, said "We are seeing increasing interest in FOWT technology as demand for wind power increases. FOWTs, fabricated onshore, can be installed in deep water and on variable seafloor topographies. Because of their low environmental impact during installation and application in deeper waters, we can see that demand for FOWTs will grow."

A Preliminary Design Approval for Bureau Veritas implies that the Basis of Design has been approved. The design is feasible, achievable, and contains no technological show-stoppers that may prevent the design from being matured.

Floating Offshore Wind Turbines (Source: GE`s DCNS Energies)

Bureau Veritas engineers verified design methodologies, covering hydrodynamics, structure, stability and electricity. They also checked that the design is deemed to be suitable for use in all phases of operation including in-transit to field, installation and commissioning as well as providing recommendations through subsequent phases of the project.

Thierry Kalanquin, Chief Executive Officer, DCNS Energies, said "The approval by Bureau Veritas of our latest foundation design is a step forward towards the development of our global industrial and integrated FOWT solutions. This certification granted by an independent and reputable international certification agency proves the maturity and seriousness of our solution. It also validates our system in the short-term for our ongoing projects, in France and in the United States but also in the mid and long term for our future commercial farms projects all around the world."

Cooperation between Bureau Veritas and DCNS Energies in the floating offshore wind sector will continue to grow with a floating wind project planned to be deployed between the Groix and Belle-Ile Islands.

The array will comprise four 6MW GE Haliade turbines, installed on a hybrid version (steel & concrete) of DCNS Energies floating foundations. Bureau Veritas has been awarded, for the entire project, certification of the floating wind array covering the different phases: site conditions assessment, design evaluation, manufacturing, transportation and commissioning surveillance. The units are expected to be operational in 2020.

Stronger competitiveness to win LNGc

Hyundai Heavy Industries (HHI) built the world's first total LNG carrier demonstration facility, targeting the LNG carrier market that is expected to become buoyant.

As there is a mounting expectation towards the market for LNG carrier which requires advanced technology amid enforcement of ever more stringent environmental regulations worldwide, HHI announced that it built a real scale total LNG carrier demonstration facility at its Ulsan headquarters on June 19 for the first time in the industry.

As a part of strategy to win large portion of new orders in LNG market, this real scale total LNG carrier demonstration facility will allow ship owners and clients to validate both performance and safety of LNG-related key facilities.

HHI unveiled this real scale total LNG carrier demonstration facility during the Nor-Shipping - the world's largest exhibition for shipbuilding and maritime industry – held the end of May, attracting attention from customers.

This real scale total LNG carrier demonstration facility, established in HHI's Ulsan headquarters, consists of 25MW LNG fuel supply system and 85MW LNG fuel supply system, which were set up in 2012 and 2015, respectively. With addition of the LNG regasification system demonstration facility this year, HHI has completed its total LNG carrier demonstration facility with an investment of KRW 10 billion thus far.

This demonstration facility can compare and verify the design performance and actual performance and accumulate various operation records based on continuous operations, thus helping strengthen customer trust and spur LNG technology development. HHI is the only domestic shipyard equipped with comprehensive demonstration facilities for LNG carriers.

The total LNG carrier demonstration facility built by HHI at its Ulsan headquarters

HHI has proven the performance of its LNG fuel supply system (product name: Hi-GAS) through this demonstration facility, which has led to an inflow of new orders. HHI installed the Hi-GAS on 176,000m^3 LNG carrier delivered in September last year and successfully won a new order for world's first LNG-fueled oil tank, a large-scale vessel ordered to Hyundai Samho Heavy Industries (HSHI) last March. Moreover, HHI plans to install the LNG regeneration system, which it developed independently, in LNG-FSRU ordered to it this year.

An official from HHI said, "Eco-friendly LNG-related ship technology has been thrust into limelight amid enforcement of IMO's rigorous environmental regulation. We will lead the LNG market based on our cutting-edge LNG fuel supply system, regasification technology, and other technologies that we have developed independently."

According to the data published by Clarkson, average number of LNG carriers ordered annually is expected to increase to 31 units from 2019. In addition to LNG carriers, the market for LNG-fueled vessels is expected to expand.

This year, LNG-fueled vessels have comprised 16% of total vessels which represents more than five-fold increase from the level seen over the last decade. Market experts predict that the number of eco-friendly vessels will increase even further. Therefore, R&D on systems using LNG as fuel for ship operation is expected to continue.

HHI, which built the LNG carrier for the first time nationwide in 1994, has become the only domestic shipyard capable of constructing both Moss type and Membrane type LNG carriers. The world' first LNG-FSRU was built in 2014 by HHI which has dominated the LNG carrier market thus far.

MacGregor readies the market for fibre-rope crane reality

The fibre rope solution can also be retrofitted on existing cranes as well as stand-alone winch systems, and is available with both hydraulic and electric drive options.

MacGregor, part of Cargotec, has announced that it is now building one of the most advanced fibre-rope cranes on the market. The MacGregor FibreTrac crane will have a 150-tonne safe working load capacity and will be ready for testing during the first quarter of 2018.

"MacGregor launched its fibre-rope crane range in 2016 and as part of demonstrating its capabilities to the market, we have entered into a programme to build, certify and validate the world's most advanced fibre-rope knuckle-boom crane that the market has yet seen," said Høye Høyesen, Vice President, Advanced Offshore Solutions at MacGregor.

"The greatest advantage of fibre rope when handling loads in ultra-deepwater is that it weighs virtually nothing in water," continued Mr Høyesen. "This neutral buoyancy means that, regardless of the length of rope paid out, the fibre rope does not add anything to the load experienced by the crane. Cranes can therefore retain their full payload lifting capacity all the way down to maximum depth. This is in complete contrast to using wire rope, where the ever increasing weight of wire paid out limits the load permissible in relation to depth."

The crane has been designed and will be built to comply with the latest DNV GL lifting appliance, fibre and rope manufacturing rules. MacGregor intends to provide the first system fully certified in compliance with DNVGL-ST-E407 (deployment and recovery system). "Compliance with DNV GL's strict regulations should provide end users with even greater confidence in the long-term use of this technology for this purpose," he added.

"DNV GL is excited to have been chosen for the technology assurance and certification of this project," said Arnstein Eknes, Director for Special Ships at DNV GL.

"Compliance with DNVGL-ST-E407 enables the long-term outcome of this technology to be certified, by moving towards focus on the 'lifetime management' of key elements within the system. Owners and operators can document towards their customers the fitness for purpose over the entire lifespan, managed with basis in the certificate of designated service."

The crane will incorporate many unique technologies including the Parkburn Deep Water Capstan with storage winch capable of accommodating 4,000m of 88mm rope. It will use Lankhorst's Lankodeep fibre rope made from DSM Dyneema's DM20 XBO fibre with DNV 303 certification. The rope will be connected directly to the crane hook using a socketed termination from Applied Fiber.

The crane will also feature an advanced rope monitoring and management system that maximises rope lifespan and provides clear lift line status information for the operator at all times. It will be controlled using MacGregor's latest control system with the added advantage of providing real-time data feedback to onshore locations using the MacGregor 'OnWatch' feature.

"The entire system has been designed and optimised to enhance user performance and ease of maintenance," concluded Mr Høyesen. "MacGregor is excited to demonstrate the crane's market potential and we will work closely with key customers during this time."

HHI Group sees a five-fold increase in its new shipbuilding order intake this year

The three shipbuilding affiliates of Hyundai Heavy Industries (HHI) Group registered strong growth in new order in May, achieving more than half of their annual new order targets.

HHI Group announced on June 1 that the three shipbuilding affiliates - Hyundai Heavy Industries (HHI), Hyundai Samho Heavy Industries (HSHI), Hyundai Mipo Dockyard (HMD) - signed contracts worth USD 1.3 billion for 20 vessels in May alone. Including the options expected to be exercised, the number of vessels to be contracted will increase to up to 29 units worth USD 1.9 billion.

That figure is comparable to that recorded in April (21 units worth USD 1.0 billion) but the value of orders increased by 30%. The three shipbuilding affiliates have shown steady performance for two consecutive months, signifying that they are pulling themselves out of prolonged slump in new order intake.

In May alone, HHI Group netted 20 ships worth $ 1.3 billion, and the total number and value of ships HHI Group won in May can be increased to 29 ships and $ 1.9 billion if all the options the group has are to be exercised. The total number of ships HHI Group won by the end of May, 62, is equivalent to 51% of its annual ship order target of $ 7.5 billion.

This year, 14 vessels worth USD 1.07 billion were added to orderbook of Hyundai Heavy Industries Group (including the orders received by HSHI), including 13 tankers and 1 LNG carrier. Meanwhile, 6 vessels worth USD 240 million were added to that of HMD, including 4 PCs (Product Carriers) and 2 other types of vessels.

According to Clarkson's Report, it is noteworthy that HHI Group secured as much as 67% (28 ships) of 100,000 DWT or bigger tankers, and 50% (14 ships) of VLCCs that are ordered globally this year to date.

The total LNG carrier demonstration facility built by HHI at its Ulsan headquarters

This strong growth in new orders is driven by technological prowess of HHI Group in the field of eco-friendly vessels and stable financial conditions underpinned by proactive improvement of management system. Particularly, European ship owners recently tend to go beyond the emphasis on fuel efficiency or quality and give priority to examining Korean shipyards' financial conditions vital for ensuring timely delivery of vessels.

According to HHI Group, some ship owners have given high rating of HHI's financial conditions and expressed great satisfaction with constant after-sales service of vessels delivered through Hyundai Global Service.

An HHI Group official said, "Considering an array of inquiries for VLCC and LNG carriers we have been receiving lately, we expect to surpass our annual order target this year. Bearing that in mind, we are redoubling our marketing efforts to meet clients' needs on the back of our stronger fiscal soundness and differentiated shipbuilding expertise."

In the meantime, HHI Group participated in Nor-Shipping 2017, the world's largest exhibition for shipbuilding & maritime industry, which opened in Oslo, Norway, at the end of last month, by sending its delegate comprised of about 20 officials supervising sales and design operations, including President Gang Hwan-Gu, President of HHI, and Ka Sam-Hyun, Vice President in charge of Shipbuilding & Maritime Sales Division of Hyundai Heavy Industries Group, who showcased its eco-friendly technologies related to LNG.

Rolls-Royce demonstrates world's first remotely operated commercial vessel

Rolls-Royce and Svitzer have successfully demonstrated the world's first remotely operated commercial vessel in Copenhagen harbour, Denmark. LR provided assurance for the vessel against our cyber-enabled ships ShipRight procedure.

The 28m long Svitzer Hermod safely conducted a number of remotely controlled manoeuvres during a demonstration earlier this year. From the quay side in Copenhagen harbour the vessel's Captain, stationed at the vessel's remote base at Svitzer headquarters, berthed the vessel alongside the quay, undocked, turned 360 degrees, and piloted it to the Svitzer HQ, before docking again.

The companies have also signed an agreement to continue their co-operation to test remote and autonomous operations for vessels. The primary systems involved will be autonomous navigation, situational awareness, remote control centre and communication.

Mikael Makinen, Rolls-Royce, President of Marine, said "It was an honour to be present at what I believe was a world first and a genuinely historic moment for the maritime industry. We've been saying for a couple of years that a remotely operated commercial vessel would be in operation by the end of the decade. Thanks to a unique combination of Svitzer's operational knowledge and our technological expertise, we have made that vision a reality much sooner than we anticipated."

Kristian Brauner, Svitzer, Chief Technology Officer, said "Disruption through innovation is happening in almost every industry and sector and technology will also be transforming the maritime industry. As the largest global towage company, Svitzer is actively engaging in projects that allow us to explore innovative ways to improve the safety and efficiency of towage operations to benefit our customers and our crews. With its direct impact on our customer performance, operational cost and environmental footprint vessel efficiency remains a main driver now and going forward. We are proud to be partnering with Rolls-Royce in this high-level research and development of systems for remote operation."

The Svitzer Hermod, a Robert Allan ship design, was built in Turkey at the Sanmar yard in 2016. It is equipped with a Rolls-Royce Dynamic Positioning System, which is the key link to the remote controlled system. The vessel also features a range of sensors which combine different data inputs using advanced software to give the captain an enhanced understanding of the vessel and its surroundings. The data is transmitted reliably and securely to a Remote Operating Centre (ROC) from where the Captain controls the vessel.

The ROC was designed to redefine the way in which vessels are controlled. Instead of copying existing wheelhouse design the ROC used input from experienced captains to place the different system components in the optimum place to give the master confidence and control. The aim is to create a future proof standard for the control of vessels remotely.

Throughout the demonstration the vessel had a fully qualified Captain and crew on board to ensure safe operation in the event of a system failure.

Next generation tankers to be powered by Wärtsilä dual-fuel engines

The technology group Wärtsilä has been contracted to supply the engines, propellers, and fuel supply systems for four new tanker vessels.

The ships will run on both liquefied natural gas (LNG) and diesel, and are being built at the Scheepswerf Ferus Smit yard in the Netherlands for Sweden based Erik Thun AB. The order with Wärtsilä was booked in the first quarter of 2017.

In 2014, the Scheepswerf Ferus Smit yard built two cement carriers on behalf of Erik Thun AB. These are now operated by JT Cement; a joint venture company with Norway based KG Jebsen Cement. Those ships also feature Wärtsilä dual-fuel propulsion, and this latest order can be seen as an endorsement of both the owner and the shipyard's satisfaction with the Wärtsilä technology.

The 115 metre long coastal tankers feature a 'next generation' design focusing on high energy efficiency, low noise levels both above and below the water, and environmental sustainability. The Wärtsilä solutions were selected primarily because they meet all these criteria. The full scope of supply for each of the four vessels includes a 6-cylinder Wärtsilä 34DF dual-fuel main engine, a Wärtsilä LNGPac fuel supply system, a Wärtsilä Gas Valve Unit (GVU), and a Controllable Pitch Propeller (CPP) with HP nozzle. The equipment will be delivered to the yard commencing in 2018.

A notable feature of the Wärtsilä fuel system to be supplied is its open type Tank Connection Space (TCS) that allows natural ventilation. The benefits of this system are its reduced weight, a combined cargo heating medium that controls the temperature both inside the TCS as well as for evaporating the LNG, less installation work for the yard, and a reduced power supply requirement.

The new efficient and environmentally sustainable tankers for Erik Thun AB will feature Wärtsilä propulsion and fuel supply solutions.

"The fuel efficiency of the Wärtsilä 34DF engine, whether in gas or diesel mode, was a prime consideration in its selection for these 'next generation' tankers. Similarly, the successful track record of both the CPP and LNGPac solutions, and the proven efficiencies that they have demonstrated, were convincing arguments in our favour," said, Aaron Bresnahan, Vice President, Sales, Wärtsilä Marine Solutions.

"We have worked closely with Wärtsilä on many projects for more than 45 years, and we recognise their technical expertise and the reliability of their products. We are pleased, therefore, to have Wärtsilä as a partner for this project where efficiency and sustainability are the key essentials," said Anders Källson, Managing Director, Erik Thun AB.

When delivered, the ice-class 1A vessels will be capable of handling the year round sailing conditions in the Baltic Sea.

Bahri adds 38th VLCC to its growing fleet of multipurpose vessels

300,000 DWT 'MAHARAH' second VLCC delivery of 2017 with 8 more on order.

Bahri, a global leader in transportation and logistics, today reinforced its position as the world's largest owner and operator of Very Large Crude Carriers (VLCCs) with the addition of 'MAHARAH', a 300,000 DWT carrier to its fast-growing fleet. Built by Hyundai Samho Heavy Industries (HSHI) in South Korea, 'MAHARAH' is Bahri's 38th VLCC.

