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코마린
전시회 공식 매체

Special Report

COMPARISON OF COMPETITIVENESS OF KOREA, CHINA AND JAPAN IN GLOBAL SHIPBUILDING INDUSTRY

Contribution

WHEN SALVAGE BECOMES WRECK REMOVAL

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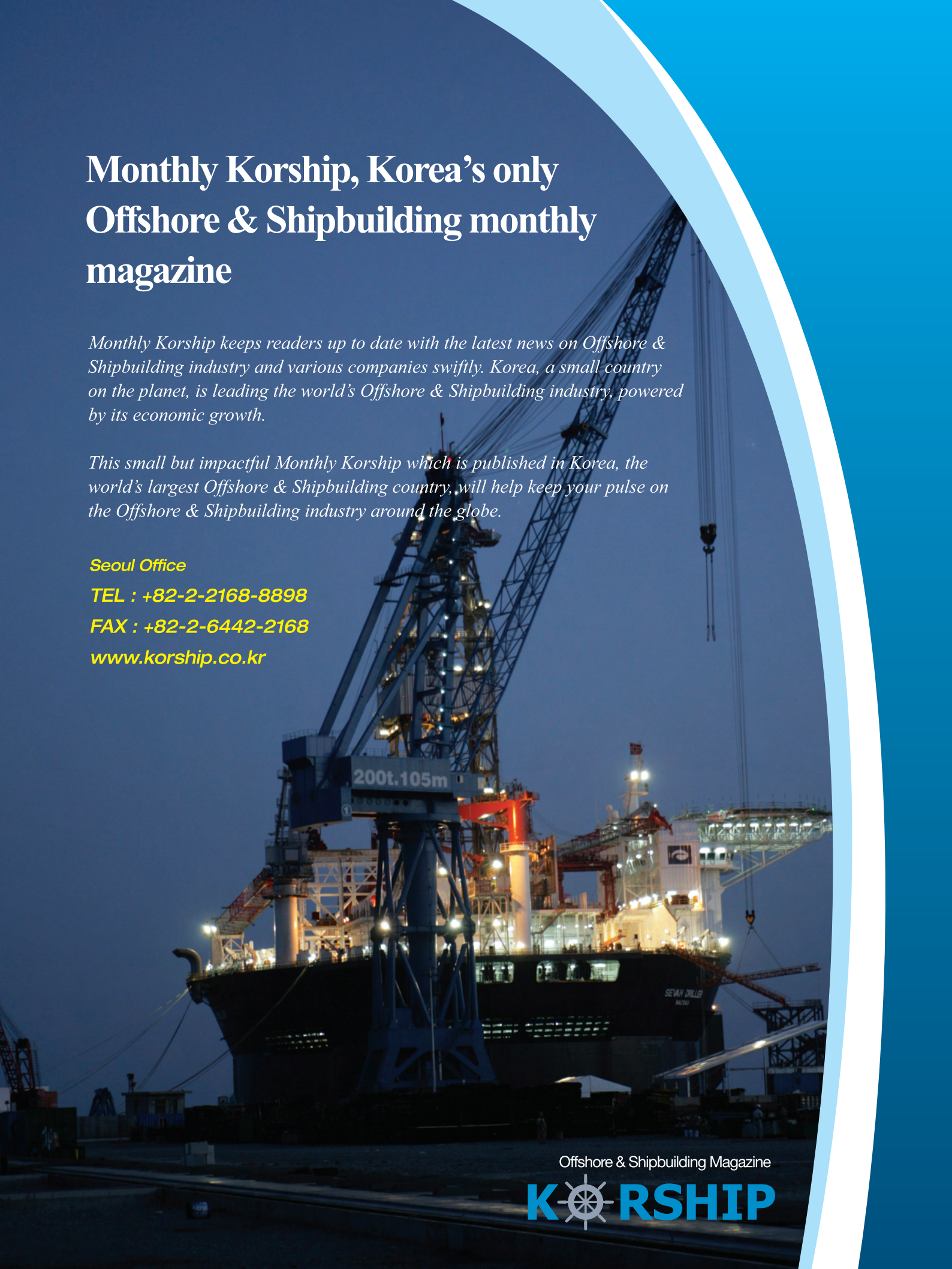
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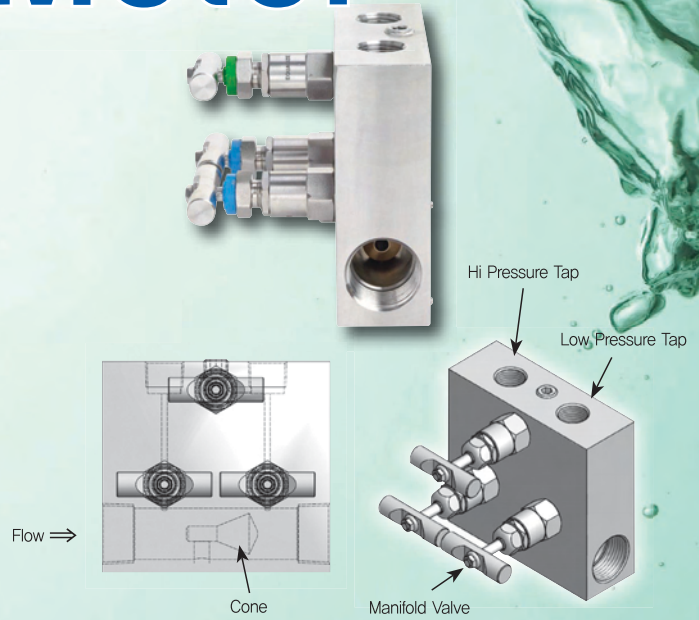
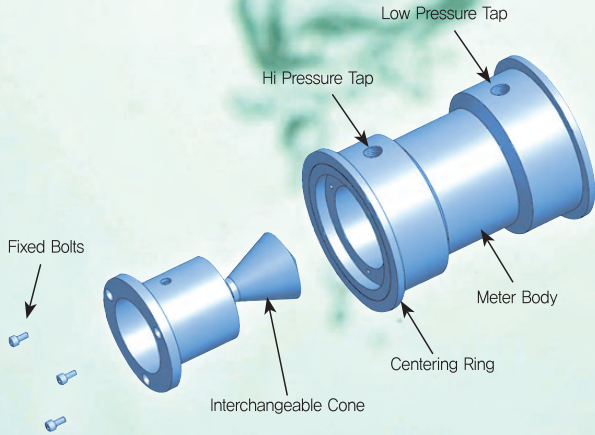
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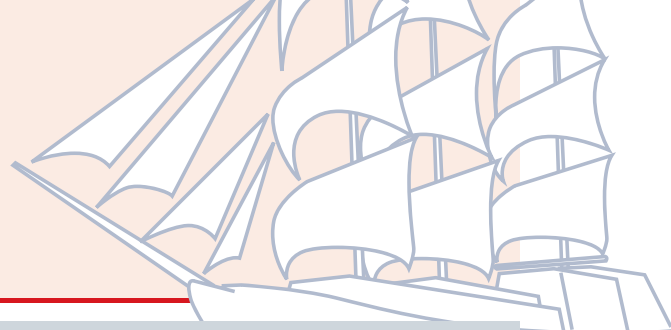
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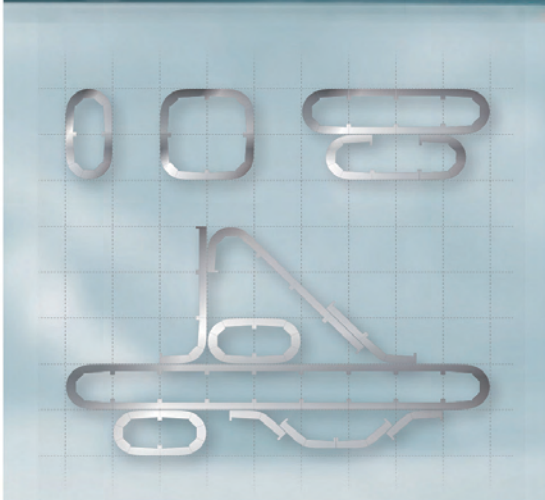
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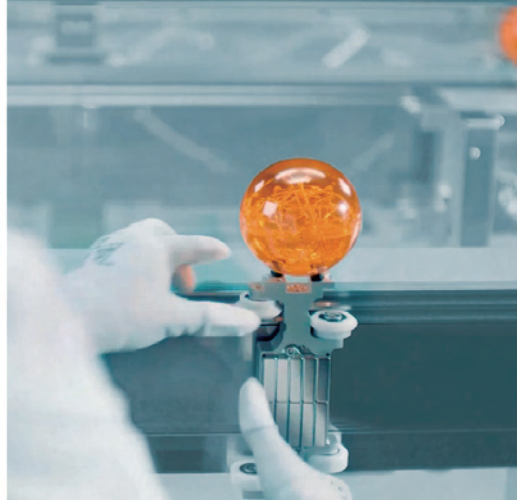
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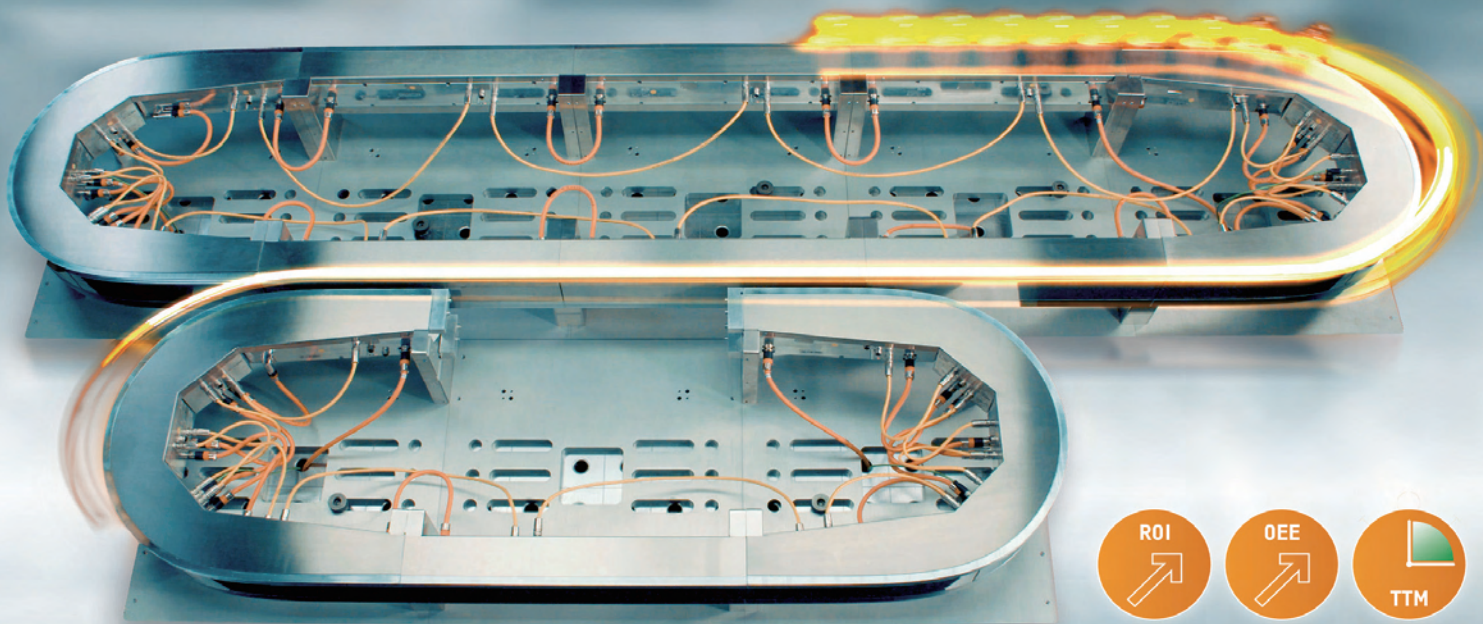