Built to the latest environmental and fuel-efficient technical specifications, 'MAHARAH' was handed over to Bahri during a delivery ceremony held at HSHI's Yeong-am shipyard in South Jeolla Province, South Korea. Bahri's Non-Executive Board Member, Ahmed Ali Al-Subaey, Hyundai Samho Heavy Industries President and CEO, M. K. Yoon, Bahri Ship Management President, Per Pedersen, Bahri Marketing and Communications Senior Vice President, Wael M. Al-Sarhan, Bahri Vice President – Commercial, Hisham Alnughaimish, Bahri Acting CEO, Ali Al-Harbi, and other senior officials from both organizations attended the special event.

Ahmed Ali Al-Subaey, Non-Executive Board Member, Bahri, said, "This is a very proud moment for all of us at Bahri as well as for Saudi Arabia. The addition of 'MAHARAH' further strengthens our position as the world's largest owner and operator of VLCCs and reinforces our leadership position in the global

transportation and logistics sector. We celebrate this important milestone only months after accepting delivery of our 37th VLCC 'AMJAD' earlier this year in February. In current times, fleet growth is critical to offsetting low spot market rates, and the timing of this delivery could not have been better."

M. K. Yoon, President and CEO of Hyundai Samho Heavy Industries, said, "Apart from the commercial significance, our relationship with Bahri is one that holds immense strategic importance not only for our two organizations but also for our two nations. With over 30 ocean-freight vessels delivered or currently on order, and other significant collaborative plans in the discussion or planning phase, HSHI and Bahri are set to alter the course of the global shipping industry. The delivery of 'MAHARAH' is another milestone achievement for us."

Wael M. Al-Sarhan, Senior Vice President, Marketing and Communications, Bahri added, "The partnership between Bahri and Hyundai Samho Heavy Industries spanning over a decade has been highly successful, with 26 vessels ordered and delivered to date and 8 more VLCCs currently on order, among which 3 will be delivered this year. With increased capacity and tonnage, we can continue to deliver world-class transportation solutions and value to our customers, shareholders and staff. Bahri is a homegrown Saudi brand and a remarkable success story that further enhances the country's position on the world map."

Bahri Oil, one of Bahri's six business units, will be responsible for the commercial operation of 'MAHARAH'. Bahri Oil has several long-term contracts with first-class charterers, with volumes exceeding its owned fleet capacity.

An era of LNG carriers operating in the Arctic Ocean has opened up!

Daewoo Shipbuilding & Marine Engineering (DSME) held a naming ceremony for the world's first icebreaking LNG carrier in Russia.

The naming ceremony, held in Saint Petersburg of Russia on June 3 was attended by about 140 officials from Korea and abroad, including Russian President Vladimir Putin who showed particular interest in Yamal Project from its initial phase, South Korea's ambassador to Russia Park Ro-byug, and DSME President Jung Sung-rip. This icebreaking LNG carrier was named as 'Christophe de Margerie' by Valentina Matviyenko - the Senate Chairman of the Russian Federation Parliament - who served the role of godmother. It was named after Christophe de Margerie, the former Chairman of France-based Total, who died in a plane crash in Moscow in 2014. During his life, Christophe de Margerie highly rated the possibility of energy resource development in the Arctic Ocean and played a key role in laying cornerstone for Yamal Project in collaboration with Russia's largest gas company Novatek from the beginning of the Project.

This vessel, which measures 299m in length and 50m in width, is an ARC-7 grade icebreaking LNG carrier capable of navigating through the ice up to 2.1m thick. Moreover, this vessel can carry 173,600m^3 of LNG which is equivalent to 2-day natural gas consumption in Korea.

In 2014, DSME attracted attention from shipyards and ship owners worldwide when it made a clean sweep of orders (worth USD 4.8 billion in all) for 15 units of icebreaking LNG carriers priced at USD 320 million apiece. That attests to the recognition of ship owners for DSME's unrivalled technologies in LNG carriers and excellence of DSME's vessel which was developed from 2008 for arctic operations.

The world's first icebreaking LNG carrier built by DSME is cutting through the ice

In last March, DSME successfully completed the test of ice-breaking operation, the final process of icebreaking LNG carrier construction, thus proving its perfect icebreaking performance that fully met requirements of ship owners for eco-friendly and high-efficiency vessels. Currently, the remaining 14 icebreaking LNG carriers are under construction at DSME's Okpo Shipyard. They are scheduled for delivery by the first half of 2020.

DSME is concentrating its world's best technologies and know-how vital for improvement of quality, reduction of construction period, cost-savings in production, etc., by leveraging its experience with successful development of the first batch vessel, ultimately strengthening the trust of ship owners and normalizing the business expeditiously.

Russian President Vladimir Putin remarked in his address, "The Yamal Project opened up the possibility of the Arctic route, an idea which was once considered vague. We will make a significant contribution to development of energy industry worldwide, as well as in Russia and Europe."

DSME President Jung Sung-rip said, "The technologies of DSME have ushered in the era of ships operating in the Arctic Ocean, although there have been difficulties in developing the polar regions due to constraints on transportation. Once the development of the Polar regions gathers pace, DSME with cutting-edge technologies for vessels operating in the Polar regions will benefit the most."

Meanwhile, the 15 icebreaking LNG carriers currently being built by DSME will carry LNG to Asia and Northern Europe through the Arctic route from the port of Sabetta in Russia.

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대우조선해양, 초대형 고정식 해양플랜트 성공적 인도

대우조선해양이 27억 달러 규모의 해양플랜트 1기를 정상적으로 출항시키며, 생산 공정 안정화 및 경영 정상화에 박차를 가하고 있다.

대우조선해양은 지난 2012년 다국적 에너지 회사인 스탯오일(Statoil)로부터 수주한 고정식 해양플랜트 1기를 성공적으로 인도했다고 지난 6월 12일 밝혔다. 이 설비는 계약금액만 27억 달러에 달하는 대형 프로젝트다. 실제 2012년 계약 당시에는 18억 달러였던 프로젝트가 설계 및 사양이 변경되면서 계약금액은 27억 달러까지 증액됐다.

이로써 대우조선해양은 올해 인도예정이었던 5기의 해양플랜트 중 두 번째 프로젝트를 성공적으로 인도했다. 향후 생산일정도 원활하게 진행될 것으로 기대된다.

이번에 스탯오일에 인도된 해양플랜트는 원유생산을 위한 상부구조물로 무게만 약 40,000톤에 달하며, 한 달에 약 250만 배럴의 원유를 생산할 수 있는 설비다. 이는 우리나라 전체가 하루 사용할 수 있는 원유 양이다.

특히 이 설비는 북해의 혹한과 거친 해상조건에서도 안정적으로 생산할 수 있도록 건조됐으며, 영국지역 북해 대륙붕에 설치된다. 북해는 험한 자연 조건으로 인해 품질과 환경에 대한 요구사항이 전세계에서 가장 까다로운 지역으로 유명하다.

스탯오일 관계자는 "잦은 설계변경에도 불구하고, 좋은 품질의 설비를 건조해줘 만족한다"며 "향후 프로젝트에서도 꼭 함께 일하고 싶다"고 말한 것으로 알려졌다. 실제

대우조선해양이 건조한 고정식 해양플랜트가 바지선에 실려 영국지역 북해 대륙붕 설치를 위해 출항했다.

대우조선해양은 지난해 6월 같은 회사에서 발주한 11억 달러 상당의 고정식 해양플랜트 1기도 성공적으로 인도해 선주측으로부터 감사의 뜻을 전달 받은바 있다.

대우조선해양 관계자는 "지난해와 올해 인도한 스탯오일 프로젝트를 통해 회사의 '자존심'과 '할 수 있다'는 자신감을 어느 정도 회복했다"며, "이 두 프로젝트를 통해 쌓아온 고객의 신뢰도 상당히 큰 만큼 앞으로 진행될 프로젝트의 영업활동에도 긍정적인 영향을 끼칠 것으로 예상된다"고 말했다.

지난해부터 대우조선해양은 수주량 감소로 매출이 줄어들고 있지만 인건비 절감, 해양 플랜트 공정의 단기적 안정화 등으로 수익성이 개선되고 있는 상황이다. 지난 1분기 영업이익은 2,918억원을 기록해 전년 동기 영업손실 381억원 대비 흑자 전환에 성공했다. 반면에 매출은 2조 7,840억원으로 전년 동기 3조 4,829억원 대비 20.1% 줄었다.

한편 대우조선해양은 현재 10기(생산설비 2기, 드릴십 8척)의 해양플랜트 수주잔량을 보유하고 있으며, 이중 올해 인도를 계획하고 있는 3기의 해양플랜트는 10월까지 정상적으로 인도할 예정이다.

LNG선 수주 경쟁력 강화

현대중공업이 세계 최초로 LNG선 종합 실증설비를 구축하며 호황이 예상되는 LNG선 시장 공략에 본격적으로 나섰다.

앞선 기술력이 요구되는 LNG선 분야는 글로벌 환경규제 강화로 시장이 확대될 것으로 예측되고 있는 가운데, 현대중공업은 지난 6월 19일 업계 최초로 울산 본사에 실물 규모의 'LNG선 종합 실증설비'를 구축했다고 발표했다. 이는 LNG선 수주 시장 선점을 위한 포석으로 선주사 미치 고객사들이 LNG 관련 핵심설비들의 성능과 안전성을 직접 검증할 수 있도록 한 것이다. 지난 5월 말에는 세계 최대의 조선해양박람회인 노르시핑(Nor-Shipping)에서 이 실증설비를 홍보해 고객의 이목을 집중시킨 바 있다.

현대중공업이 울산 본사에 구축한 이 종합 설비는 각각 지난 2012년과 2015년에 구축한 25MW급 LNG연료공급시스템과 85MW급 LNG연료공급시스템 실증설비로 구성되어 있다. 또한 올해 LNG재기화시스템 실증설비까지 추가함으로써 현재까지 총 100억 원을 들여 종합적인 LNG선 실증설비를 완성시켰다.

이 실증설비는 설계상의 성능과 실제 성능을 비교·검증하고 지속적인 운전을 통해 다양한 상황에서의 운전기록을 축적하며, 고객 신뢰 향상과 더불어 LNG 기술개발에 큰 역할을 하고 있다. LNG선을 위한 종합 실증설비를 갖춘 곳은 조선업계에서 현대중공업이 유일하다.

현대중공업은 이 실증설비를 통해 자체 개발한 LNG연료공급시스템(제품명: Hi-GAS)의 성능 입증을 하며, 실제 수주로도 이어지고 있다. 지난해 9월 인도한 176,000m^3 LNG운반선에 Hi-GAS를 장착했으며, 올해 3월에는 현대삼호중공업이 대형선박으로는 세계 최초로 LNG연료 추진 유조선을 수주하는 성과를 거뒀다. 또 현대중공업이 올해 수주한 LNG-FSRU에도 자체 개발한 LNG 재기화시스템(제품명: Hi-ReGAS)을 장착할 예정이다.

현대중공업이 울산 본사에 구축한 'LNG선 종합 실증설비'

현대중공업 관계자는 "최근 국제해사기구(IMO)의 환경규제 강화에 따라 친환경 연료인 LNG 관련 선박 기술이 주목을 받고 있다"며 "자체 개발한 LNG 연료공급시스템, 재기화시스템 등의 선도적인 기술로 LNG 시장을 주도하겠다"고 밝혔다.

클락슨의 발표 자료에 따르면, LNG선 연평균 발주량은 2019년부터 31척으로 증가할 것으로 전망하고 있다. LNG선 뿐만 아니라 LNG 추진선박 시장에 대한 성장세가 기대되고 있는데, 올해 LNG를 연료로 사용하는 선박 비중은 16% 수준으로 과거 10년 전과 비교해 5배 이상 증가했다. 시장 전문가들은 이러한 친환경 선박의 발주가 앞으로 더욱 늘어날 것으로 분석하고 있다. 따라서 선박 운항을 위한 연료로 LNG를 사용하는 시스템에 대한 연구개발은 지속될 것으로 보인다.

한편, 지난 1994년 국내 최초로 LNG선을 건조한 현대중공업은 국내에서 유일하게 모스(Moss)형과 멤브레인(Membrane)형 LNG선을 모두 건조할 수 있으며, 2014년에는 세계 최초로 LNG-FSRU를 건조하는 등 LNG선 시장을 선도하고 있다.

현대중공업 그룹, 선박 수주 5배 증가

현대중공업 그룹의 조선3사가 올해 들어 견고한 수주실적을 기록하면서, 연간 수주목표의 절반이 넘는 실적을 조기에 달성했다.

현대중공업 그룹에 따르면, 조선3사(현대중공업, 현대삼호중공업, 현대미포조선)가 5월에만 총 20척, 13억 달러의 수주계약을 체결했다고 지난 6월 1일 밝혔다. 발주 예정인 옵션까지 포함하면 수주는 최대 29척 19억 달러까지 늘어나게 된다.

이는 지난 4월에 수주한 21척(10억 달러)에 비해 척수는 비슷하지만, 수주 규모는 30% 증가했다. 이에 2개월 연속 안정적인 실적을 기록함으로써 장기화 됐던 수주 불황에서 벗어나고 있다는 긍정적인 신호가 감지되고 있다.

올해 들어 5월 누적 수주량은 총 62척, 38억 달러를 기록해 지난해 같은 기간(12척, 10억 달러) 대비 척수 기준으로 5배 이상 증가했다. 특히 연간 수주목표인 75억 달러(조선 3사 기준)의 51%를 조기에 달성함으로써 올해 실적 기대감마저 높아지고 있다.

현대중공업 그룹이 올해 수주한 선박을 선종별로 살펴보면, 현대중공업(현대삼호중공업 포함)은 탱커 13척, LNG선 1척 등 총 14척 10억 7,000만 달러, 현대미포조선은 PC선 4척, 기타 2척 등 총 6척 2억 4,000만 달러를 수주했다.

특히 현대중공업그룹 조선3사는 5월까지 10만 톤급 이상 탱커선 28척을 수주하며, 전세계 발주물량 42척(클락슨 발표 기준)의 67%를 수주하는 성과를 거뒀다. 또, 초대형유조선(VLCC)도 전세계 발주물량인 27척의 절반이 넘는 14척을 수주했다.

이러한 수주 실적에는 현대중공업 그룹의 친환경 선박에 대한 기술력과 조선업계 중에서 선제적으로 경영 개선 계획을 수행함으로써 눈에 띄는 안정적인 재무 건전성을 갖추게 된 것이 긍정적인 영향을 미친 것으로 해석된다. 특히나 유럽 선주사들은 최근 선박 연비와 품질에만 중점을 두고 발주하는 것에서 벗어나 선박을 적기에 인도받기 위해 한국 조선업체들의 재무 상태를 최우선적으로 살피는 것으로 알려졌다.

현대중공업그룹에 따르면, 몇몇 선주사들은 현대중공업의 재무 상태에 높은 평가를 내린 한편, 현대글로벌서비스를 통해 인도받은 선박을 지속적으로 AS받을 수 있다는 점에서 큰 만족을 표했다고 전했다.

현대중공업 관계자는 "초대형유조선, LNG선 등을 중심으로 수주 관련 문의가 꾸준히 증가하고 있어 올해 수주목표를 초과하는 실적이 나올 것으로 기대하고 있다"며 "선주사들의 니즈를 사전에 파악하는 한편, 앞선 선박건조 기술력과 안정적인 재무건전성 등의 장점을 앞세워 적극적인 영업활동을 펼쳐 나가겠다"고 밝혔다.

한편, 현대중공업그룹은 지난 30일부터 노르웨이 오슬로에서 열리고 있는 세계 최대 조선해양박람회 '노르시핑(Nor-Shipping) 2017'에 현대중공업 강환구 사장과 그룹선박해양영업본부 가삼현 사장을 비롯해 영업·설계 부문 임직원 200여명이 참석, LNG 관련 친환경 기술을 선주사들에게 선보이며 활발한 영업활동을 펼치고 있다.

바흐리(Bahri), 현대삼호중공업과 38번째 원유운반선 수주 계약 체결

올해만 두 번째 대형 원유운반선 계약, 추가 8척도 발주 상태

글로벌 물류 운송 선두기업인 바흐리(Bahri)는 한국의 현대삼호중공업(HSHI, Hyundai Samho Heavy Industries)이 건조한 300,000 DWT급 초대형원유운반선(VLCC, Very Large Crude Carrier)인 '마하라(MAHARAH)'호를 인도 받았다고 발표했다.

바흐리는 기존에 보유한 대형 원유 운반선에 이어 38번째로 '마하라'호를 추가함으로써 세계 최대 초대형원유운반선(VLCC) 선주 겸 운항사로서의 입지를 더욱 강화하게 되었다.

바흐리는 전라남도에 위치한 현대삼호중공업 영암조선소에서 개최된 인도서명식을 통해 최신의 환경 및 연비 기술 규격에 맞춰 건조된 초대형원유운반선(VLCC) '마하라'를 인도 받았다. 지난 6월 12일 개최된 인도서명식에는 아메드 알리 알 수베이(Ahmed Ali Al-Subaey) 바흐리의 비상임이사, 윤문균 현대삼호중공업 대표이사, 퍼 페더슨(Per Pedersen) 바흐리 선박관리 사업부 바흐리쉽(Bahri Ship) 매니지먼트 사장, 웨일 M. 알-사르한(Wael M. Al-Sarhan) 바흐리 마케팅 & 커뮤니케이션스(Bahri Marketing and Communications) 수석 부사장, 알리 알-하비(Ali Al-Harbi) 바흐리 CEO 권한대행, 히스함 알누가이미쉬(Hisham Alnughaimish) 커머셜 담당 부사장 등 기타 양사의 주요 고위 임원들이 참석했다.

아메드 알리 알 수베이, 바흐리 비상임이사는 "오늘은 바흐리는 물론이고 사우디아라비아 전체에 매우 자랑스러운 날"이라며, "'마하라'호를 추가함으로써, 세계 최대 VLCC 선주 겸 운항사로써 본사 입지가 더욱 강화되고 글로벌 운송 및 물류 분야의 글로벌 리더로서의 위치가 더욱 탄탄해졌다"고 말했다. 또 "올해 초 2월 37번째 VLCC '암자드(AMJAD)'호를 인도받은 후 얼마 지나지 않아 38번째 VLCC를 인도받는 중요한 업적을 기념하게 되었다. 현재 낮은 현물 운임을 상쇄하기 위해서는 선단 확대가 매우 중요하다. 그렇기 때문에 '마하라'호의 인도는 매우 시의적절하다"고 덧붙였다.

윤문균 현대삼호중공업 대표이사는 "상업적인 중요성을 제외하고도 바흐리와 현대중공업의 관계는 양사는 물론 양국에 있어 매우 중요한 전략적 의미를 갖는다. 30척 이상의 해상화물 선박이 인도되었거나 현재 발주된 상태에 있으며, 그 밖의 중요한 협업계획이 논의나 계획 단계에 있는 점을 감안하면 현대중공업과 바흐리는 앞으로 세계 해운업의 방향을 바꾸게 될 것"이라며, "'마하라'호의 인도는 우리가 이룬 또 하나의 업적"이라고 말했다.

알리 알-하비 바흐리 CEO 권한대행은 "현재까지 26척의 선박이 발주되어 인도받았으며 추가로 8척의 VLCC가 현재 발주된 상태이다. 더불어 올해 3척이 추가로 인도될 예정으로, 바흐리와 현대삼호중공업은 지난 10여년 이상 매우 성공적인 파트너십을 유지하고 있다"고 말했다. 특히 "바흐리는 선대수용능력 및 톤수의 증가로 세계 최고의 운송 솔루션과 가치를 고객과 주주 및 직원들에게 제공할 수 있으며, 사우디의 자국 브랜드로 국제적 입지를 한층 제고하는 주목할 만한 성공적인 이야기를 만들어내고 있다"고 덧붙였다.

한편, '마하라'의 상업적 운영은 바흐리의 6개 사업부문 중 하나인 바흐리오일에서 맡게 된다. 바흐리오일은 여러 일류 용선 선사와 장기 계약을 맺고 있으며, 볼륨은 자체 소유 선대수용능력을 초과한다.

북극해 LNG 운송 시대 열리다!

대우조선해양이 건조한 세계 최초 쇄빙LNG선의 명명식이 러시아 현지에서 개최됐다

지난 6월 3일 러시아 상트페테르부르크에서는 개최선 이날 행사에는 야말프로젝트 시작단계부터 각별한 관심을 가지고 있던 러시아 블라디미르 푸틴(Vladimir Putin) 대통령을 비롯해, 박노벽 주러시아 한국대사, 대우조선해양 정성립 사장 등 내외빈 140여명이 참석했다.

대모 역할을 맡은 발렌티나 마트비옌코(Valentina Matviyenko) 러시아연방의회 상원 의장에 의해 이 쇄빙LNG선은 '크리스토프 드 마르주리(Christophe de Margerie)'호로 명명됐다.

선명은 지난 2014년 모스크바에서 비행기 사고로 안타깝게 운명을 달리한 프랑스 토탈(Total) 크리스토프 드 마르주리 전회장을 기리기 위해 정해졌다. 마르주리 회장은 생전 북극해 에너지 자원개발의 가능성을 높게 평가했으며, 야말 프로젝트 초반부터 러시아 최대 가스 회사인 노바텍(Novatek)과 함께 프로젝트의 기반을 다지는데 큰 역할을 한 것으로 평가받는 인물이다.

이 선박은 길이 299m, 폭 50m이며, 최대 2.1m 두께의 얼음을 깨며 나갈 수 있는 '아크(ARC)-7'급 쇄빙LNG선이다. 우리나라 전체가 이틀간 사용할 수 있는 양인 173,600㎥의 LNG를 나를 수 있다.

대우조선해양은 지난 2014년 척당 3억 2,000만 달러에 달하는 쇄빙LNG선 15척(총 48억 달러) 모두를 수주하며 전 세계 조선소와 선주들의 이목을 끌었다. LNG선 분야 세계 최고의 독보적인 기술력과 2008년

대우조선해양이 세계 최초로 건조한 쇄빙LNG선이 얼음을 깨면서 운항하고 있다.

부터 꾸준히 극지용(artic) 선박을 개발해온 덕분에 선주들로부터 기술력을 인정받은 결과다.

특히 지난 3월에는 쇄빙LNG선 건조의 마지막 관문인 빙해운항 테스트를 성공적으로 마치고 완벽한 쇄빙항해 성능을 보여줘 친환경, 고효율 선박에 대한 선주의 요구를 완벽하게 실현했다. 현재 대우조선해양 옥포조선소에는 나머지 14척의 쇄빙LNG선이 건조 중에 있다. 오는 2020년 상반기까지 모두 인도할 계획이다.

대우조선해양은 첫 호선의 성공적인 건조 경험을 바탕으로 품질 향상 및 공기 단축, 생산비용 절감 등 세계 최고 기술력과 노하우를 집중시켜 선주들의 신뢰도 향상과 함께 회사 경영정상화를 견인할 계획이다.

푸틴 대통령은 기념사를 통해 "야말 프로젝트는 막연하게 여겨지던 북극항로의 가능성을 활짝 연 것"이라며, "러시아, 유럽뿐만 아니라 전세계 에너지 산업 발전에 큰 공헌을 하게 될 것"이라고 말했다.

대우조선해양 정성립 사장은 "지금까지 수송의 제약으로 극지방 개발에 어려움이 있었으나, 대우조선해양의 기술력이 본격적인 북극해 운항시대를 열었다"며, "향후 본격적으로 극지방 개발이 활발해 지면 극지운항 선박에 대한 높은 기술력을 확보하고 있는 대우조선해양이 가장 큰 수혜를 볼 수 있을 것"이라고 말했다.

한편 대우조선해양이 건조하는 15척의 쇄빙LNG선은 러시아 사베타(Sabetta)항에서 북극항로를 통해 아시아 및 북유럽 지역에 LNG를 운송할 예정이다.

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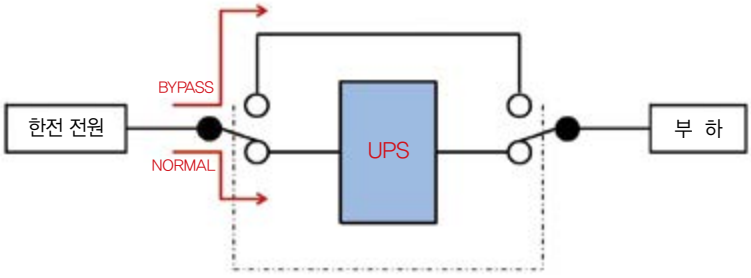

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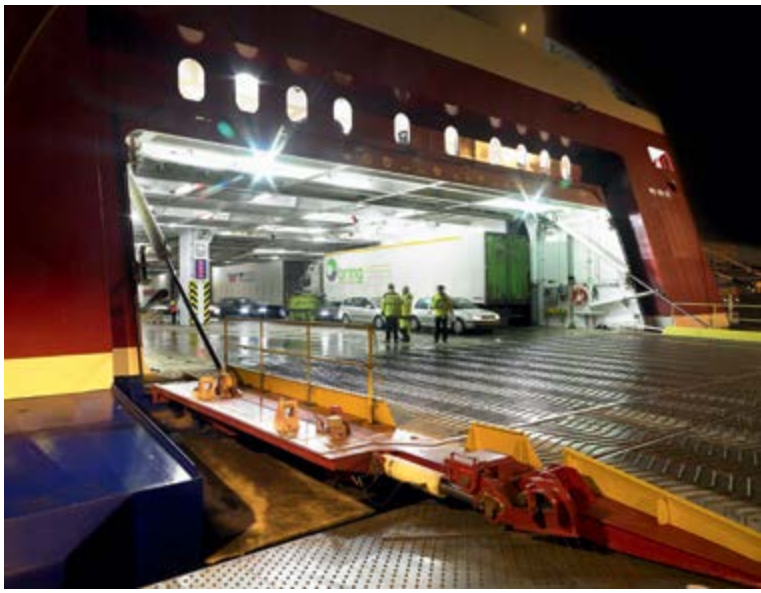
TTS Marine from Gothenburg is widely regarded as the world's top provider of stern and bow ramps, movable car decks, door systems, freight elevators and gangways for ships and ferries. In conjunction with WAGO, the Swedish company is developing a new control system for cargo doors and gangways. The solution's open design is focused on maximum operating safety, and its modular structure will be ready for modernizations, updates and expansions.

WAGO

Dock, unload, load, undock: Time is money in ferry travel and schedules are tight. To minimize loading times, RORO ferries rely on high-performance ramps from TTS Marine. The company provides the world's leading shipping fleets and shipyards with ship-side and land-based systems that provide the trouble-free loading operations of passengers, vehicles and goods. For the past three years, the Swedish subsidiary of Norway's TTS Marine AS Concern has relied on the WAGOI/O-SYSTEM 750 for the central control system.

The decision to use WAGO automation solutions followed comprehensive benchmarking in which the architecture of the control system, its quality, reliability and above all, its approval for use in the maritime sector played essential roles. "We wanted a flexible control system that we could easily update later, and a vendor with a global presence," explains Tobias Ahlberg, Sales Manager at TTS Marine AS. "Our loading systems travel around the world and have an average service life of 25-30 years, so it is important that the products we use are also robust." And reliable, as Ahlberg adds, because failures or incidents cannot be allowed in the TTS systems - they are key points in ship security.

> *"We wanted a flexible control system that we could easily update later, and is backed by a vendor with a global presence"*



Loading ramps from TTS marine are used internationally.

The interior of large RORO ferries can be compared to a multi-story parking garage.

Step-by-step to the perfect solution

"When we considered WAGO's solutions, we quickly decided to incorporate them because they have several different certificates from maritime standardization committees," explains Ahlberg. However, the Swedes did not want to convert the entire system at once, recalls Ahlberg. "And WAGO did not encourage us to do that, either."

In order to gain a mutual understanding of which components were best suited for each task, TTS Marine AS and WAGO initiated the technical ystem conversion in small increments. "Initially, we decided not to exchange all components for WAGO parts," states Martin Andersson, Design Engineer at TTS.

Andersson is essentially responsible for everything: from developing electrical systems and component specification, on through to the writing of all programs for the programmable logic controllers, up to implementing acceptances. "Because there was absolutely no pressure to specify WAGO, we could concentrate on one aspect of the conversion at a time. We gradually expanded our inventory of WAGO components, including the TOPJOB®S Rail-Mounted Terminal Blocks and relays.

Conquering the maritime sector together

Ultimately, Andersson found that WAGO's system is an excellent fit for this type of approach, because it can be modularly expanded with ease, and can grow in unision with the customer's needs. "The open architecture of WAGO's controllers will allow us to integrate new components in the future via simple updates," states Andersson, who is excited that the Linux® based controllers can be freely programmed. They are also approved for control tasks on the bridge.

This is vital as the need for resistance to interference and the demand for low interference emissions are articularly high, because failures of sensitive systems, like radio or navigation, must be safely revented.

More than anything, Andersson values that, "WAGO knows what technology we need for developing control systems so that we can be just as successful with future projects as well." The collaboration of the last few years has opened new doors within the maritime industry for both companies.