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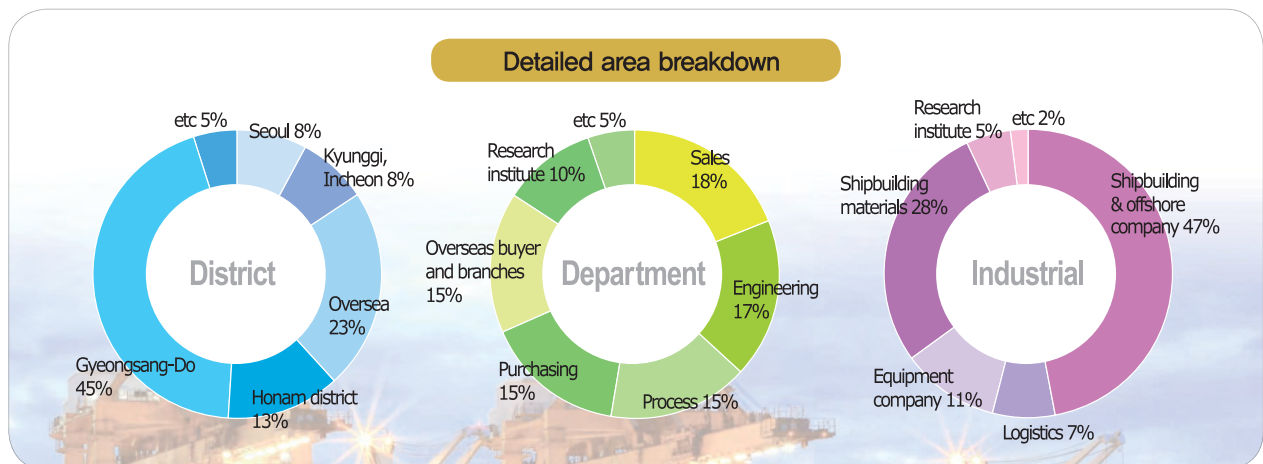
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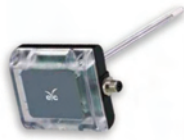
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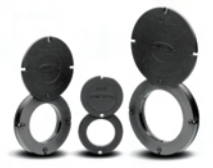
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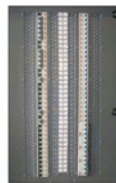
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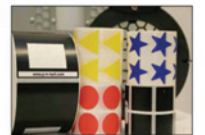
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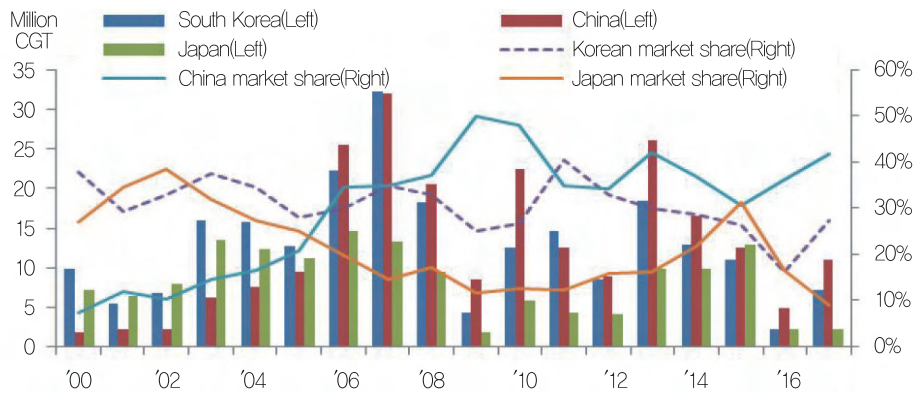


Comparison of competitiveness of Korea, China and Japan in global shipbuilding industry

*Institute of Industrial Technology Research
Seok Jong-hoon(Researcher), Kim Dae-jin(Researcher), Park Yoo-sang(Researcher)*

Korean shipbuilding industry is confronted with potential erosion of its competitiveness amid Chinese shipbuilding growth, fierce competition and restructuring worldwide. Current status and competitiveness of shipbuilding industry in Korea, China and Japan, which comprised 80% of global shipbuilding industry, were compared in an attempt to explore the measures for maintaining the competitiveness of domestic shipbuilding industry for upcoming period. For that, more than 100 surveys were performed in parallel with in-depth interviews of experts, including the officials from shipping companies, shipyards, domestic and overseas ship owners' supervisors, etc., along with literature study related to shipbuilding industry competitiveness.

The results showed that the competitiveness of China and Japan stood at 88 and 99, respectively, when the competitiveness of Korea was set to 100. Korean shipyards were found to have competitive advantage over Chinese and Japanese rivals for all vessel types excluding the bulk carrier and small and medium-sized tanker, the segments where price competitiveness would be important. Korean shipyards have strengths such as extensive shipbuilding experience, track records, excellent facilities, R&D, production capability, etc. However, Korean shipyards also have weakness such as lack of technology sharing among shipyards, brain efflux and skill drains in the midst of restructuring, vertical relationship between shipyards



<Fig. 1> New order intakes of Korea, China, and Japan

(Source: Clarkson)

and their subcontractors, high price tags of vessels, etc. China has strengths, such as continuous influx of workforce, improvement of technology and productivity, low labor cost, low ship price, etc., underpinned by the government support, but has weakness such as lack of R&D, technology, frequent errors, and low workmanship.