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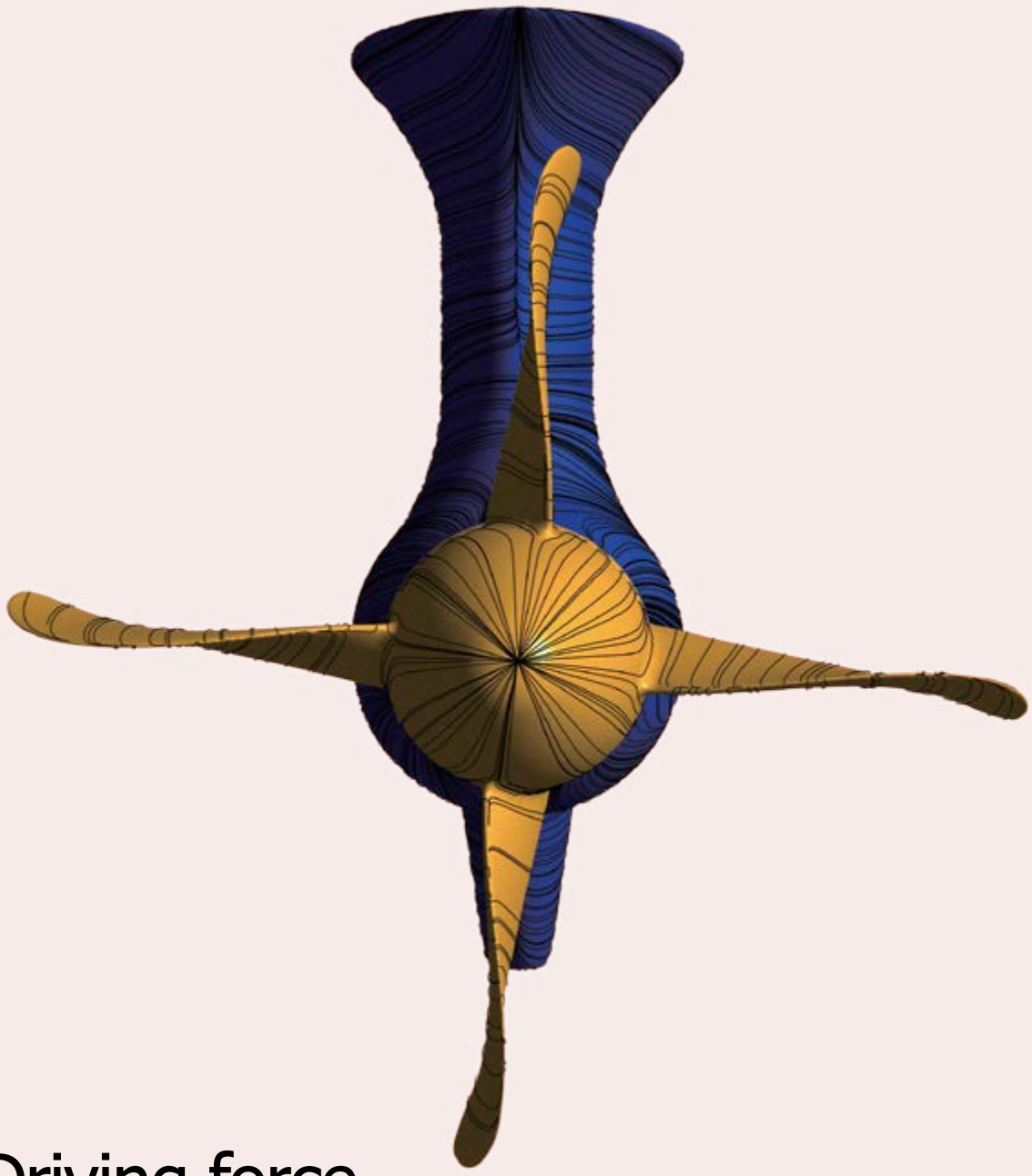


Driving force

Rolls-Royce hydrodynamics expertise and Azipull thrusters are key contributors to making the world's first battery-powered car ferry a reality

Rolls-Royce

When Norwegian ferry operator Norled's ZeroCat 120 ferry enters service next year, it will be capable of carrying 360 passengers and 120 vehicles.

Norled has won the ten-year contract to operate ferries on the Lavik-Oppedal route across Sognefjord, the largest and deepest fjord in Norway. Centrally located, it carves its way from the coast 205km inland. The ferry route forms the link for the E39 highway to bridge the north and south of the country. Operating in an area of outstanding natural beauty, environmental protection is a key local government goal. So from 2015, three ferries will serve the route, one of them the innovative ZeroCat 120.

The battery ferry was designed and is being built by Fjellstrand to operate with zero emissions. The ZeroCat 120's transit time across the fjord is 20 minutes, with ten minutes at the linkspan at each end. This departure frequency demands a service speed of 10 knots. Norled and Fjellstrand worked together to develop a design with energy requirements low enough for a reasonably sized battery pack, weighing about ten tonnes, to provide the necessary energy for propulsion and all onboard services.

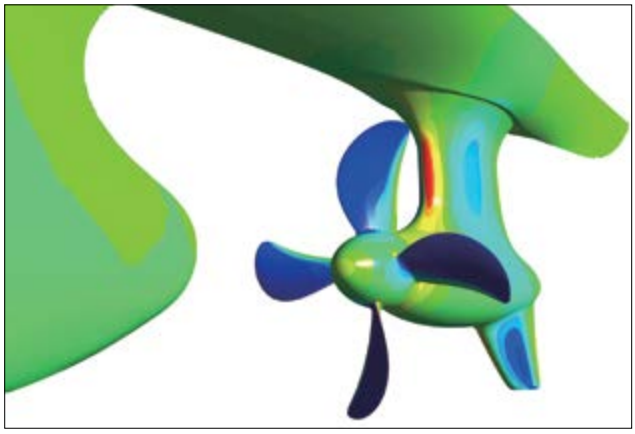
The hull and propulsion system design draw their inspiration from collaborative work done by Rolls-Royce and Fjellstrand more than a decade ago, when a new concept in double ended ferry design was born, accompanied by extensive calculations and tank testing.

That was the FerryCat concept, where the traditional heavy steel low speed monohull, typically used on shortish routes, was replaced by an aluminium catamaran with an equivalent capacity for vehicles and passengers. It is propelled at about 22 knots instead of the traditional 10-12 knots by four Rolls-Royce Azipull azimuth thrusters with pulling propellers placed at each corner of the vessel.

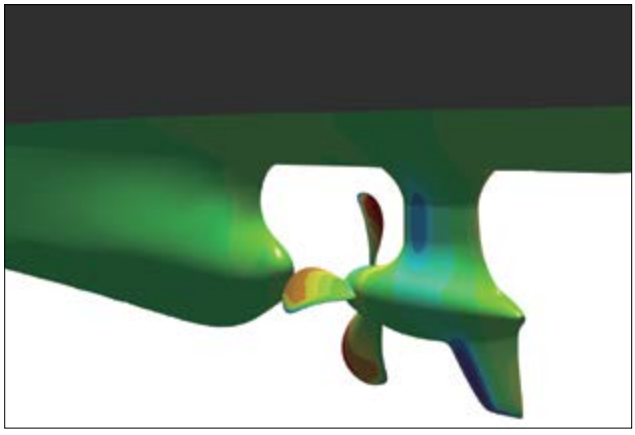
The first ferry of this design, Stavanger, was put on the Stavanger-Tau route in west Norway, where the high speed allowed the required departure frequency to be maintained with fewer ferries.

It has operated successfully there for ten years. Stavanger was followed by two ferries for IDO in Turkey, similar but with some changes to loading arrangements and passenger spaces to suit local requirements and a hotter climate. They operate on Sea of Marmara routes.

When the hydrodynamics of the FerryCat concept were being calculated it was found that the total resistance at slow sailing speeds was low, while the vessel's light weight in relation to the weight of vehicles and passengers meant that less energy was needed to accelerate and manoeuvre. This low speed knowledge was not forgotten.



The two Azipull thrusters use large diameter propellers with a low blade area of very efficient shape.



The propulsion hull, with a bulb at each end, integrates hydrodynamically with the two thrusters.

When the concept of a battery ferry for the E39 route was being explored, it became clear that the Fjellstrand lightweight aluminium catamaran with Rolls-Royce Azipull propulsion was an excellent starting point. Resources were devoted to refining the FerryCat to obtain the lowest energy consumption for the carrying capacity and the 10 knot speed demanded by the Lavik-Oppedal service, also with an eye to many other potential routes with comparable transport needs.

The result is ZeroCat 120. Unlike the majority of vessels, this ferry is symmetrical end to end, but not from side to side, making full use of the opportunities offered by multihulls. It is double ended, 80m long by 20.8m beam, with loading gates

The ZeroCat 120 battery-powered ferry will have space for 120 cars and up to 360 passengers.

offset to dock at the standard side wall and linkspan terminals. Above deck the layout is Norwegian best practice.

But it is the propulsion system with the extremely low propeller speeds, the slim thruster body with feathering front propeller combined with the catamaran demi-hulls, that are the key drivers of low energy consumption. Each hull is symmetrical end to end, but they are very different. The hull at the opposite side from the superstructure houses the propulsion system; the hull under the superstructure just carries its share of the weight and is shaped for minimum resistance.

The propulsion hull is formed to integrate hydrodynamically with the two Azipull thrusters, with bulbs at each end of the hull. A ferry with thrusters at each end can in principle choose to supply 100 per cent power to the aft unit, and nothing to the forward one, or split the power. For ZeroCat120 the best solution is for all the power to drive the aft thruster, with the propeller blades of the forward thruster set to a minimum drag feathered position. On the return trip the thrusters are rotated and the two units swap roles. These will be the first Azipull 085 units to have feathering propellers and electric steering to reduce energy consumption further.

"Because the power is so low for the required transit speed it is possible to profit from a virtuous circle in the propeller design," says Leif Vartdal, Section Head for Hydrodynamic Research and Technology."

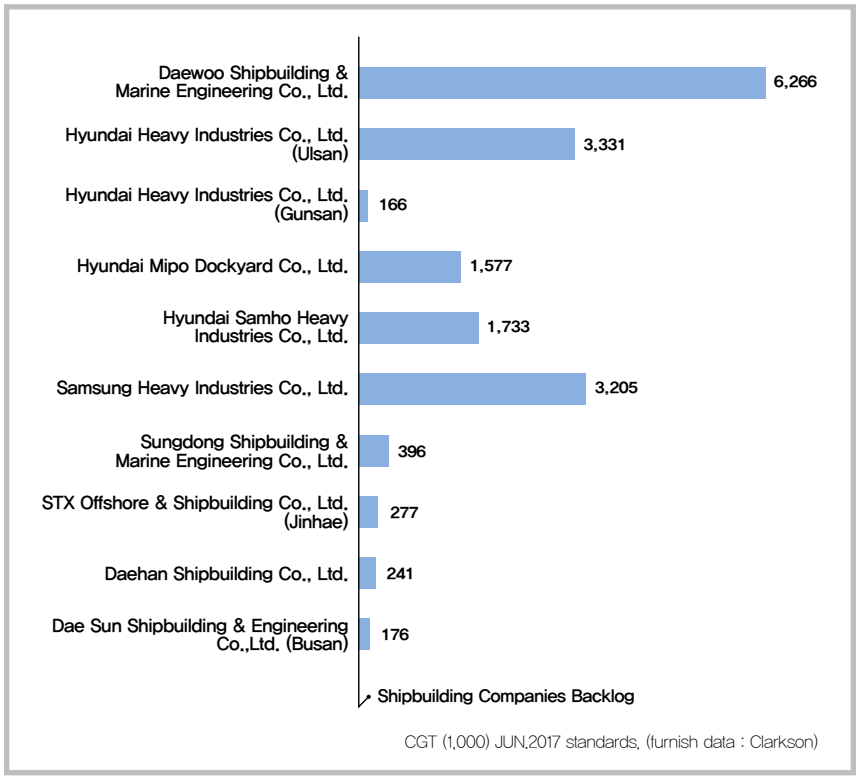
"The ideal efficient propeller has a large diameter and turns at low speed. The low propeller rotation rate in this case is possible because Azipull units have a high torque capacity. Yet propeller diameter is often restricted because of space or draught limitations. But for ZeroCat's thrusters Rolls-Royce has been able to use very large diameter propellers for the power they transmit, rotate them at an optimal low speed, and give them a low blade area of a very efficient shape. So propulsive efficiency is improved and the drain on the battery minimised."

Norled's new ferry is scheduled to enter service in 2015, and will produce no local emissions. Norway, on a yearly basis, derives most of its electrical energy requirements from hydro power, so the all electric ZeroCat 120 will provide a corresponding reduction in CO^2 emissions compared with a conventional-diesel engined ferry.

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

According to Clarkson, global new orders slid from the previous year to 750,000 CGT with 28 vessels in April. New orders at Korean shipyards stood at 340,000 CGT (12 vessels), topping the global list, followed by China (260,000 CGT with 13 vessels). Japan received no order.

Global cumulative new orders up to April this year stood at 4.71 million CGT with 179 vessels, which is similar to the previous year's level of 4.51 million CGT with 179 vessels. By country, new orders totaled 1.43 million CGT (78 vessels) at Chinese shipyards, 1.23 million CGT (34 vessels) at Korean shipyards, 740,00 CGT (8 vessels) at Italian shipyards, 330,000 CGT (2 vessels) at Finnish shipyards, and 250,000 CGT (11 vessels) at Japanese shipyards.



Meanwhile, Korean shipyards took the third spot in terms of order backlog despite strong growth in order intake during April. Global order backlog stood at 78.24 million CGT, as of late April. By country, order backlog totaled 26.82 million CGT at Chinese shipyards, 17.73 million CGT at Japanese shipyards, and 17.62 million CGT at Korean shipyards.

Newbuilding price index hit 122 points in early May and pre-owned vessel price index hit 86 points in the same period. Newbuilding price index, which rose to an all-time high of 190 points in October 2008, has been on a downward spiral.

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 wins KRW 2.8 trillion FLNG order

Samsung Heavy Industries (SHI) concluded a 2.8 trillion Korean won contract to build a giant offshore production unit. SHI revealed on 2nd a contract award to build a FLNG (Floating LNG production facility) for Italian oil major ENI's Coral development in Mozambique.

The gigantic FLNG boasts length of 439m, width of 65m, depth of 38.5m, and weighs 210,000 tons. It is designed to produce 3 million tons of LNG and 480,000 tons of gas condensates (ultra-light oil) annually.

SHI won the order as consortium with France's Technip and Japan's JGC. SHI's portion amasses engineering, procurement, and construction for the hull and production engineering and construction of topsides amounting to 2.5 billion USD.

The gigantic FLNG boasts length of 439m, width of 65m, depth of 38.5m, and weighs 210,000 tons. It is designed to produce 3 million tons of LNG and 480,000 tons of gas condensates (ultra-light oil) annually.

An official from SHI said, "Having signed a FPU contract worth KRW 1.5 trillion last July, SHI is the only domestic shipyard that has steadily received orders for offshore plant since 2015. The latest contract will help thicken our orderbook."

SHI' latest order further extends its order record for 2017 including 8 tankers, 2 LNG carriers, a LNG-FSRU, a FLNG, and a FPU totaling 13 vessels at 4.8 billion USD.

(from left) Dae-young Park, Samsung Heavy Industries CEO, Tadashi Ishizuka, JGC CPO (Chief Project Officer), Paolo Campelli, Coral FLNG JV chairman, Doug Pferdehirt, Technip CEO

삼성중공업, 2조 8,534억원 해양플랜트 수주

삼성중공업은 지난 6월 2일 2조 8,534억원(약 25억 달러) 규모 초대형 해양플랜트인 모잠비크 코랄(Coral) FLNG 프로젝트의 건조계약을 체결했다고 밝혔다. 이번에 수주한 FLNG는 길이 439미터, 폭 65미터, 높이 38.5미터로 자체 중량 약 21만톤의 초대형 해양설비임. 연간 약 340만톤의 LNG를 생산할 수 있다.

삼성중공업은 프랑스 테크닙(Technip), 일본 JGC와 함께 컨소시엄으로 이번 프로젝트를 수주했다. FLNG 선체의 설계 · 구매 · 제작의 전 공정, 상부 플랜트(Topside) 생산설계와 제작 등 삼성중공업이 수행하는 공사 금액만 25억 달러에 이른다. 이 설비는 2022년부터 현지에서 LNG를 생산할 예정이다.

삼성중공업은 현재까지 전세계에서 발주된 FLNG 4척 가운데 3척을 수주함으로써 FLNG 시장에서 강력한 경쟁력을 보여주고 있다. 지난 2011년에 쉘(Shell)로부터 세계 최대 규모인 'Prelude(프릴루드) FLNG'를 36억 달러에 수주했고, 2015년에는 말레이시아 페트로나스로부터도 15억 달러 규모의 FLNG인 'PFLNG-2'를 수주해 건조 중에 있다.