Japanese shipyards have strengths such as win-win structure among shippers, shipping companies, and shipyards, high competitiveness of equipment sector, strong price competitiveness achieved by production of standardize vessels, but have weakness such as drain of manpower, sluggish investment in facilities, etc. Korean shipbuilding industry has maintained technology level on a par with that of Japan and outstripped China. Due to the structural problems of China (inadequate designing capability at the site under integrated designing system, low labor productivity, and inefficient management system), Korean shipyards are expected to maintain competitiveness for the time being.

For competitive advantage of Korea, the following 4 recommendations can be presented:

First, joint R&D system needs to be established across the shipbuilding industry. Second, intelligent shipbuilding system (K-Yard project) needs to be introduced to strengthen price competitiveness. Third, shipbuilding

industry workforce pool needs to be maintained to attract the manpower with key capability such as ship designing. Finally, co-growth of related industries needs to be pushed forward by expanding the private-sector and government consultative bodies for shipbuilding and shipping.

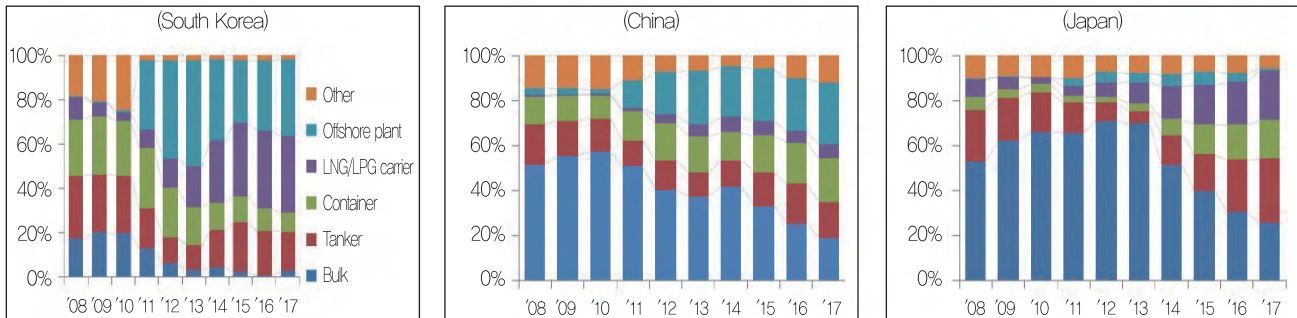
I . Current status of characteristics of shipbuilding industry of Korea, China, and Japan

1. Current Status

(1) Share of Order Intake: Korea 30.7%, China 30.1%, Japan 21.0% (averaged for the period between 2000 and 2017)

Korea has maintained 30% of share in global new orders over the last years, except 2016. China saw a surge in new orders until 2009, while Japan experienced constant decline in new orders until 2011, followed by rebound and subsequent decline.

(2) Order backlogs of Korean shipyards consist primarily of high value-added vessels (LNG carrier, etc.), while those of Chinese and Japanese shipyards are comprised main-



<Fig. 2> Share of order backlog by type in Korea, China, and Japan (based on amount)

(Source: Clarkson)

ly of basic vessel types(bulk carrier, etc.). Korean shipyards have seen an increasing share of off-shore plants and LNG carriers and a diminishing share of containerships and bulk carriers in their order backlogs. Meanwhile, Chinese shipyards have seen a declining share of bulk carriers and a rising share of high-priced vessels such as offshore plants and containerships in their order backlogs. Japanese shipyards have seen a sliding share of bulk carriers and an increasing share of LNG carriers, containerships, and tankers in their order backlogs.

2. Characteristics

(1) Korea: It is home to many of the world's largest shipyards. However, Korea has seen a lack of government support and weak cooperation between shippers and shipping companies, compared to China.

Korea's three domestic shipbuilding heavyweights have the world's unrivalled technology, productivity, manpower, and facilities, while many small and medium-sized shipyards of Korea have been outstripped by Chinese shipyards armed with strong price competitiveness. Korean government is placing the focus of its policy on restructuring, rather than providing support, since its WTO dispute with the European Union(EU) in 2002. Korean shipyards are receiving very little external support, unlike shipyards in rival countries.

(2) China: Government-led growth of shipbuilding industry and weak spontaneous competitiveness

As government support is essential for maintaining competitiveness, Chinese shipyards have not seen their competitiveness strengthened spontaneously.

Chinese shipyards are accumulating shipbuilding experience and technology, buttressed by consistent support from the government and swift decision-making, while making massive investment to acquire technology as quickest as possible.

(3) Japan: Weakened industrial foundation due to intensive restructuring; formation of maritime industry ecosystem(long-term cooperative relationship with shippers and shipping companies); strong competitiveness of marine equipment and materials industry, underpinned by standardization of ship models

Intensive restructuring was carried out, such as closure of large-scale docks, dismissal of technology development/design workforce, etc., under the first and second rationalization measures in 1970s and 1980s. Japan also experienced aging of workforce, broken link of technology, and degradation of quality. Furthermore, Japan maximized the design and production efficiency based on stable domestic demand, long-term cooperative relationship with shippers, shipping companies, financial firms and trading corporations, and development of standardized ship models.

As traditional technology powerhouse, Japan has strong potential and world's unrivalled competitiveness in marine equipment and material industry.

II. Comparison of shipbuilding industry competitiveness among Korea, China and Japan

1. Method and results of survey

(1) Method: Comparison of technology gap among Korea, China, and Japan in terms of competitiveness by element and ship type based on questionnaire survey and interview with experts

① Items of survey: Technology, production, price and other elements for 5 vessel types(bulk carrier, tanker, containership, LNG/LPG carrier, offshore plant) were surveyed as follows:

<Table 1> Specific items of evaluation by technology, production, price and other elements

Type	Specific items of evaluation
Technology	R&D capability, design level, design flexibility, mileage, failure rate
Production	Productivity, skillfulness, delivery
Price	Newbuilding price competitiveness, pre-owned vessel price competitiveness
Others	After-sale service, brand image

② Method of survey: Current competitiveness was examined through questionnaire survey of officials in concerned industry and interview with experts

- Survey period: From November 2017 to July 2018

- Targets: Questionnaire survey of 105 officials in concerned industry and interview with 42 experts(14 persons from shipyards, 11 ship owners' supervisors, 6 officials

from ship management companies, 6 officials from classification societies, and 2 persons from academic societies)













(2) Results: Korea has competitive advantage in technology/production elements and high value-added vessels, while China has competitive advantage in price elements and low value-added vessels such as bulk carriers. Meanwhile, Japan has competitive advantage in production/price elements and bulk carriers.

① Competitiveness by element: Korea has competitive advantage in technology/production elements, and China has competitive advantage in price. Meanwhile, Japan has competitive advantage in production, price and other elements.

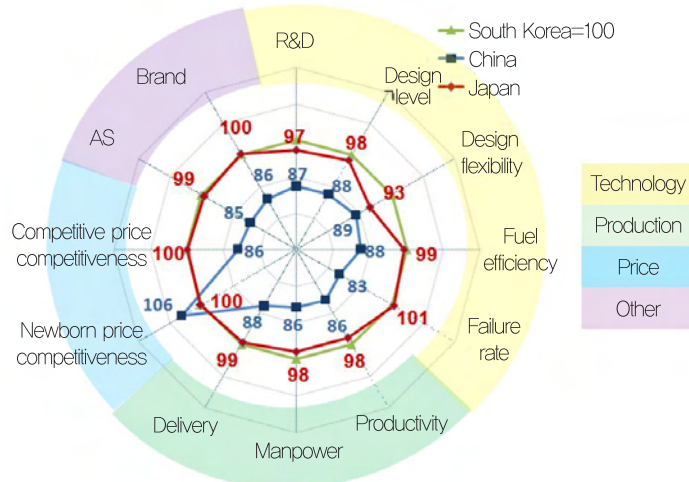
② Competitiveness by vessel type: Korea has competitive advantage in VLCC, ultra-large containerships, LNG carriers and offshore plants, while China has competitive advantage in bulk carriers and small and medium-sized tankers. Japan is as competitive as Korea in bulk carriers.

③ Technology gap: China was found to be 5.2 years behind Korea in terms of technology.