삼성중공업 관계자는 "지난 1월에도 1조 5,000억원 규모의 FPU를 수주하는 등 2015년 이후 국내 조선사 중 유일하게 해양플랜트 수주를 이어가고 있다. 일감 확보에도 많은 도움이 될 것"이라고 말했다.

한편 삼성중공업은 이번 수주를 포함해 올해 들어 현재까지 유조선 8척, LNG선 2척, LNG-FSRU 1척, FLNG 1척, FPU 1척 등 13척 48억 달러를 수주했다.

Hempel coats innovative new luxury cruise ship Silver Muse from head to toe

Luxury cruise line owner and operator Silversea has appointed leading coatings supplier Hempel to deliver innovative coating solutions for its newbuild 40,700 GT cruise ship Silver Muse. Alongside top quality performance, it was vital for Silversea's that its coatings delivered fuel savings and minimised maintenance costs.

Silver Muse was built at the Fincantieri shipyard in Genoa Sestri Ponente and delivered on Monday 3 April. Silversea was impressed with Hempel's

understanding of the highly competitive cruise industry and the increasing pressure to improve operational efficiency whilst complying with strict environmental regulations. This led the company to select Hempel's advanced fouling defence coating Hempaguard X7 to protect the hull of its new vessel.

Hempaguard X7 uses an advanced combination of hydrogel-silicone and an efficient fouling preventing biocide in a single coat. This technology releases 95 per cent less biocide than traditional antifoulings delivering enhanced environmental performance. A significant six per cent fuel saving compared with best-in-class antifoulings over the entire docking interval maximises operational efficiency. The effectiveness of Hempaguard X7 over an extended docking interval of up to 90 months helps minimise maintenance costs.

Kim Scheibel, Group Director, Marine/Container, New Building, Hempel A/S, said "Silver Muse will be trading mainly in the warm waters of the Mediterranean which tend to encourage fouling. Cruise ships operate unique trading patterns which involve a combination of slow and fast steaming as well as regular periods alongside. An effective hull coating must be trusted to deliver flexible protection. Hempaguard provides proven outstanding resistance to fouling during idle periods of up to 120 days and retains its effectiveness at all passage speeds."

Roberto Martinoli, CEO of Silversea, said "At Silversea we are fully committed to operating in the most efficient way and with minimal impact on the marine environment. Hempaguard not only promises to deliver impressive fuel savings which will help us contain our costs, but it also will incredibly help us to reduce CO_2 emissions. We are honoured that Silver Muse was awarded the RINA GREEN PLUS voluntary notation, which is based on an environmental performance index that covers all aspects of the vessel's impact on the environment, including carbon emissions."

Application of the entire coating system on the hull took just four days. Other products applied to the Silver Muse include Hempathane TC 55210 (a two-component glossy acrylic polyurethane coating) for the topsides and external areas, Hempadur Quattro 17634 (a two-component universal epoxy IMO PSPC compliant coating) for the ballast tanks, Hempadur 35560 (solvent-free two-component high-build polyamine adduct cured epoxy coating) for the potable water tanks and Hempadur 85671 (a two-component amine adduct cured phenolic epoxy (novolac) coating) for the grey water tanks.

MAN Diesel & Turbo Signs Cooperation Agreement with MM-Offshore

At a signing ceremony on 1 June at the Nor-Shipping trade fair in Norway, MAN Diesel & Turbo signed a cooperation agreement with MM-Offshore, the major, German supplier of ship's equipment to the international shipbuilding market.

The impetus for the agreement stems from the marine industry's constant efforts to enhance ship performance. These have resulted in highly efficient propulsion and manoeuvring systems with both now optimised - individually - essentially to perfection.

Poul Knudsgaard, Vice President and Head of the Aft Ship & Propeller

department, MAN Diesel and Turbo, said "Any further potential for improving overall efficiency can only be realised through a combined optimisation of propeller and rudder systems, using a holistic approach that takes the interaction between these two vital components - as well as the ship's hull- into consideration."
He added, "A number of recent projects have already documented how beneficial such a combined optimisation could be for ship designers, operators and owners in achieving low fuel and operating costs, as well as attaining a low EEDI. I welcome this agreement with MM-Offshore and look forward to developing our technology together and making further gains in terms of propulsion efficiency."

Jan Hamann, President of MM-Offshore, said "A further refinement of this concept - aided by modern and advanced simulation and calculation tools - requires a coordinated effort right from the initial design phase of the vessel before the ship design is frozen. The focus of this cooperation agreement will be on developing common propulsion and manoeuvring solutions for different ship types using each company's unique experience and know-how, and I am already looking very much forward to the results."

Rolls-Royce wins order for 15 gas engines to five new ferries for Torghatten Nord

Rolls-Royce has signed a deal to supply 15 gas engines to Norwegian Ferry Company, Torghatten Nord AS. The engines will power five Multi Maritime designed LNG ferries operating between Bergen and Stord.
Kjell Harloff, Rolls-Royce, Vice President, Engines Marine, said "Since the introduction of our first marine gas engines ten years ago, Rolls-Royce has delivered more than 700 gas engines on land and at sea accumulating over 25 million running hours of operating experience. We have proved that the Bergen lean-burn, pure gas, medium-speed engine range, combined with efficient hull designs, can help customers, like Torghatten Nord, cut their ships' emissions and fuel bills significantly."

All 15 engines are C26:33L9AGs, a generating set with nine cylinders in-line. The engine can operate on variable speed to reduce both fuel consumption and emissions. The C-gas engine has an operating speed of 1,000rpm and power of 2430kW.
Two of the vessels will be built at the VARD Brevik, yard in Norway whilst the other three will be built at the Tersan Shipyard, Turkey. The vessels are expected to enter service in January 2019.
The Bergen C26:33 series reduces total greenhouse gas (GHG) emissions by about 20 % compared to a similar diesel engine, even including the effects of methane slip, and is IMO Tier 3 compliant without the need of exhaust after treatment system. Engine rooms on gas powered vessels also stay much cleaner, saving operators time and money by reducing the frequency of cleaning tasks and the cost of chemicals. Crews appreciate the clean, safe working environment. The whole LNG System is designed for safety with double walled stainless steel containment.
Bergen C26:33 series engines are in operation across a range of vessel types including cargo vessels, PSVs and tugs as well as passenger vessels.

Torghatten Nord currently has 33 ferries and 10 express boats in operation in Norway. Four earlier LNG ferries, with Bergen gas engines, were built at Polish yard Remontowa, and have been operating on two routes serving Lofoten.

SAILOR 900 VSAT the choice for Winning fleet optimisation

Singaporean shipowner and operator Winning International Group will deploy SAILOR 900 VSAT antenna systems from Cobham SATCOM across its fleet of 30 bulk carriers. The decision to provide high-speed always-on connectivity was driven by a desire to improve crew welfare and explore new opportunities for optimising vessel operation.

The contract was signed between the operator's business unit in Qingdao, China and Dalian Landsea Electronic System Co. Ltd., a key Cobham SATCOM partner since 2010, also based in China.

The SAILOR 900 VSAT is an advanced three-axis stabilised Ku-band antenna system designed and built specifically for maritime applications. Recognising that ships have tight constraints on available maintenance time when in port, it is supplied ready-to-go with standardised components and has only a single cable running between the antenna and below-deck unit.

In addition, the antenna is shipped fully balanced, which eliminates a time-consuming configuration process before installation. These adaptations make the SAILOR 900 VSAT the most cost effective Ku-band antenna on the market to deploy. It also incorporates several innovative diagnostic features to ensure 'always-on' availability while handling dual-antenna arrangements with no additional hardware.

The SAILOR 900 VSAT is a future-proofed solution. The reflector dish and radome are tuned to both Ku- and Ka-band frequencies, providing a pathway for vessel owners to upgrade and take advantage of new high throughput satellites without having to replace the antenna unit.

Mr Yu, General Manager of Qingdao Winning International Ship management, said "Offering crew more reliable access to the web and electronic communication to allow them to keep in contact with their families was the foremost factor in Winning's decision to deploy the SAILOR 900 VSAT. Additionally, we have plans to evaluate options for improved vessel and fleet analytics to reduce fuel consumption and make other efficiency gains."

Dalian Landsea General Manager Mr. Liu Qi says that the SAILOR 900 VSAT solution was recommended after detailed consultation. "Cobham SATCOM offers an extensive portfolio of VSAT solutions; it is essential that all aspects of the end-user's true requirements are met, including the product, but also the logistics, installation and service agreement."

Installation of SAILOR 900 VSAT antenna on deck

Christian Kock, Senior Sales Director Global Maritime of Cobham SATCOM, said "It is particularly satisfying to see a leading bulk carrier operator such as Winning International Group invest in our technology. With highest RF performance in the 1m antenna class, the SAILOR 900 VSAT sets a new standard for broadband communication at sea. Thousands of units have shipped worldwide since its initial market launch in 2011."

Stena RoRo selects Selektope® for extensive newbuild program

Stena has signed a contract to coat the hulls of four newbuild RoPax ferries with paint that incorporates the bio-repellent antifouling ingredient Selektope®.

The agreement confirms yet more full vessel applications for Selektope® whose pharmacological mode of action combats barnacle settlement on ships' hulls by temporarily stimulating the barnacle larvae's swimming behavior. To date, marine coating products containing Selektope® have been applied to over 150 vessels including; tankers, containerships and LNG carriers, in a series of newbuilding and overcoating projects.

The organic, non-metal compound is the only one of its kind in marine antifouling application. It is characterized by high efficacy at extremely low concentrations (0.1% w/w), ultra-low leaching and flexibility to boost copper-based paint formulations or to replace copper completely.

Tests have shown that anti-fouling paints containing Selektope® offer superior hard fouling protection, resulting in lower water resistance and decreased fuel consumption, in addition to lower maintenance costs. Selektope® repels barnacles even when ships are idle, allowing fuel saving claims made by coatings suppliers to cover the ship's entire operational cycle.

"We are honored that a pioneer of sustainability in commercial shipping such as Stena RoRo has chosen a Selektope®-containing hull coating product for its newbuild program. Their investment in a premium antifouling product that contains Selektope® will deliver strong antifouling performance with the additional benefit that their high-activity vessels will have the best protection from barnacle invasion." said Philip Chaabane, CEO I-Tech AB.

The delivery of the newbuild Stena RoPax ferries is scheduled for 2019-2020. They will be built at the AVIC yard in Weihai, China.

Framo delivers pumping systems to Höegh LNG

Framo has signed a contract with Höegh LNG for the delivery of pumping systems to their new Floating Storage Regasification Unit (FSRU). The contract is for one unit, with option for three more units which are currently being built at Samsung Heavy Industries in Korea.

FSRU is a floating processing and terminal facility used when it is not profitable, or for other reasons not practical, to develop onshore terminals. By using an on-board regasification unit, the liquid gas carried by the LNG tanker is converted to gas prior to being brought ashore. This process requires the gas to be

heated, and for this heating large quantities of seawater have to be pumped from the ocean. Framo is to install four pumps in each of the vessels which are due to be delivered during the period 2019 to 2021.

"Global demand for energy is on the rise, but in many areas the necessary infrastructure is not in place. FSRU is a highly versatile alternative as a vessel can be moored at any quay and operate as a terminal. Furthermore, the investment costs are significantly lower than for onshore developments," said Thorbjørn Vågenes, Director, Oil & Gas Pumping Systems at Framo AS.

The delivery to Höegh LNG is based on highly recognised Framo technology, which has been used in connection with offshore operations for a number of years. A similar solution was delivered to Shell's floating LNG facility, Prelude FLNG.

These pump systems have improved operating reliability, are lighter, and have fewer components to maintain compared with the conventional pumps most commonly used on board FSRU vessels. The Framo system will also eliminate the need for a separate pump room on the vessels where space often is limited.

"We are using recognized and well-proven Framo technology in a new market where there has been a significant rise in demand the past few years," said Vågenes.

ACO Marine supplies Indian Coast Guard With its first biological wastewater management system

Reliance Defence and Engineering (RDEL) has contracted ACO Marine to supply a comprehensive wastewater management package for installation to a new coastguard training vessel building for the Indian Coast Guard.

RDEL, which in January 2016 acquired Pipavav Defence & Offshore Engineering to become India's largest private sector engineering and shipbuilding group, awarded ACO Marine the contract through its Indian distributor, Vanson Engineering. This is the first time Indian Coast Guard is using ACO Sewage Treatment plant. Until now, ICG typically operated conventional chemical-based technologies.

Vanson Engineering will supply, install and commission two ACO Clarimar MF-4 biological treatment units and ACO PV 225 vacuum stations, after which system training will be given to ICG crews.

"The Indian Coast Guard's new training vessel is an important addition to its fleet and, indeed, our reference list. With a complement of 242 personnel, the 35000t displ vessel is designed to provide basic sea training to all Coast Guard crews," said Mark Beavis, ACO Marine Managing Director.

"We are delighted that the Clarimar system has been selected. Not only will it provide an effective sanitation solution for those onboard but it will also provide the basis for enhanced training on biological wastewater management for Coast Guard engineering teams."

Fully type-approved to meet MEPC 227(64) and EC MED module B, the ACO Clarimar MF is a plug and play system manufactured using

ACO Composite PPFR GREY, a durable polymer material. It combines ACO Marine's extensively researched and developed ACO-MF filtration technology with the company's new patented ACO 'bio-sword', a self-cleaning filtration element that effectively treats a ship's wastewater to well below the mandatory levels.

Tests have confirmed that the Clarimar MF can reduce Coliform Bacteria to 25/100ml, TSS to <14mg/l, BOD to <3mg/l, and COD to <25mg/l, with capacity to treat up to 37 800 litres of ship generated wastewater per day.

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

2016	Feb	158,000 DWT oil products carriers	2 vessels	-	Ditas Shipping, Turkey	2018s	Hyundai Heavy Industries
	May	40,000 DWT products carriers	2 vessels	-	Greece ship owner	-	Hyundai Mipo Dockyard
		159,000 DWT oil tankers	2 vessels	-	AMPTC, Kuwait	2018s	Hyundai Heavy Industries
	Jun	75,000 tons product carriers	4 vessels	USD 170 million	Tsakos, Greece	The first of 2018	Sungdong Shipbuilding & Marine Engineering
		180,000m³ LNG carriers	2 vessels	USD 400 million	SK E&S, Korea	The first of 2019	Hyundai Heavy Industries
		50,000 tons bulk carrier	1 vessels	-	Ilshin Marine Transport, Korea	The end of 2017	Hyundai Mipo Dockyard
	Jul	31,000 tons Car ferry	1 vessels	-	Weidong Ferry	The end of 2018	Hyundai Mipo Dockyard
	Sep	180,000m³ LNG carriers	2 vessels	USD 367 million	Europe ship owner	-	Samsung Heavy Industries
	Oct	2,800 ton convoy	1 vessel	USD 297 million	Korean Navy	The end of 2020	Daewoo Shipbuilding & Marine Engineering
		2,600 ton frigates	2 vessels	USD 324 million	Department of National Defense, Philippines	2020s	Hyundai Heavy Industries
		Patrol killer medium	3 vessels	USD 173 million	Korean DAPA	2019s	Hanjin Heavy Industries & Construction
		157,000 DWT oil tankers	2 vessels	USD 220 million	Viken, Norway	-	Samsung Heavy Industries
		113,000 DWT oil tankers	2 vessels				
		157,000 DWT oil tankers	3 vessels	USD 170 million	Nordic American Tankers Limited, Norway	-	Samsung Heavy Industries
	Dec	14,500 TEU container ships	4 vessels	USD 700 million	IRISL, Iran	2th quarter 2018	Hyundai Heavy Industries
		49,000 tons products carriers	6 vessels				Hyundai Mipo Dockyard
		LNG Bunkering Vessel	1 vessel	-	Bernhard Schulte, Germany	The end of 2018	Hyundai Mipo Dockyard
2017	Jan	114,000 tons product carriers	2 vessels	-	SFL, France	3th quarter of 2019	Daehan Shipbuilding
		50,000 tons oil tankers	1 vessel	-	Fukujin Kisen, Japan	-	Hyundai Mipo Dockyard
	Feb	RO-RO Ship	2 vessels	USD 117.8 million	CLdN, Luxembourg	The first of 2017	Hyundai Mipo Dockyard
		50,000 DWT product carriers	1 vessel	-	Greece ship owner	-	Hyundai Mipo Dockyard
		300,000 DWT VLCCs	2 vessels	-	Enesel, Greece	The end of 2018	Hyundai Heavy Industries
	Mar	173,400m³ LNG carriers	2 vessels	-	Europe ship owner	The end of 2019	Daewoo Shipbuilding & Marine Engineering
		114,000 tons oil tankers	4 vessels	USD 240 million	Sovcomflot, Russia	3th quarter of 2018	Hyundai Samho Heavy Industries
		21,000m³ LPG carriers	2 vessels	-	Solvang ASA, Norway	2019s	Hyundai Samho Heavy Industries
	Apr	VLCCs	1 vessel	-	Neda Maritime, Greece	2019s	Hyundai Samho Heavy Industries
		318,000 tons VLCCs	3 vessels	USD 250 million	Maran Tankers Management, Greece	2018s	Daewoo Shipbuilding & Marine Engineering
	May	300,000 DWT VLCCs	2 vessels	-	Sentek Marine, Singapore	The first of 2019	Hyundai Samho Heavy Industries
		VLCCs	4 vessels	-	Oceania ship owner	The first of 2019	Samsung Heavy Industries
		11,200 DWT product oil & chemical tanker	3 vessels	-	Korea ship owner	The end of 2018	STX Offshore & Shipbuilding
		7,500m³ LNG carriers	2 vessels	USD 100 million	Korea Line, Korea	The end of 2019	Samsung Heavy Industries
	Jun	114,000 DWT oil tankers	2 vessels	-	Metrostar Management, Greece	The end of 2018	Daehan Shipbuilding
		RO-RO Ship	2 vessels	USD 117.8 million	CLdN, Luxembourg	The end of 2019	Hyundai Mipo Dockyard

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

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

Cruise ship market in the biggest boom

- Taking top spot in terms of new orders from Europe

The sensation in cruise ship market has something out of the common this year. It was reflected in the quantity and value of new orders for cruise ships. The cruise ship market is currently witnessing an unprecedented boom. USD 12 billion were invested in shipbuilding orders globally in the first quarter of this year, out of which USD 6.1 billion or a half of aggregate investment amount were injected into cruise ship segment as a total of 7 cruise ships were ordered in the same period. Last year, cruise ship orders increased by 70% from the level set in 2015. Reflecting this, Italy, where Fincantieri is located, took top spot in term of order value, overtaking global shipbuilding powerhouses such as Korea and other Asian countries.


TUNISIA ferries


NORFOLK LINE


corsica ferries
sardinia ferries


CLUB HARMONY


Blue Star Ferries
Blue Star Ferries


Queen Victoria
CUNARD

New Product

The first SAILOR Terminal for Iridium Certus℠

Cobham plc.

Cobham SATCOM has unveiled its first Iridium Certus Connected™ terminal 'SAILOR 4300'. Due to go live in the first half of 2018, Iridium Certus℠ is a new portfolio of global satellite services powered by Iridium® NEXT, a ground-breaking second-generation L-band global satellite constellation established to deliver an uncompromising solution for the future of global maritime communications.

The SAILOR 4300 is a Broadband Core Transceiver (BCX) type terminal, offering a highly reliable link over the Iridium NEXT satellite network with speeds suitable for data-heavy applications including; videoconferencing, multi-user Internet/VPN, IoT and telemedicine, alongside regular usage including email, electronic forms/reporting and crew communication.

With the first customer shipment expected by the end of 2017, Cobham SATCOM's new Iridium Certus Connected terminal will be among the first available for operation on the Iridium NEXT constellation. Like Iridium's current satellite constellation, Iridium NEXT features a cross-linked Low-Earth Orbit (LEO) architecture, providing coverage over 100 percent of the earth's surface. Iridium Certus will guarantee high bandwidth connectivity as a primary channel or as an integral part of multi-band communication networks.

While delivering high-speed, global connectivity as a standalone terminal, SAILOR 4300 has also been designed for seamless integration with onboard communication networks, making it an ideal solution for VSAT service providers to provide a cost-effective, high-speed secondary/back-up communications channel. SAILOR 4300 provides this capability using a specially designed, easy to configure VSAT integrator 'smart box'.

-TEL: +45-3955-8903
-http://www.cobham.com

New antifouling coating

Selektope®

A brand-new antifouling product containing the unique bio-repellent ingredient Selektope® has been launched onto the global market. SEA GRANDPRIX 880HS PLUS is the third product Chugoku Marine Paints (CMP) has launched that contains Selektope®. It joins CMP's SEAFLO NEO CF Premium; and SEAFLO NEO-S PREMIUM products that were launched in August 2016.

The new antifouling coating is based on hydrolyzing technology and can be applied to deep sea-going vessels trading worldwide in service periods for up to 90 months. Uniquely, CMP guarantees extended static performance of up to 45 days, thanks to the barnacle-repellent boost enabled by Selektope® combatting barnacle settlement on the ship's hull by temporarily stimulating the barnacle larvae's swimming behavior.

The organic, non-metal compound is the only one of its kind in a marine antifouling application. It is characterized by high efficacy at extremely low concentrations (approx.0.1% w/w), ultra-low leaching and flexibility to boost copper-based paint formulations or replace copper completely. Due to the low concentration needed, Selektope® does not compromise the chemical structure, color or other cooperative biocides of a marine coating.

For the inventors of Selektope®, Gothenburg-based I-Tech AB, the increase in the number of products on the market that harness the power of Selektope® is an encouraging sign of the confidence held by paint manufacturers in the technology. This latest product launch is set to be the first of many in the near future from an array of manufacturers.

Marine coating products containing Selektope® have been applied to over 150 vessels to date, including: tankers; containerships, and LNG carriers, in a series of newbuilding and over-coating projects. I-Tech reports orders for coatings including Selektope® in the first part of 2017 being double those achieved in 2016.

-TEL: +46-31-788-05-06
-http://selektope.com

New Product

전자식 케이블 풀 스위치

로크웰 오토메이션

로크웰 오토메이션은 알렌 브래들리 가드마스터 라이프라인 5 전자식 케이블 풀 스위치(Allen-Bradley Guardmaster Lifeline 5 Cable-pull switch)를 출시했다. 이 스위치는 마이크로프로세서 기반 기술을 사용한 전자식 산업용 케이블 풀 비상 정지 스위치로, 업계 최초로 특허 받은 제품이다.

기존의 전통적인 케이블 풀 스위치는 온도로 인한 케이블 장력 변화 때문에 유해 트립에 취약하고 신뢰성이 낮았다. 이에 반해, 이번 출시된 Lifeline 5 케이블 풀 스위치는 전자식으로 작동하기 때문에, 전자식 로프 모니터링 시스템을 통해 열 팽창과 케이블의 갑작스런 이상을 보강한다.

로크웰 오토메이션의 글로벌 제품 매니저인 스티브 탬보(Steve Tambeau)는 "Lifeline 5 케이블 풀 스위치는 전자식 스위치이기 때문에, 기존 스위치에 일반적으로 발생하던 기계적 마모가 전혀 없다"며, "길어진 제품 수명으로 이 제품으로 구성된 장비를 사용하는 제조 고객의 생산 운영 시간은 더 연장되고 동시에 더 신뢰할 수 있는 안전 기능을 확보하게 되었다"고 말했다.

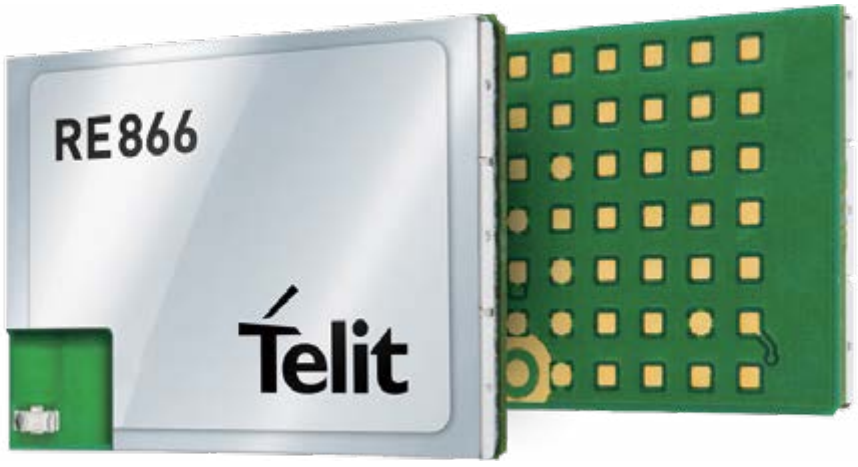
Lifeline 5 스위치를 통해 언제나 비상 정지 기능을 사용할 수 있으며, 부착된 케이블을 당기기만 하면 장비에 대한 위해 요소를 정지시킬 수 있다. 뿐만 아니라, 특허 받은 마이크로프로세서 기반 솔루션으로 설치가 간단하고, 유지보수와 문제 해결이 보다 효과적이다. 보기 쉬운 LED 표시 장치를 사용해 케이블 인장시 빠르고 정확한 설정이 가능하며, 작동 중에는 스위치 상태와 진단 정보를 제공한다.

Lifeline 5 스위치는 환경 등급이 각각 IP66 및 IP67인 다이캐스트 알루미늄 하우징과 강력 스테인리스 스틸 하우징을 제공한다. 예기치 않은 다운타임을 방지하는 진단 기능으로 안전 신뢰성을 확보해 최적의 생산성을 보장하며, 다이캐스트 알루미늄 모델은 비상 정지 버튼을 함께 제공해 어플리케이션의 유연성을 더욱 향상시킬 수 있다.

-TEL: +82-2-2188-4400
-http://www.rockwellautomation.co.kr

LoRaWAN™ 및 BLE 통합 IoT 모듈

Telit Wireless Solutions



텔릿은 LoRaWAN™ 프로토콜과 저전력 블루투스(BLE–Bluetooth low energy) 통합 IoT 모듈인 'RE866A1–EU'를 출시했다.

텔릿은 최근 LoRaWAN, BLE, Wi–Fi는 물론 NB–IoT, Cat M을 포함한 다양한 셀룰러 표준 기술의 IoT 모듈을 출시함으로써 공통 폼팩터를 특징으로 하는 업계에서 가장 광범위한 무선 모듈 포트폴리오를 제공하게 되었다. IoT 솔루션 기업들은 텔릿의 핀 호환 모듈을 사용하여 다양한 밴드를 지원하는 디바이스를 설계할 수 있다. 사업적으로나 기술적으로 각각의 영역 및 용도에 맞게 기술을 활용하면 된다.

RE866A1–EU 모듈은 LoRaWAN 표준을 완벽하게 준수하며, 공중망 또는 전용망, 스마트 미터링, 원격 센싱, 산업 자동화/모니터링 및 제어, 무선 경보 및 보안 시스템, 농업, 자산 추적, 가로등, 스마트 시티 애플리케이션에 이상적인 솔루션이다.

로넷 벤 하모우(Ronen Ben–Hamou) 텔릿 제품 및 솔루션 사업부 전무(EVP)는 "마켓 트렌드와 관련 기술을 반영한 저전력 모듈 포트폴리오를 강화하고 유지하는 것은 엔드투엔드(end–to–end) IoT 솔루션 제공을 약속하는 텔릿 브랜드 철학에 부합한다. 고객은 셀룰러용으로 설계한 기존 디바이스 및 애플리케이션에 텔릿 LoRaWAN 프로토콜 모듈을 탑재하기만 하면 디바이스 교체 없이 재사용할 수 있다. 이는 신제품 개발, 새로운 시장 발굴, 새로운 사업 기회 창출로 이어질 수 있다. 물론 자사 Wi–Fi 모듈과 LTE Cat NB 및 Cat M 모듈의 경우도 마찬가지다"라고 말했다.

또한 텔릿은 개방형, 비영리 연합인 '로라 얼라이언스(LoRa Alliance™)'에 가입했다. 업계의 선도 업체들에 의해 시작된 이 연합의 미션은 전 세계에 구축되고 있는 저전력 광역 네트워크(LPWAN)를 표준화 하여 IoT, M2M, 스마트 시티 및 산업 애플리케이션을 활성화 하는 것이다. 텔릿은 로라 얼라이언스 회원사로서 지식과 경험을 공유하여 LoRaWAN 프로토콜의 향상을 위해 협력하게 되었다. 하나의 개방형 글로벌 표준에 준하여 통신 사업자에게 상호운용성을 보장할 예정이다.