<Table 2> Comparison of competitiveness by element

Division	Predominance		
Technology	 >	 >	
Production	 ≥	 >	
Price	 >	 ≥	
Other	 ≥	 >	

(Note: ' > ' competitive advantage, ' ≥ ' equally competitive / slightly higher competitive advantage)



<Fig. 3> Scores by items of evaluation

(Note: Competitiveness scores by item: 100 for Korea, 88 for China, and 99 for Japan(average score by item))

<Table 3> Comparison of competitiveness by vessel type

Division	Predominance		
Bulk		>	\geq
Tanker		\geq	>
Container		>	\geq
LNG/LPG carrier		>	\geq
Offshore plant		>	\geq

(Note: '>' competitive advantage, ' \geq ' equally competitive / slightly higher competitive advantage)

2. Competitiveness by element

(1) Technology

① **R&D capability:** Korea has accumulated the R&D track records and technologies. China is imitating the technologies of developed countries. Japan has excellent technol-

ogy in equipment and material sectors.

Korea has excellent technical workforce, accumulated R&D experience and design capability, but has seen no sharing of technology among shipyards and has less competitiveness in equipment sector, compared to Japan. Furthermore, Korean shipyards have experienced a diminishing capability to develop new technology amid sluggishness in the market and are not supported adequately by government compared to China and Japan.

In the meantime, Chinese shipyards enjoy generous support from the government, which has led to greater availability of engineers, but have not gone beyond imitation of technologies of developed countries and have insufficient independent R&D capability.

Japan has promoted joint research among private-sector companies, government and research institutes, and is a world's leader in technology, particularly, for equipment sector. However, Japan has a diminishing capability to cope with new technologies and a declining R&D capability amid shrinkage of shipbuilding sector, lack of workforce and standardization of ship models.

<Table 4> Scores in technical evaluation by item

Type	Korea	China	Japan
R&D capability	100	87	97
Design level		88	98
Design flexibility		89	93
Mileage		88	99
Failure rate		83	101
Average	100	87	98

(Note: Lower score on failure rate means higher frequency of failure.)

② **Design level:** Korea has the highest level of design ability. China has insufficient independent design capability and errors occur repeatedly. Japan has insufficient design ability for vessels other than standard vessel type.

Korea has accumulated design skill, experience, and ability to cope with design for new vessel types, but has seen brain efflux and skill drains of professional design workforce, resulting in leakage of technologies to China. Meanwhile, China has seen an expansion of design capability for basic ship types while Chinese government is providing support to state-run design companies. However, Chinese shipyards do not have adequate design capability which makes it difficult to reflect characteristics of each shipyard, and same errors have been recurring. Japan has long history, design workforce with extensive track record and accumulated data. However, Japanese shipyards have little incentive to make inroads into new markets and have a lack of design capability for vessels other than standardized ship models.

③ **Design flexibility:** Korean shipyards excel in product quality, but do not respond well to customers. Chinese shipyards make errors frequently. Japanese shipyards have encountered significant difficulty with design alteration, etc. Korean shipyards have excellent design capability and superiority in quality, but tend not to respond to the demands of ship owners and maintain high-handed atti-

tude, causing complaint among ship owners' supervisors, and focus on demanding payment of additional costs.

Meanwhile, Chinese shipyards, which make errors frequently and have a lack of confidence in design quality, tend to respect the opinion of ship owners and respond actively to their demands. However, Chinese shipyards rarely reject the demands of ship owners even when they are beyond their ability, leading to confusion in decision-making. Japanese shipyards are responding actively to improvement of standardized ship types but tend to be excessively prudent in design alteration.

(2) Production

<Table 5> Scores in production evaluation by item

Type	Korea	China	Japan
Productivity	100	86	98
Skillfulness		86	98
Delivery		88	99
Average	100	86	98

(Note: Lower score on failure rate means higher frequency of failure.)

① Korean shipyards have the unmatched productivity and facilities Chinese shipyards have inadequate capability for software. Japanese shipyards have achieved high productivity based on construction of identical ship models.

Korean shipyards have the unparalleled facility capability, process control capability, block production capability, and excellent technical craftsmen. However, Korean shipyards are experiencing stagnation in production technology improvement, along with difficulty with technology transfer due to brain efflux and skill drains in the wake of restructuring. Leading Chinese shipyards have excellent facility capability, but have inadequate capability for process control, low dock turnover rate and outfitting rate, etc. Small and medium-sized shipyards in China also have



inadequate capability for facilities and software aspects. Japanese shipyards have achieved high productivity while producing the vessels of identical models with low rate of errors. However, Japanese shipyards are not responding actively to aging of facilities and investment due to the strategy to maintain status quo.

② Skillfulness: Korean shipyards, which once had many skilled workers, have seen reduction in skilled workforce in the aftermath of restructuring. Chinese shipyards are seeing degradation of skillfulness of workforce due to increased turnover rate. Meanwhile, Japanese shipyards have seen low rate of technology transfer due to aging. Korean shipyards have experienced a reduction in skilled workforce due to restructuring, which has resulted in imbalance in demand and supply of workforce, degradation of skillfulness, discontinuation of technology transfer. Chinese shipyards are pressing ahead with improvement of workforce skillfulness, bolstered by government support, but are facing difficulty in raising the level of skillfulness due to lifelong job security, low loyalty and high turnover rate. Meanwhile, Japanese shipyards are experiencing a vacuum of workforce due to failure to attract workforce during certain period(from 1980 to 1995) despite presence of highly skilled workforce, which has resulted in lack of technology transfer, along with significant variation in skill level for construction of vessels other than standardized ship models.

③ Labor cost: Korean shipyards have the higher labor cost than Chinese and Japanese shipyards. Chinese shipyard have relatively low labor cost, but has witnessed a significant increase in labor cost. Japanese shipyards have competitive advantage over Korean shipyards when productivity, etc., are taken into consideration. Wage level in Korea is about 4 times higher than that in China, and is

similar to that in Japan. The wage level is about 1/4 of the wage level in Korea(1/5 when mandatory insurance premium is excluded). However, Chinese shipyards have seen a skyrocketing increase in labor cost although productivity remains low. China has inefficient labor management system where promotion and wage level are determined by relationship and membership of communist party, rather than competency. Japan is considered to have excellent wage system, compared to that of Korea and China, when labor productivity, labor culture, production quality, etc., are taken into account, although wage level in Japan is similar to that in Korea.

④ Korean shipyards have excellent workforce, but have experienced degradation of labor and management relationship and diminishing preference. Chinese shipyards have attracted excellent workforce constantly, but have rarely seen workers taking the initiative. Japanese shipyards have excellent workforce and labor culture, but are confronted with the issue of aging workforce. Korean shipyards have excellent workforce, but is seeing a decline in preference rating due to degradation in labor and management relationship and tendency to avoid difficult works. Amid restructuring, Korean shipyards have seen a decreasing motivation and increasing rigidity in their hierarchical systems. Chinese shipyards are very likely to achieve improvement in work capability if they attract excellent workforce constantly and introduce proper manpower management system. However, Chinese shipyards have recently experienced a sharp decline in preference rating and shown passive attitude in works. Meanwhile, Japanese shipyards have excellent workforce and labor culture, such as positive attitude, strong commitment, high workmanship, compliance with regulations and strong community spirit. However, Japanese shipyards have been affected by aging of manpower and are recruiting

workforce from South East Asian countries, except for some large shipyards.

⑤ Relationship with subcontractors: Korean shipyards maintain the relationship of top dog underdog. Chinese shipyards maintain horizontal relationship between direct-run shipyards and subcontractors. Japanese shipyards maintain partnership relationship with subcontractors. Korean shipyards have seen the degradation of ship quality which can be attributed to the relationship of top dog underdog and low-price contracts, and are using the subcontractors as a shield from retrenchment of workforce on regular payroll. Furthermore, Korean shipyards are confronted with the issues of degraded employment stability and diminishing wage which resulted in decreased motivation for work. Chinese shipyards are maintaining stable quality, bolstered by undisrupted transfer between direct-run shipyards and subcontractors, high productivity of subcontractors, and flexibility in contract execution with subcontractors. Japanese shipyards maintain the highest quality based on the culture where subcontractors are regarded as partners and constantly cooperative relationship with subcontractors.