-TEL: +82-2-368-4622
-http://www.telit.com

BMEA (Busan Marine Equipment Association)
Member List

ANSWER CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.answerclear.com
Main Products : CO2 Extinguishing Sys. External Fire Fighting Sys.
TEL : +82-51-831-3691

BANDO MARINE.
Head Office : Gangseo-gu Busan
Homepage Add. : www.bando.info
Main Products : Life Boat
TEL : +82-51-831-1950

BERM YOUNG VALVE.
Head Office : Gangseo-gu Busan
Homepage Add. : www.byvalve.com
Main Products : Quick Closing Valve, Ball Valve, Bellows, Beal Valve
TEL : +82-51-311-2511

B-I INDUSTRIAL CO., LTD.
Head Office : Gangseo-gu, Busan
Homepage Add : www.b-i.co.kr
Main Products : Fire & gas detection system, smoke, heat & flame detector.
TEL : +82-51-441-5670

BMT CO., LTD.
Head Office : Yangsan Gyeongsangnam-do
Homepage Add. : www.superlok.com/
Main Products : Fitting & Valve, Vacuum Clamp
TEL : +82-55-783-1000

BO KYOUNG IND., CO.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : O-ring, Sealing, Gasket
TEL : +82-51-831-4615

BOKYUNGTL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Rudder Body, Winch, Crane
TEL : +82-51-832-0801

BO MYUNG METAL CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Copper Tube & Pipe, Cupro-Nikel Pipe, Copper Fitting
TEL : +82-51-266-4101

BOYANG HARDWARE CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.byhd.co.kr
Main Products : Stairway Body, Ladder, Hardware
TEL : +82-55-345-1951

BUSAN INDUSTRY CO.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Powder Coating
TEL : +82-51-831-4810

BUSUNG PLANT CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Cargo Reducer Piece
TEL : +82-51-831-1784

CEPHAS PIPELINES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Butterfly Valve
TEL : +82-51-263-3661

CHK CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.chkj.co.kr
Main Products : Telephone Booth, Work Shop, Cable Box, Spare Box
TEL : +82-51-831-9500

CHWANG HYEOP INSTRUMENTS.
Head Office : Gangseo-gu Busan
Homepage Add. : www.chkj.co.kr
Main Products : Telephone Booth, Work Shop, Cable Box, Spare Box
TEL : +82-51-831-3607

CHANG WON ENVIRONMENT IND CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.seaclean.kr
Main Products : Sewage Tredtment Plant
TEL : +82-55-342-5545

CMR KOREA CO., LTD.
Head Office : Kumjung-gu Busan
Homepage Add. : www.cmkkorea.com
Main Products : Temperature & Press Sensor, Alarm Monitoring Sys.
TEL : +82-51-521-2883

DAECHANG METAL CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Main Bearing support, Chain Wheel, Gear Wheel
TEL : +82-51-264-0831

DAE-DONG ENTEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.ddentec.com/
Main Products : Air Cooler, Oil Cooler, Oil Tank, Air Tank, Oil Heater
TEL : +82-51-832-1123

DAE HAN HEAT ELECTRIC MACHINERY IND.,CO.
Head Office : Kijang-kun Busan
Homepage Add. :
Main Products : CO_2 Welder, DC Tig, Welder, AC ARC Welder
TEL : +82-51-724-6777

DAEHEUNG IND. CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.daeheungind.kr/kr/
Main Products : Forged Flanges, Nozzel & Forged Neck, Forged Items for ship
TEL : +82-51-831-6635

AQ TECK CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Flower Meter, Viscometer, Control Valve
TEL : +82-51-831-3720

DAEHWA TECHNICAL CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. :
Main Products : Shot & Blast, Painting, Painting's Manufacture
TEL : +82-55-329-5705

DAEJUNG SPECIAL STEEL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Winch, Shaft, Gear Cluch
TEL : +82-51-831-1133

DAEKYUNG CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.dkhoist.com
Main Products : Chain Block, Lever Block Trelley
TEL : +82-51-264-6611

DAERIM MACHINERY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dae-rim.kr
Main Products : Head, Air Receiver Tank, Pressure Vessel, Reactor
TEL : +82-51-831-1456

DAESAN ENGINEERING CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.daesan-eng.com
Main Products : E/R Package unit, Pipe Group Unit
TEL : +82-51-831-0090

DAE SEONG MARINE TEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.ds-frp.com/
Main Products : Pipe Insulation System, FRP Weather Door
TEL : +82-51-832-2071

DAESUNG IND CO.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : VENT SYS, OIL TANK, Out Fitting
TEL : +82-51-831-7427

DAE WON HEAVY INDUSTRIES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.daewonindustry.co.kr/
Main Products : Deck Machinery, Deck Equipments, OffShore
TEL : +82-51-831-5215

DAEWON METAL IND. CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.galvanizing.co.kr/
Main Products : Hot Dip Galvanizing, Pipe for Shipbuilding
TEL : +82-51-831-2541

DAEYANG ELECTRIC CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.daeyang.co.kr
Main Products : Precision Instrument
TEL : +82-51-200-5331

DAEYANG INSTRUMENT CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.daeyang.co.kr
Main Products : Precision Instrument
TEL : +82-51-200-5331

DAEYANG SP CO., LTD.
Head Office : Yangsan Gyeongsangnam-do
Homepage Add. :
Main Products : Welding machine
TEL : +82-55-388-3800

DA HEUNG ENG. CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Marine valves
TEL : +82-51-311-1882

DAOM METAL.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Sus plate, Flange, Pipe sleeve
TEL : +82-51-315-1347

DEAIL MACHINERY.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Piston Rod, Cross headpin, Propeller Shaft
TEL : +82-51-832-1119

DECKWIN CO., LTD.
Head Office : Youngdo-gu Busan
Homepage Add. : www.deckwin.com
Main Products : Winch
TEL : +82-51-413-1193

DH-M CO., LTD.
Head Office : Seo-gu Incheon
Homepage Add. : www.dhm.co.kr
Main Products : High Pressure Blower, High Pressure Washer
TEL : +82-32-527-5782

DHP ENGINEERING CO., LTD.
Head Office : Dongnae-gu Busan
Homepage Add. : www.dhpeng.com
Main Products : Plate Type heat Exchanger, Disk & Shell type heat Exchanger
TEL : +82-51-556-4200

DINES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Provision Crane, Tilting Radar Post
TEL : +82-51-971-0972

DK INDUSTRIAL CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.dk-ind.com/
Main Products : Silencer, Fire Damper, Lashing Bridge, Rudder
TEL : +82-51-832-1436

DK TECH CORPORATION CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.dklok.com
Main Products : Instrument TuBe Fitting, Instrument Valve
TEL : +82-55-338-0114

DNP CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dnpco.kr
Main Products : Fire & Gas Damper, Galley Equipment, AL, Steel Furniture
TEL : +82-51-831-4551

DOLIM PRECISION.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Cross Head Pin, Main Journal, Crank Shaft
TEL : +82-51-831-8861

DONG-A VALVE IND.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Marine Offshore valve, Strainer
TEL : _+82-51-831-1500

DONGBANG SHIP MACHINERY CO., LTD.
Head Office : Jinhae Gyeongsangnam-do
Homepage Add. : www.dongbangsm.co.kr
Main Products : General Steel Poping, Framo & Hydro Piping, Module Unit
TEL : +82-55-545-0882

DONGHAE INTEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dhintec.co.kr
Main Products : Sleeve, Scupper, Suction Bell Mouth
TEL : +82-51-831-2565

DONG HUN ENTERPRISE CO.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Ball Valve
TEL : +82-51-314-2610

DONGHWA ENTEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dh.co.kr
Main Products : E/R Heater & Cooler, Copt, Condenser, Plate Heat Exchanger
TEL : +82-51-970-1000

DONGHWA M&E CO., LTD.
Head Office : Gangseo-gu, Busan
Homepage Add. : www.donghwame.com
Main Products : Heat Exchanger
TEL : +82-51-971-3455

DONGHWA PNEUTEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Air Comfressor, Cylinder, Cylinder, Head, Piston
TEL : +82-51-974-4800

DONGIL SHIPYARD CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :www.dongilshipyard.co.kr
Main Products : Rescue Boat Davit & Winch, Assembly, Line Hauler
TEL : +82-51-200-1211

DONGKYUNG INDUSTRY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dki21.co.kr
Main Products : Reducer, Gear
TEL : +82-51-832-1602

DONG NAM ENGINEERING CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.dongnam-eng.com
Main Products : Electric Control Panel
TEL : +82-51-204-3984

DONGNAM PRECISION IND. CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Multi Core Tube, Sus Cable Tray & Cover, LNG Line Out Fitting
TEL : +82-51-831-3500

DONG SUNG HIGHTECH.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dshitech.com
Main Products : Shutter Grill, P-Chamber, Diffuser, Frie Damper, Volume Damper
TEL : +82-51-831-9561

DONGYANG G.T.S.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Compresed Centellen Board, Metal Inserting Gasket
TEL : +82-51-831-6505

DONGYANG HYDTEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dongyang-hyd.com
Main Products : Rudder & propeller Truck, Block lifter, Gripper Jack System
TEL : +82-51-831-6185

DONGYANG METAL CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. : www.dy-metal.co.kr
Main Products : Swing bolt a' ssy, Fittings
TEL : +82-51-814-5157

DONGYOUNG ELECTRIC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dyelectric.com
Main Products : Main Switchboard, Emergency Switchboard
TEL : +82-51-261-9800

DSB ENGINEERING CO., LTD.
Head Office : Youngdo-gu Busan
Homepage Add. : www.dseng.com
Main Products : Totally Enclosed, Lifeboat, Herged Qrarity Davit
TEL : +82-51-412-5937

DSE BEARING CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.dsebearing.com
Main Products : Metal Bearing
TEL : +82-51-831-2046

DSK CO., LTD.
Head Office : Youngdo-gu Busan
Homepage Add. : www.dskworld.com
Main Products : Piston Crown
TEL : +82-51-417-7800

DUYOUNG INDUSTRIAL MACHINES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Plate-Baffle
TEL : +82-51-831-2477

EM SYSTEC CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. : www.emsystec.com
Main Products : Marine Switch Board, Control Console
TEL : +82-51-302-8761

FRIEND CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.thefriend.co.kr
Main Products : Marine Cable Tray, Mud Box, Strainer
TEL : +82-51-831-9456

GEO MAEK SHOT&PAINT CO.,LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Deck Machinery Part, Hose Handling Crane
TEL : +82-51-264-3315

GEORIM ENGINEERING CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.kangrim.com
Main Products : Marine Indutrial Boiler, Exhaust Gas Boiler
TEL : +82-51-831-2929

GISUNG ENGINEERING CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Air Reserovir, Heat Exchanger
TEL : +82-51-831-4475

G. M. TEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.igmtec.com
Main Products : Duct Equip't Seat Support
TEL : +82-51-831-5851

G.S HIGH-TECHER CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.gshightecher.koreasme.com
Main Products : Air Vent Head, Pipe Coupling
TEL : +82-51-832-0456

G&S PRECISION IND CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Cable Tray, Vent, Hull Outffittings
TEL : +82-51-831-0849

HAE DONG METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.hdanode.com
Main Products : Zinc Anode, Al Anode
TEL : +82-51-831-3751

HAE DUK RUDDER & R.STOCK CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.rudders.co.kr
Main Products : Rudder & R.Stock, Rudder Horn, Rudder Carrier
TEL : +82-51-831-0101

HAE SUNG INDUSTRIAL.
Head Office : Saha-gu Busan
Homepage Add. : www.hsjs.co.kr/
Main Products : Cable Tray, Cable Way Fitting, Cable Coaming
TEL : +82-51-264-8103

HAEWON INDUSTRIES CO.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : P/Crown, P/Skirt
TEL : +82-51-831-4600

HAEWON IND. CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. : www.heawon.net
Main Products : Copper, Copper-Nickel, Monel Fitting & Flanges
TEL : +82-51-312-2161

HAEYANG FAMILY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : F.P Propeller, C.P Propeller, Propeller Shaft
TEL : +82-51-831-3550

HAEYANG METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : F.P Propeller, C.P Propeller, Propeller Shaft
TEL : +82-51-831-4591

HAEYANG PROPELLER CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Marine Propeller
TEL : +82-51-831-4599

HANCHANG TRANS CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.hctr.co.kr
Main Products : Pole Mounted Transformer, Pad Mounted Transformer
TEL : +82-51-831-3470

HANJULEVEL.
Head Office : Sasang-gu Busan
Homepage Add. : www.hanjulevel.co.kr
Main Products : Level instrument Etc, Vapour Emision Control Sys.
TEL : +82-51-303-0537

HANLA IMS CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.hanlalevel.co.kr
Main Products : Cargo Tank Monitoring Sys. Tank Remote Sounding Sys.
TEL : +82-51-601-3019

HANLA IND CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Oil Filter unit, Gas Blower
TEL : +82-51-264-2201

HANMAUM KI-GONG CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.hankg.co.kr
Main Products : Air Cooler Housing, Oil Cooler Housing
TEL : +82-51-831-5211

HEARTMAN CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.heartman.co.kr
Main Products : Nozzle Tip, Plunger Ass'y, Fuel Injection V/V
TEL : +82-51-262-8869

H.M.E.
Head Office : Kijang-kun Busan
Homepage Add. : www.hyomyungeng.com
Main Products : Battery Charger, Light Signal Column
TEL : +82-51-709-9000

HOSEUNG ENTERPRISE CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add.: 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

HWAJIN ENTERPRISE CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.hwa-jin.com
Main Products : Control Box, Gauge Board System
TEL : +82-512-831-9447

HWAJIN PF CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.hwajinpf.com
Main Products : Butt-Welding Pipe, Fittings Carbon Steel
TEL : +82-51-204-3001

HWA SHIN PRECISION CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Life Boat Winch
TEL : +82-51-831-9839

HYOSUNG STEEL TECHNOLOGIES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Steel plute cutting, Hy Auto or Manual
TEL : +82-51-831-5093

HYUNDAI HYCRAULIC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.hhmc.co.kr
Main Products : TURNING ROLLER, BLOCK LIFT
TEL : +82-51-831-8611

HYUNDAI ZINC METAL CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.hdz.co.kr
Main Products : Sacrificial Anode, Hot Dip Galvanizing, Ship Manufacture
TEL : +82-51-266-4788

HYUNJIN MATERIALS CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.hjmco.co.kr
Main Products : Cross Head, Connecting Rod, Piston Rod
TEL : +82-51-602-7700

ILDO MACHINE ELECT CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Heavy Electric Parts
TEL : +82-51-266-6066

IL - SUNG INDUSTRY CO.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Silencer, Water Air Filter, Air Intet Trunk
TEL : +82-51-312-4056

IN SUNG INDUSTRY CO.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Profile, Steel Coalming Insulation
TEL : +82-51-293-7550

JAESEUNG ENGINEERING CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Steel Pipe Spool, Sus Pipe Spool, CuNi Pipe Spool
TEL : +82-51-831-8838

JEILSANKI CO.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-831-5398

JEONG-AM SAFETY GLASS CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.jeong-am.co.kr
Main Products : Tempered Glass, Laminated Glass
TEL : +82-51-831-6161

JEONG HWA ACCOMMODATION SYSTEM CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.jeonghwa21.com
Main Products : Wooden Furniture
TEL : +82-51-974-8000

JEONG WOO COUPLING CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.jwcjoint.co.kr
Main Products : Pipe Coupling, Pipe Repair Clamp
TEL : +82-55-339-7666

JIN GU ENGINEERING.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. :
Main Products : Rudder Stock, Stern Tube, Stern Roller, Winch
TEL : +82-55-343-3414

JIN IL BEND CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-832-1919

JINKWANG ELECTRIC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Pull Card Switch, Belt Sway Switch, Belt Speed Switch
TEL : +82-51-831-2571

JINYOUNG METAL CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. : www.jymct.co.kr
Main Products : Multi Core Tube, Welded Stainless, Steel Tube
TEL : +82-51-313-4001

JMC HYDRAULICS.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Hydraulic Motor For Marine, Hydraulic Control Valve
TEL : +82-51-204-4046

JNC HI-TECHNOLOGIES.
Head Office : Gangseo-gu Busan
Homepage Add. : www.jnchitec.com
Main Products : Junction Box, Elect panel bard, Tel Booth
TEL : +82-51-974-9500

JOKWANG I.L.I CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-602-0200

JONGHAP POLESTAR ENGINEERING CO., LTD.
Head Office : Youngdo-gu Busan
Homepage Add. :
Main Products : Diesel Engine Piston, Cylinder, Valve
TEL : +82-51-403-5514

JUNG GONG IND. CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.jung-gong.com
Main Products : Ordinary Window Side, Scuttle, Heated Window
TEL : +82-51-261-2911

JUNG - WOO MACHINERY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Carrier Housing, Split Bearing,Stock, Up.Lower Sleeve
TEL : +82-51-831-5394

KANG BACK INDUSTRY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Electric Control Box, Valve & Similar , Equipment
TEL : +82-51-831-9025

KANGIL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Pressure Vessel, Deaerator, Heat Exchanger
TEL : +82-51-972-5672

KANGRIM HEAVY INDUSTRIES CO., LTD.
Head Office : Changwon Gyeongsangnam-do
Homepage Add. : www.kangrim.com/
Main Products : Marine Indutrial Boiler, Exhaust Gas Boiler
TEL : +82-55-269-7701

K.C. LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.iccp-mgps.com
Main Products : I.C.C.P. System, M.G.P.S, Shaft Earthing Device
TEL : +82-51-831-7720