(3) Price

<Table 6> Scores in price evaluation by item

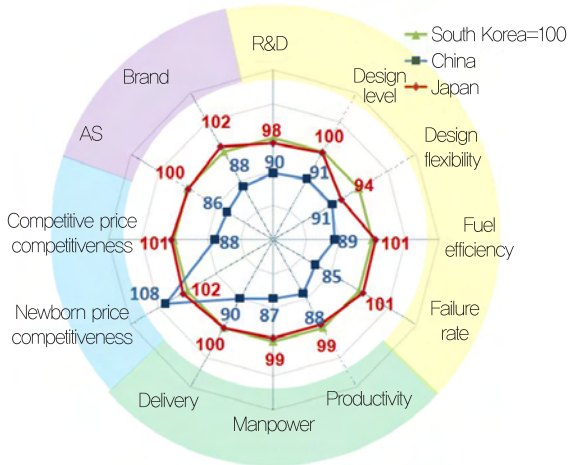
Type	Korea	China	Japan
Newbuilding vessel price competitiveness	100	106	100
Pre-owned vessel price competitiveness		86	100
Average	100	96	100

① Newbuilding vessel price competitiveness: Korean shipyards have maintained excellent quality for prices, while Chinese shipyards have strong price competitiveness. Japanese shipyards have solid price competitive-

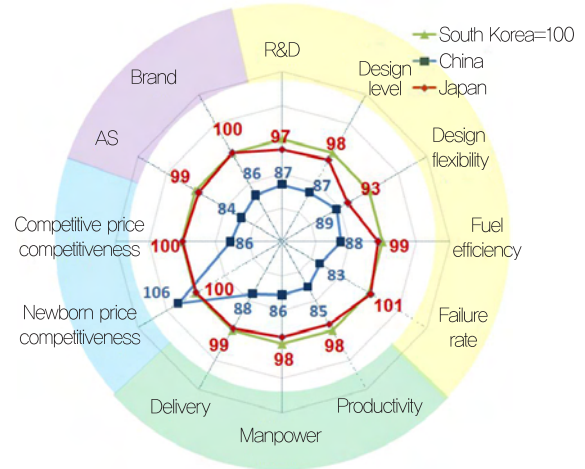
ness for basic ship types.

Korean shipyards have maintained superb quality for prices. Ship owners operating the fleets directly have preference for vessels built at Korean shipyards. However, optimal prices are difficult to be set due to excessive competition among the nation's three shipbuilding heavyweights. For basic newbuilt vessel types such as bulk carriers, Chinese shipyards offer prices at least 10% cheaper than the vessels built at Korean shipyards. However, most ship owners put greater emphasis on ship price than operating cost due to constraints such as ship financing. As a result, Chinese shipyards have competitive advantage in basic vessel types. Japanese ship owners reduce the designing cost based on standardized vessel types and have low motivation for low-price contracts due to the culture of order placement at domestic shipyards, and focus on bulk carriers characterized by less fluctuation of demand. Moreover, Japanese shipyards are building up price competitiveness based on repetitive designing and economy of scale.

② Pre-owned vessel price competitiveness: Korean shipyards have stood out for excellent mileage of pre-owned vessels. Chinese shipyards have shown the problem of inadequate durability of vessels. Japanese shipyards have maintained excellent durability and convenience of maintenance at the same time. Korean shipyards have kept both mileage and quality at high level with fuel efficiency being at least 20% higher compared to that of vessels built at Chinese shipyards. Although Korean shipyards put an emphasis on fuel efficiency, vessels built at Korean shipyards are considered to be inferior to those built at Japanese shipyards in terms of durability and maintenance convenience. Vessels built at Chinese shipyards have lower durability and quality, which make the pre-owned vessels of China priced lower than those built at



<Fig. 4> Score of bulk carriers by element



<Fig. 5> Score for tankers by element

Korean and Japanese shipyards. Japanese shipyards have maintained excellent durability and convenience of marine equipment and perfect consistency between vessels and design drawings which has almost prevented occurrence of problems such as oil leakage, corrosion or bending of external steel plate, etc., and further strengthened competitive advantage of pre-owned vessels.

(4) Others

<Table 7> Scores in other evaluations by item

Type	Korea	China	Japan
After-sales service	100	85	99
Brand image		86	100
Average	100	85	100

① After-sales service: Korean shipyards have kept failure rate low. However, there is no ship repair yard in Korea. Chinese shipyards have faced the problems of frequent failure and difficulty in parts supply. Japanese shipyards have maintained excellent durability of equipment. Korean shipyards have maintained low failure rate and provided excellent after-sales service. However, there is no repair yard across Korea. Chinese shipyards are confronted with the problem of frequent failure and difficulty

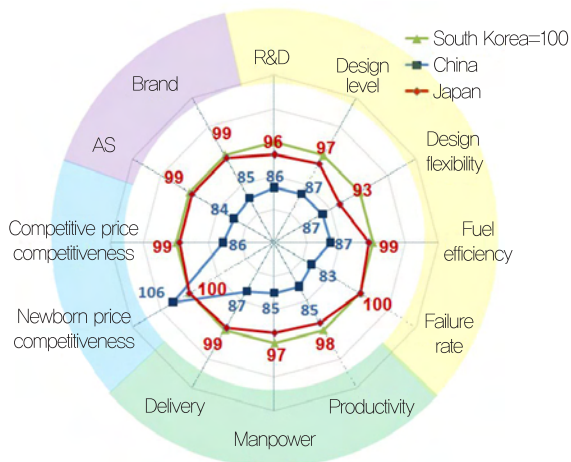
with parts supply and after-sales service. Meanwhile, Japanese shipyards have maintained excellent durability of equipment and convenience of repair.

② Brand image: Korean shipyards have maintained high productivity. Chinese shipyards have seen frequent failure. Japanese shipyards have maintained excellent durability. Korean shipyards have maintained excellent quality for prices, along with high productivity, which has resulted in good brand image. Chinese shipyards have faced the problems of frequent failure, low quality, inadequate after-sales service, which has led to low brand image. Meanwhile, Japanese shipyards have maintained high brand image based on excellent durability, convenience of maintenance, and strong reliability of quality.

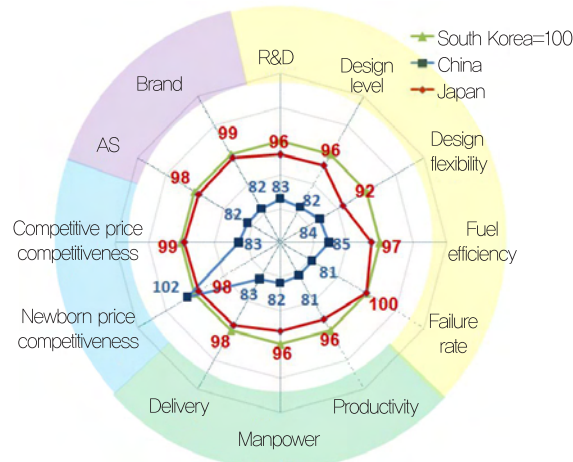
3. Competitiveness by ship type

(1) Bulk carriers

Korean shipyards have lower competitiveness than Chinese and Japanese shipyards. Chinese shipyards have advantage in price competitiveness and have captured the largest share of the market. Japanese shipyards have competitive advantage in price and quality, but



<Fig. 6> Score for containerships by element



<Fig. 7> Score for LNG/LPG carriers by element

receive shipbuilding orders based on the practice of domestic order placement.

(2) Tankers

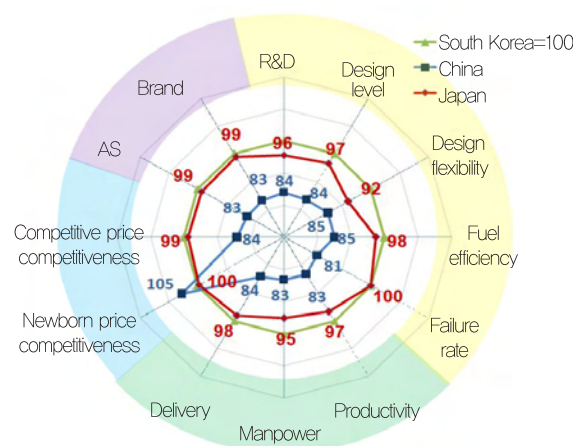
Korean shipyards have weaker competitiveness in small and medium-sized tanker segment and strong competitiveness in VLCC segment. Chinese shipyards have weaker competitiveness in VLCC segment and strong competitiveness in small and medium-sized tanker segment. Meanwhile, Japanese shipyards that rely on domestic order placement have a slightly weak competitiveness.

(3) Containerships

Korean shipyards have competitive advantage in ultra-large containership segment, while Chinese shipyards have competitive advantage in small and medium-sized containership segment. Meanwhile, Japanese shipyards, which depend on domestic order placement, have weak competitiveness.

(4) LNG/LPG Carriers

Korean shipyards have competitive advantage in technology, quality, etc., while Chinese shipyards focus on small-

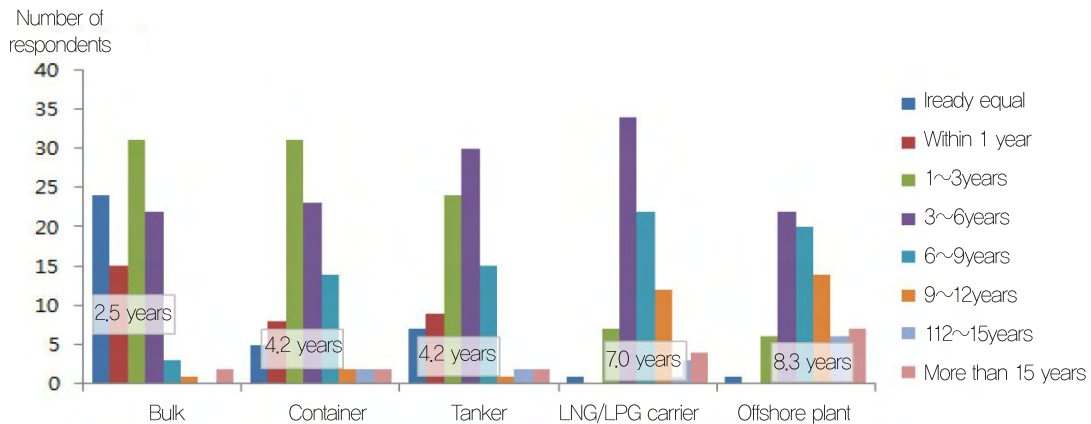


<Fig. 8> Score for offshore plants by element

sized LPG carriers and LNG carriers ordered domestically. Japanese shipyards are focusing on small-sized LPG carriers and have weak competitiveness in LNG carriers.

(5) Offshore plants

All the three countries do not have strong competitiveness, but Korean shipyards have shown relatively strong competitiveness. Chinese shipyards have competitive advantage in small-scale FPSO and offshore support vessels for offshore plants. Japanese shipyards have weak competitiveness due to lack of experience in the construction.



<Fig. 9> Technology gap between Korea and China by vessel types

(Note: Median value of each section was used. For example, 4.5 years were applied for 3-6 years. For 15 years or more, however, 20 years were applied.)

4. Technology gap between Korea and China

Korean shipyards have competitive advantage over Chinese shipyards in the technology for high value-added vessels. Chinese shipyards are considered to be about 5.2 years on average behind Korean shipyards for overall types of vessel. Specifically, Chinese shipyards are 2.5 years behind for bulk carriers, 4.2 years behind for containerships, 4.2 years behind for tankers, 7.0 years behind for LNG/LPG carriers, and 8.3 years behind for offshore plants.

III. Conclusion

1. Korean shipbuilding industry is expected to maintain competitiveness in the period ahead with strong performance in the fields of ultra-large containerships, VLCC, LNG/LPG carriers, offshore plants, etc. Korea is keeping the large technology gap for ultra-large containerships, VLCC, LNG/LPG carriers, offshore plants, etc., and is expected to remain competitive for the time being based on efforts focusing on technology, production, reduction of

price gap, etc. Chinese shipyards have not further strengthened their competitiveness due to structural problems, and as a result, the gap is expected to be maintained, unless overall system is innovated.

<Reference> Limitation arising from structural problems of Chinese shipyards

- Inadequate designing capability at the site under integrated designing system
 - Lack of independent development capability; imitation of ship types of developed countries
 - Occurrence of same errors (absence of on-site error feedback system)
- Sluggish improvement of labor productivity
 - Employment system that prevents long-term service at companies (permanent employment for those hired twice or working for more than 10 years continuously)
 - High turnover rate due to lack of loyalty
- Inefficient management system
 - Sluggish improvement of software, such as manpower, process, and precision management, compared to improvement in facilities

2. Establishment of joint R&D system and intelligent ship construction system; maintenance of core technical workforce pool; expansion and promotion of private-sector and

government consultative bodies for shipbuilding and shipping, which are necessary for Korean shipyards to maintain competitiveness

(1) Establishment of joint research and development system

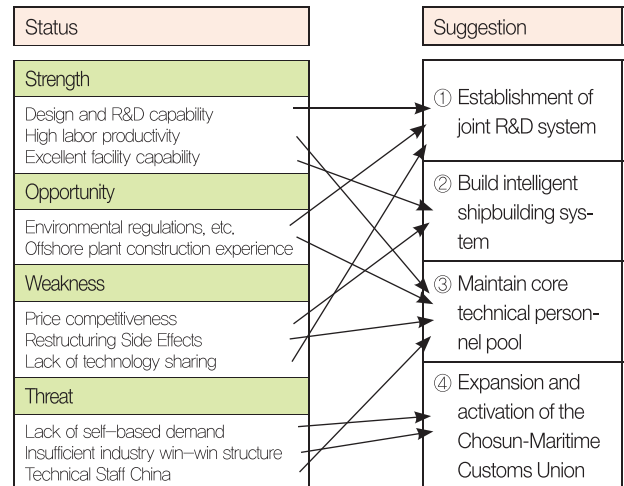
- Sharing the joint R&D outcomes and research results, mitigating excessive competition, and reducing R&D costs through expansion and restructuring of ship/offshore plant research institutes
- R&D support and technology transfer by ship/offshore plant research institutes, etc., for development of strategic ship types of small and mid-sized shipyards
- Cost reduction through joint R&D on standardization and modularization of marine equipments, and product development

(2) Establishment of intelligent shipbuilding system (Smart k-yard) → 10% cost-reduction target

- Establishment of intelligent shipbuilding system based on ICT technology, big data, and deep learning to create a breakthrough for improvement of currently stagnant productivity → 10% cost-reduction target
- Recovery of price competitiveness for basic vessel types ordered in large quantity, such as bulk carriers, tankers, containerships, etc.

(3) Maintenance of core technical workforce pool

- Prevention of design and technical workforce vacuum which arises from ongoing large-scale restructuring; prevention of workforce and skill drain to rival countries
- Recruitment of excellent technical manpower by ship/offshore plants research institutes; publication of white papers on offshore plants, etc.; management of technical



<Fig. 10> Recommendations for maintenance of competitiveness

workforce database; maintenance of network

(4) Establishment of win-win structure by expanding and promoting private-sector and government consultative bodies for shipbuilding and shipping

- Volumes of domestic shippers → Transportation by domestic shipping companies → Ship financing by domestic financial institutions → Shipbuilding at domestic shipyards → Insurance coverage by Korean insurance companies; establishment of circulatory structure of advance deposit into accounts
- Encouraging financial institutions to participate in private-sector and government consultative bodies for shipbuilding and shipping
- Establishment of control tower to prevent low-price contracts arising from excessive competition and to maintain optimal facility capability
- Establishment of win-win structure through mutual equity purchase among shippers, shipping companies and shipyards with extra funds generated during the boom period



한·중·일 조선산업 경쟁력 비교

산업기술리서치센터 석종훈 연구위원/김대진 연구위원/박유상 연구위원

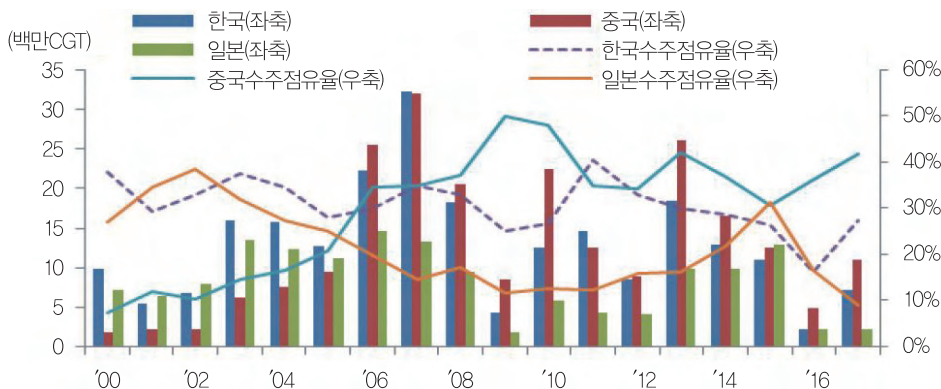
국내 조선산업은 중국의 성장과 세계 시장의 경쟁심화, 조선업 구조조정 등으로 경쟁력 약화가 우려되고 있다. 세계 조선업의 80%를 차지하는 한·중·일의 조선산업 현황 및 경쟁력 비교를 통해 향후 국내 조선산업의 경쟁력 유지 방안을 모색하였다. 이를 위해 조선산업 경쟁력 관련 문헌 조사 및 해운사, 조선소, 국내·외 선주감독관 등의 전문가 심층 인터뷰와 100여건 이상의 설문조사 등을 수행하였다.