KEO HUNG MACHINERY.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Deck Crane, Provision Crane, Hose Handling Crane
TEL : +82-51-831-6296

KEYSUNG METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.keysungmetal.com
Main Products : Valve(Cryogenic, Ball), Strainer
TEL : +82-51-831-3391

KOC ELECTRIC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Cast Resin Transformer, Dry Resin Transformer
TEL : +82-51-832-0550

KOREA HYDRAULIC CO.
Head Office : Gangseo-gu Busan
Homepage Add. : www.enpos21.com
Main Products : Electtric Motor Pump, Hand Pump, Single/ Double Acting Ram
TEL : +82-51-832-1100

KOREA PHE CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.kphe.co.kr
Main Products : Plate Heat Exchanger, Tank Cleaning Heater
TEL : +82-51-261-2664

KOREA STEEL SHAPES CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. : www.ekosco.com
Main Products : Flat Bars, Equal Angles, Unequal Angles
TEL : +82-51-323-2611

KOREA TRADING & INDUSTRIES CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.kticopper.co.kr
Main Products : Copper alloy coil, Plate
TEL : +82-51-293-4423

KORINOX CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.korinox21.com
Main Products : Cold Mill Stainless, Steel Coil
TEL : +82-51-832-0031

KORVAL CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.korval.co.kr
Main Products : Crank Case Relief Valve, Main Starting Valve, Rotary Valve
TEL : +82-51-790-9700

KSP CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Ship Engine Valve Spindle, Flange, Ring Gear
TEL : +82-51-831-6274

KSV
Head Office : Youngdo-gu Busan
Homepage Add. : www.ksv-valve.co.kr
Main Products : Valve Spindle, Seat-Ring for marine Engine
TEL : +82-51-415-4466

KTE CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.kte.co.kr
Main Products : Electrical Equipment (Switchboard & Console)
TEL : +82-51-265-0255

KUKDONG ELECOM CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.kukdongelecom.com
Main Products : Naviagtion/Signal LT, EX-Plosion Proof LT, Fluorescent LT
TEL : +82-51-266-0050

KUKDONG INDUSTRIAL ENGINEERING.
Head Office : Sasang-gu Busan
Homepage Add. : www.kdie.co.kr
Main Products : Exhaust Gas Pipe With Insulation, Fuel Injection Pipe and Bloc
TEL : +82-51-303-6900

KUKJE METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.kjmetal.co.kr
Main Products : Manhole Cover, Portable Tank, EXH. Gas Pipe
TEL : +82-51-831-1541

KUM HAW PRECISION CO.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Coupling Flange, Bellows Flange
TEL : +82-51-831-5685

KUMKANG ENGINEERING.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Hand Rail, Storm Rail, Platform, Inc. Ladder
TEL : +82-51-831-0091

KUMKANG PRECISION.
Head Office : Saha-gu Busan
Homepage Add. : www.kkmarine.co.kr
Main Products : Engine Parts, (Air Reservoir) & Valve
TEL : +82-51-262-4893

KWANGIL CORP.,
Head Office : Sasang-gu Busan
Homepage Add. : www.k-i.co.kr
Main Products : Stainless Steel, HR Coil
TEL : +82-51-324-0006

KWANG JIN E.N.G CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Pipe Piece, Pipe Spool
TEL : +82-51-831-1435

KWANG JIN IND. CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Part of Heat Exchanger
TEL : +82-51-831-4131

KWANG JIN TECH.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Non Asbestos, Teflon, Rubber
TEL : +82-51-973-5566

KWANG LIM MARINE TECH. CO.,LTD.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Window Box, (STEEL, AL, SUS) Vent Hole
TEL : +82-51-313-0055

KWANG SAN CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.kwangsan.com
Main Products : Heating Coil unit, Expansion joint
TEL : +82-51-974-6301

KWANGWOON CO.,LTD.
Head Office : Youngdo-gu Busan
Homepage Add. : www.kwang-woon.com
Main Products : Square Window, Side Scuttle, Door, Hatch, Window Wiper
TEL : +82-51-414-9494

KYEONG SIN FIBER CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.ksfiber.co.kr
Main Products : Rudder Bearing Bush, Insulation
TEL : +82-51-831-0268

KYOUNGWON BENDING CO.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.bending4u.com
Main Products : Hwase Pipe, Chain, Locker
TEL : +82-55-313-1277

KYUNGIL METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Marine Equipment Plating, Head Rest Pipe Plating
TEL : +82-51-831-1677

KYUNGSUNG INDUSTRY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.e-clamp.com
Main Products : Svs Corner & Anchor, Strip, Clamp
TEL : +82-51-831-4960

LHE CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.lhe.co.kr
Main Products : Heat Exchanger
TEL : +82-55-340-0624

MANZU INDUSTRY. CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Phosphate Coat, Pipe & Structure Painting, Special Painting
TEL : +82-51-832-0944

MARINE RADIO CO., LTD.
Head Office : Youngdo-gu Busan
Homepage Add. : www.mrckorea.co.kr
Main Products : Public Addressor Sys, Common Aerial Sys.
TEL : +82-51-414-7891

MARINE TECHNICAL ENGINEERING CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Oily Water Seperator, Bilge Alarm, Air Dryer
TEL : +82-51-831-1118

MARSEN CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.marsen.co.kr
Main Products : Cargo Tank Monitoring System, Tank High/ Overfill Alarm System
TEL : +82-51-831-2108

MAX TECH.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.maxtech21c.com
Main Products : Engine, Shock Absorper, Gasket
TEL : +82-55-327-9652

MCM CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.mcm21.co.kr
Main Products : Valve, Junction Box, Switch Cover
TEL : +82-51-832-0505

MI JIN PRECISION.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Valve, Tube, Vend, Pipe for ship
TEL : +82-51-315-3143

MIJOO INDUSTRY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-831-1588

MIRAE ENGINEERING CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.miraeship.co.kr
Main Products : Hull Block, Steel Outfitting, Pipe Spool/Unit
TEL : +82-51-790-5800

MJ TSR CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.mjtsr.com
Main Products : Rubber Sheets & Hats, All Types of Parts for Shipbuilding & Industries
TEL : +82-51-832-0002

MODERN INTECH CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. :
Main Products : Curtain, Carpet, Upholstery, Mattress for Marine
TEL : +82-51-325-0260

MT.H CONTROL VALVES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : 82-51-974-8831

MYTEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.imytec.com
Main Products : Heat Exchanger, Pressure Vassel
TEL : +82-51-831-7474

NAMSUNG SHIPBUILDING CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Rescue Boat Davit & Winch, Assembly, Line Hauler
TEL : +82-51-200-1277

NAMYANG METAL.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Stair Way Body, Bulk Head Hnlon, Galley Hood
TEL : +82-51-832-1721

NARA CORPORATION CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-790-7505

NAVUTEC.
Head Office : Kijang-kun Busan
Homepage Add. : www.navutec.com
Main Products : Fire fighting & Safety, equipment for marine & Offshore
TEL : +82-51-728-5055

NEW-OHSEUNG CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Manifold, Spool piece, Chain compressor
TEL : +82-51-266-5724

NK CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Ballast Water Treatment System, Co2 System
TEL : +82-51-204-2211

NOKSAN FLANGE CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Flange for ship
TEL : +82-51-831-7956

OBOK ELECTRIC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Transformer
TEL : +82-51-832-1751

OK KWANG ENG CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.okv.co.kr
Main Products : Marine valves, Strainers
TEL : +82-51-326-7741

OK KWANG METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.okkwang.com
Main Products : Std Flange, Tube Sheet, Forging Material
TEL : +82-51-831-9885

ORIENTAL PRECISION & ENGINEERING CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.opco.co.kr
Main Products : Deck house, Engine room Casing, Life Boat
TEL : +82-51-202-0101

ORIENTAL PRECISION MACHINERY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.opco.co.kr
Main Products : Crane Component
TEL : +82-51-831-0202

O.S.C.G CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. : www.oscg.net
Main Products : Cable grand, Junction box
TEL : +82-51-305-3910

PACO HITEC CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.pacohitec.com
Main Products : Hydraulic hose, Fitting
TEL : +82-51-266-6994

PAL MI METAL IND CO., LTD.
Head Office : Jinhae Gyeongsangnam-do
Homepage Add. :
Main Products : Valve, Yoke, Fork, Knuckle, Carrier
TEL : +82-55-552-3840

PANASIA CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.worldpanasia.com
Main Products : Hi-level Alarm Sys. Tank level Gauge
TEL : +82-51-831-1010

PI PLUS CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.pharmaidsolutions.com
Main Products : Rudder stock, Pintle, Intermediate Shaft
TEL : +82-51-831-9338

POONG JIN METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Emergency Shut-Off Valve, Veneral Bronze Casting Valve
TEL : +82-51-831-8510

PSM CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.psminc.co.kr
Main Products : Ring Flange, Shaft, Nozzle
TEL : +82-51-970-3000

SAEJIN INTECH CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.saejinintech.com
Main Products : Emergency Towing, Arrangement, Universal Swivel Fairlead
TEL : +82-55-328-1458

SAMBOO METAL CO,, LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.samboometal.com
Main Products : Wheel, Shaft, Hyd-Net, Hyd Coupling Bolt, Flange
TEL : +82-51-831-1478

SAMGONG CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.sam-gong.co.kr
Main Products : Oil Purifiers, Ship' Accommodation, Ladders
TEL : +82-51-200-3040

SAMJOO ENG. CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.sam-joo.co.kr
Main Products : Catering Furniture, Galley Hood, Laundry Equipment
TEL : +82-51-264-6677

SAMJUNG MACHINERY.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Piston Rod, Cross Head, Inter Shaft
TEL : +82-51-832-0190

SAM KWANG HI-TEC CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Rectangle Windows
TEL : +82-51-832-0177

SAMSUNG NONFERROUS METAL CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.metalsamsung.co.kr
Main Products : Bushing, Liner, Sleeve, Pintle Bush
TEL : +82-55-329-1067

SAMYANG METAL IND. CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. : www.cuniship.com
Main Products : W-NT 90/10 Flange, Elbow, Tee
TEL : +82-51-266-6655

SAMYOUNG FITTING.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Elbow, Tee, Coupling
TEL : +82-51-832-0211

SDK CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Winch, Hatch
TEL : +82-51-832-1882

SEAPLUS CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.sea-plus.co.kr
Main Products : Low Pressure CO2, Fire Extinguishing Sys
TEL : +82-51-831-0119

SEBO METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.sebometal.co.kr
Main Products : Pump Tower for LNG, Vent Mast
TEL : +82-51-970-0200

SEBO TECH CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Windwall, Heat Shield, Manual Hatch
TEL : +82-51-831-4171

SEIL SERES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.seilseres.com
Main Products : VRC system, ODME
TEL : +82-51-831-1858

SEJIN BOLT CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Bolt, Nut & Be, Double Nut, Chard Nut, Hinge Bog
TEL : +82-51-831-9832

SEUNG JIN E.N.G.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Pipe Spool (Steel)
TEL : +82-51-831-9050

SEUN STEEL CO., LTD.
Head Office : Jin-gu Busan
Homepage Add. : www.seunsteel.co.kr
Main Products : CR, HGL, CGL, EGL
TEL : +82-51-639-3200

SEWOONG PRECISION MACHINERY CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products :
TEL : +82-51-831-0595

SEYANG HIGH-TECH
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Water & Oil Strainer, Condensate Chlorination Tank
TEL : +82-51-831-9125

SHILLA E&T CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Spot Cooler, Heat Exchanger, Pressure Yeses
TEL : +82-51-831-7705

SHINDONG DIGITECH CO., LTD.
Head Office : Dong-gu Busan
Homepage Add. : www.shindong.com
Main Products : Navigation Communication, Satellite Communication
TEL : +82-51-461-5000

SHINHWA INTERIOR & TECHNOLOGY CO., LTD.
Head Office : Saha-gu Busan
Homepage Add. :
Main Products : Marine Furniture
TEL : +82-51-441-1294

SHINKWANG ACE ELECTRIC CO., LTD.
Head Office : Kimhae Gyeongsangnam-do
Homepage Add. : www.skace.com
Main Products : Cable Tray, Accessories
TEL : +82-55-332-3315

SHINMYUNG INDUSTRIAL CO., LTD.
Head Office : Gangseo-gu Busan

Homepage Add. :
Main Products : Cable Tray Joint, Hanger
TEL : +82-51-831-5061

SHIN SHIN HEAVY INDUSTRIES CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Deck Machinery, Hydraulic system, Serface Treatment
TEL : +82-51-832-0734

SHIN SHIN MACHINERY CO., LTD.
Head Office : Kijang-kun Busan
Homepage Add. : www.sspump.com
Main Products : Centrifugal Pumps, Gear Pumps, Screw Pumps
TEL : +82-51-727-5300

SHINWOO METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.shinwoometal.net
Main Products : Flange, Forging
TEL : +82-51-831-2830

SHIN YOUNG AIR CLUTCH.
Head Office : Gangseo-gu Busan
Homepage Add. : www.airclutch.co.kr
Main Products : SY-CB Type, SY-VC Type, SY-E Type
TEL : +82-51-831-7072

SILLA METAL CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.sillametal.com
Main Products : PROPELLER(F.P.P), C.PPROPELLER Blade & Hub
TEL : +82-51-831-5991

SIN HUENG FLANGE CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. :
Main Products : Flange for ship
TEL : +82-51-831-6167

SINWEOL GRATING CO., LTD.
Head Office : Sasang-gu Busan
Homepage Add. : www.steelgrating.net
Main Products : Steel Grating for Ship
TEL : +82-51-323-7000

SMS CO., LTD.
head office : Saha Gu Busan
homepage add : www.sms-marinesystem.com
main products : hatch-pontoon type, folding type, side rolling type, etc. lashing equipment-2/3tier
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SM POWER TEC CO., LTD.
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Homepage Add. : www.smpt.co.kr
Main Products : Vacuum Pump for Shipping Bldc, AC,DC Motor & Generator
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Main Products : Wall Panel, Celing Panel, Unit Toilet, Marin Door
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Homepage Add. :
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STASB CO., LTD.
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Homepage Add. :
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Main Products : SUS Pipe Fitting, SUS Bend
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Homepage Add. :
Main Products :
TEL : +82-55-541-2212

SUHHEUNG ENGINEERING CO., LTD.
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Homepage Add. : www.shge.co.kr
Main Products : Steel Grating
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Homepage Add. : www.sunboind.co.kr
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TEL : 82-51-831-8800

SUNG KWANG M/C.
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TEL : +82-51-831-0620

SUNGWON ELECTRIC CO.
Head Office : Gangseo-gu Busan
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Main Products : Cable Tray, Starter, Panel, Cable Way
TEL : +82-51-831-9230

SUNG WON ENTERPRISE. CO., LTD.
Head Office : Gangseo-gu Busan
Homepage Add. : www.sungwonent.co.kr
Main Products : V-Flow Swing Check, Valves, Manifold Unit
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U-YOUNG PRECISION IND. CO., LTD.
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Homepage Add. : u-nex.com/
Main Products : Elec/Hyd. Windless, Elec/Hyd, Winch, Steering Gear
TEL : +82-55-326-9691

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Main Products : Steering Gear, Deck Machinery, Auto Filter
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Homepage Add. : www.yoowonmtech.com
Main Products : Steering Gear, Windlass, Mooring winch
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Main Products :
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Homepage Add. : www.younginele.com
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Homepage Add. : www.ys-airsystem.co.kr
Main Products : Heat exchanger, Plant
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