조사 결과 한국 조선산업 경쟁력을 100으로 볼 때, 중국 88, 일본 99 수준이며, 선종별로는 가격경쟁력이 중요한 벌크선과 중소형 탱커선을 제외한 모든 선종에서 한국이 중·일 대비 경쟁력 우위를 유지하고 있는 것으로 나타났다.

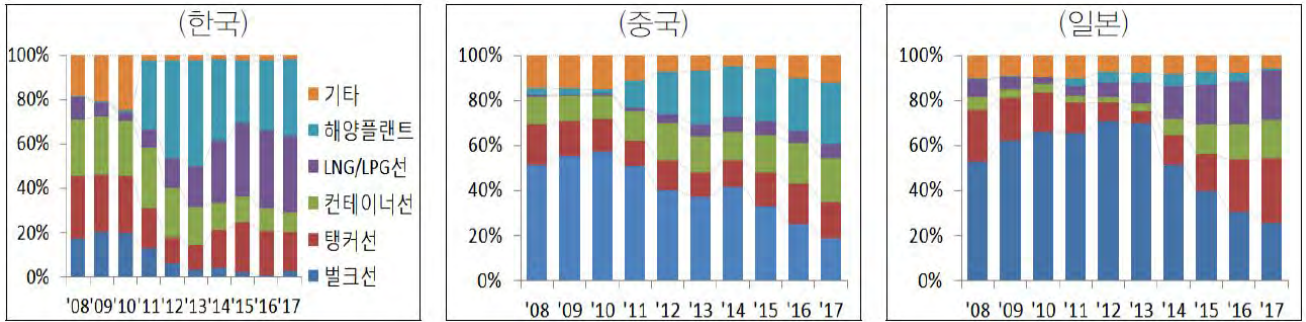
국가별 장단점을 살펴보면, 한국은 최다 건조경험, 건조설비와 인력, R&D 및 생산능력 등은 우수하였으나, 조선시간 기술공유 부족, 구조조정으로 인한 인력이탈, 협력업체간 갑을관계, 높은 선가 등이 단점으로 나타났다.

중국은 정부지원 하에 인력 지속유입, 기술 및 생산성 개선, 저렴한 인건비, 낮은 선가 등이 강점이나, R&D와 기술력 부족, 오류 빈번, 낮은 숙련도가 단점이다. 일본은 화주·해운사·조선사간의 상생 구조, 높은 기자재경쟁력, 표준선박 생산에 따른 가격경쟁력은 우수하나, 인력 이탈, 설비투자 부진 등이 단점으로 나타났다. 한국 조선산업은 일본 대비 대등한 기술수준, 중국 대비 기술우위를 유지하고 있으며, 중국의 구조적 문제(통합설계에 따른 현장 설계능력 부진, 낮은 노동생산성, 비효율적 관리시스템) 등으로 당분간 경쟁력 우위가 지속될 것으로 보인다.

한국의 경쟁력 우위를 유지하기 위한 4가지 제언은 다음과 같다. 첫째 조선산업 전반의 공동연구 개발체계 구축, 둘째 가격경쟁력 확보를 위한 지능형 선박건조시스템(K-Yard 사업) 도입, 셋째 선박설계 등 핵심적인 능력을 보유한 조선산업 인력풀 유지, 마지막으로 조선해운 민관 협의체 확대를 통해 관련 산업 동반성장 추진 등이 필요할 것으로 판단된다.



(그림1) 한·중·일 수주 현황 (출처: 클락슨)



〈그림2〉 한·중·일 선종별 수주잔량 비중(금액 기준)
(출처: 클락슨)

I. 한·중·일 조선산업 현황 및 특성

1. 현황

(1) 수주점유율: 한국 30.7%, 중국 30.1%, 일본 21.0%(’00~’17년 평균)
한국은 ’16년을 제외시 30% 내외 수주점유율 유지, 중국은 ’09년까지 수주점유율 크게 증가 후 정체, 일본은 ’11년까지 지속 감소 후 반등했으나 다시 하락세이다.

(2) 자수주잔량: 한국은 고부가선종(LNG선 등), 중국·일본은 기본 선종(벌크선 등) 위주

한국은 해양플랜트 및 LNG선의 비중이 증가하고 있으며, 컨테이너선과 벌크선의 비중은 감소세를 보이고 있다. 한편, 중국은 벌크선의 비중이 감소하고, 해양플랜트와 컨테이너선 등 고가선종의 비중이 증가세를 보이고 있으며, 일본 역시 벌크선의 비중은 감소하고 있으나 LNG선과 컨테이너선, 탱커의 비중이 증가세를 나타냈다.

2. 특성

(1) 한국: 세계 최상위 조선사 다수 보유, 중국 대비 정부 지원 부족, 화주·해운사와 협력관계 부족

국내 대형 3사는 세계 최고 수준의 기술력·생산성·인력·설비를 보유하고 있으나, 중소형 조선사는 중국과 가격경쟁력에 밀려 상당수가 퇴출됐다. 정부는 2002년 EU의 WTO제소 분쟁 이후, 지원보다 산업 구조조정 차원에서 정책 시행중이며, 경쟁국과 달리 외부 지원 미미한 것으로 평가받고 있다.

(2) 중국: 정부 주도의 조선산업 육성으로 자생적 경쟁력 취약
경쟁력의 절대적인 부분을 정부 지원이 차지하여 자생적 경쟁력이 취약한 편이다. 정부의 일관된 지원정책과 빠른 판단으로 건조경험과 기술력을 지속적으로 축적하고, 대규모 자원을 투입하여 기술체득 시간을 단축 중에 있다.

(3) 일본: 고강도 구조조정으로 산업 기반 약화, 해상 산업 생태계(화주·해운사와 장기적인 협력관계) 구축, 선형 표준화로 조선기자재 및 소재산업 경쟁력 보유

1970~80년대 1차·2차 합리화 조치를 통하여 대형도크 폐쇄, 기술개발·설계인력 퇴출 등 고강도 구조조정을 단행했으며, 인력고령화·기술단절·품질하락을 경험했다. 또한, 안정적 내수물량 확보, 화주·해운사·금융·종합상사와 장기적인 협력관계 구축, 표준선형을 개발하여 설계·생산효율성을 극대화했다. 전통적 기술 강대국으로 잠재력이 우수하며, 조선기자재와 소재산업의 경쟁력이 세계 최고 수준이라고 할 수 있다.

II. 한·중·일 조선산업 경쟁력 비교

1. 조사 방법 및 결과

(1) 방법: 설문조사와 전문가 인터뷰를 통해 요소별, 선종별 경쟁력, 한·중 간 기술격차 연수를 비교

① 조사항목: 5개 선종별(벌크선·탱커선·컨테이너선·LNG/LPG



선·해양플랜트) 기술·생산·가격·기타 요소를 아래와 같이 세분하여 조사

〈표1〉 기술·생산·가격·기타 요소별 세부 평가 항목

구분	세부 평가 항목
기술	R&D 능력, 설계수준, 설계유연성, 연비, 고장률
생산	생산성, 인력숙련도, 납기
가격	신조 가격경쟁력, 중고 가격경쟁력
기타	AS(사후 서비스), 브랜드 이미지

② 조사방법: 업계관계자 설문조사와 전문가 인터뷰를 통해 경쟁력 현황 조사

- 조사기간: 2017.11월~2018.7월

- 대상: 업계관계자 105명 설문조사, 전문가 42명(조선사 14명, 선주 감독관 11명, 선박관리회사 6명, 한국선급 6명, 학계 2명 등) 인터뷰

(2) 결과: 한국은 기술·생산 요소와 고부가 선종에서 우위, 중국은 가격 요소와 벌크선 등 저부가 선종에서 우위, 일본은 생산·가격 요소와 벌크선에서 우위

① 요소별 경쟁력: 한국은 기술·생산·기타 항목에서 모두 우위, 중국은 가격에서 우위, 일본은 생산과 가격, 기타항목에서 한국과 대등

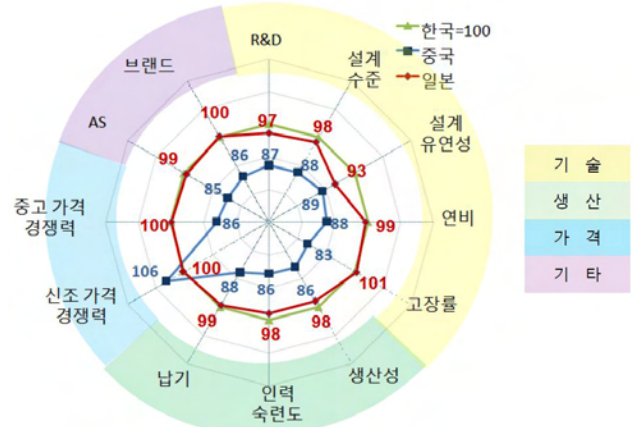
② 선종별 경쟁력: 한국은 VLCC2)·초대형컨테이너선·LNG선·해양플랜트에서 우위, 중국은 벌크선·중소형 탱커선에서 우위, 일본은 벌크선에서 한국과 대등

③ 기술격차: 한국과 중국 간 기술격차는 5.2년으로 조사

〈표2〉 요소별 경쟁력 비교

구분	우위
기술	한국 > 일본 > 중국
생산	한국 ≧ 일본 > 중국
가격	중국 > 일본 ≧ 한국
기타	한국 ≧ 일본 > 중국

(주: ‘>’ 우위, ‘≧’ 대등·소폭 우위)



〈그림3〉 세부 평가 항목별 점수

(주: 세부 요소별 경쟁력은 한국 100, 중국 88, 일본 99(항목별 점수 평균))

〈표3〉 선종별 경쟁력 비교

구분	우위
벌크선	중국 > 한국 ≧ 일본
탱커선	중국 ≧ 한국 > 일본
컨테이너선	한국 > 중국 ≧ 일본
LNG/LPG선	한국 > 일본 ≧ 중국
해양플랜트	한국 > 중국 ≧ 일본

(주: ‘>’ 우위, ‘≧’ 대등·소폭 우위)

2. 요소별 경쟁력

(1) 기술

① R&D능력: 한국은 축적된 R&D 및 기술력 보유, 중국은 선진국 기술을 모방하는 수준, 일본은 기자재 기술력 우수
한국은 우수 기술인력·축적된 R&D 경험·기술력·설계능력 보유하였으나, 조선소간 기술공유 없는 경쟁적 풍토와 일본 대비 기자재 경쟁력이 열위에 있으며, 시황부진으로 신기술 개발 여력이 하락했고, 중일 대비 국가지원이 부족한 실정이다.

한편, 중국은 다수의 엔지니어 배출 및 국가 주도 기술개발 여건이 우수하나, 선진국 기술 모방 수준에 머물고 있으며 자체적 R&D 능력이 미흡한 상황이며, 일본은 민·관·연 공동연구 풍토를 조성하고, 기저 기술력이 우수한 세계적 기술강국이나, 조선 부문 축소·인력부족·표준선형 기반 등으로 신기술 대응능력과 R&D능력이 하락한 실정이다.

〈표4〉 기술 세부 평가 항목별 점수

구분	한국	중국	일본
R&D능력	100	87	97
설계수준		88	98
설계유연성		89	93
연비		88	99
고장률		83	101
평균	100	87	98

(주: 고장률은 점수가 낮을수록 고장 발생 의미)

② 설계수준: 한국은 최고 수준 설계능력 보유, 중국은 자체 설계능력 미비하고 오류 반복, 일본은 표준선형 외 설계능력 열위
한국은 축적된 설계기술과 경험, 신선행 설계대응능력 보유하였으나, 구조조정으로 고급 설계인력이 다수 이탈하며, 중국으로 기술을 유출했다.

한편, 중국은 국영 설계업체 지원 및 기본선종 설계수준이 향상되고 있으나, 조선소 자체설계능력 미비로 조선소별 특성을 반영하기 어렵고 동일한 오류를 반복하고 있다. 일본의 경우, 오랜 역사와 고경력 설계인력, 축적된 데이터를 보유하고 있으나, 자국 물량 위주로 신규 시장 진출의 유인이 부족하고, 표준선형 외 설계능력이 열위인 상황이다.

③ 설계유연성: 한국은 품질 우수하나 미흡한 고객응대, 중국은 오류 빈번, 일본은 설계변경 등이 매우 어려움
한국은 설계유연성과 품질우수하나, 선주의 요구를 무시, 가르치려고 하는 고압적 태도에 선주감독관의 불만족하는 편이며, 추가 비용요구에 치중하고 있다.

한편, 중국은 잦은 설계오류와 설계품질에 대한 확신 부족으로 선주 의견을 존중하고 적극적으로 대응하나, 오류가 빈번하고 조선소 역량을 초과하는 선주요구에도 무조건 가능하다고 하여 의사결정에 혼란을 유발하고 있으며, 일본의 경우에는 표준선형 개선시에는

적극적으로 대응하나, 설계변경시 매우 어렵고 지나치게 신중하게 대응하는 편이다.

(2) 생산

〈표5〉 생산 세부 평가 항목별 점수

구분	한국	중국	일본
생산성	100	86	98
인력숙련도		86	98
납기		88	99
평균	100	86	98

(주: 고장률은 점수가 낮을수록 잦은 고장 발생 의미)

① 생산성: 한국은 최고수준의 생산성과 설비 보유, 중국은 소프트웨어 측면 미흡, 일본은 동일 선형 건조로 높은 생산성
한국은 최고 설비능력과 공정관리 능력, 블록제조 역량, 기술장인 등을 보유하고 있으나, 구조조정에 따른 인력 유출로 기술전수 단절 및 생산기술 개선 부분에서 정체를 보이고 있으며, 중국의 경우에는 상위조선소 설비능력 우수하나, 공정관리·도크회전율·선행의장율 등 소프트웨어 측면 부족하고, 하위조선소는 설비 및 소프트웨어 부분이 모두 미흡한 실정이다. 그리고 일본은 동일 선형 연속·반복 생산으로 오작률이 낮고 생산성이 높으나, 현상유지 전략으로 설비 노후화, 투자에 소극적인 모습을 보이고 있다.

② 인력숙련도: 한국은 숙련 인력 다수 존재했으나 구조조정으로 감소, 중국은 잦은 이직으로 숙련도 저하, 일본은 고령화로 기술 전수 미흡
한국은 숙련도 높은 인력이 다수였으나, 구조조정으로 숙련 인력 감소로 인력불균형·숙련도 저하·노하우 전수단절 등의 문제가 발생하고 있으며, 중국은 정부 주도로 인력의 숙련도 향상을 추진하고 있으나, 평생직장 개념과 충성도가 낮아 잦은 이직으로 숙련도 상승이 미흡한 실정이다. 한편, 일본은 고숙련 인력은 건재하나, 일부 시기(80~95년) 인력 유입되지 않아 인력 공동화로 기술 승계가 미흡하고, 표준선 이외의 선박에 대한 숙련도의 편차도 큰 편이다.

③ 인건비: 한국은 중·일 대비 높은 수준, 중국은 인건비 낮은 수준이나 크게 상승세, 일본은 생산성 등 감안 시 한국 보다 우위
한국은 급여수준이 중국 대비 약 4배로 일본과 유사한 수준이며,



중국은 한국의 1/4 수준(법정보험료 제외시 1/5)으로 저렴하나, 생산성이 낮고 인건비가 크게 상승하고 있는 추세다. 능력보다 관계, 공산당원 여부 등에 따라 급여와 승진기회가 결정되는 불합리한 인사 시스템을 가지고 있다. 한편, 일본은 급여는 한국과 유사하나, 노동생산성, 노동문화, 생산 품질 등을 종합적으로 감안 시 중국이나 한국에 비해 우수한 것으로 평가받고 있다.

④ 인력수준 및 노동문화: 한국은 인력의 질 우수하나 노사관계가 낙후, 조선소 선호도 하락, 중국은 우수인력 지속 유입되나 수동적 업무, 일본은 인력과 노동문화 수준 높으나 고령화 심화

한국은 인력의 질이 우수하나, 노사관계 낙후, 힘든 업무를 기피하는 풍토로 조선소 선호도가 하락하고 있는 추세이며, 구조조정으로 사기저하 심화, 경직적 위계질서를 보이고 있다. 중국의 경우에는 우수인력의 지속적인 유입, 적절한 인력관리 시스템 도입 시 업무능력 개선 가능성이 높으나, 최근 조선소 선호도가 급속한 하락 추세이며, 수동적 업무태도를 보이고 있다. 한편, 일본은 업무 열정·태도·장인정신·규정 준수·공동체 의식 등 인력과 노동문화 수준이 높으나, 고령화 심화 및 일부 대형 조선소 제외하고 인력난으로 동남아 인력을 수입중이다.

⑤ 협력업체 관계: 한국은 협력업체와 갑을관계, 중국은 직영과 협력업체간 상대적 수평적 관계, 일본은 파트너 관계 유지

한국은 협력업체간 갑을관계, 저가발주로 인한 선박품질 하락, 협력업체를 정규직 구조조정의 방패막으로 이용, 고용안정성 하락 및 임금삭감 등으로 근로의욕이 저하된 상황이며, 중국은 직영과 협력업체간 이직 일반화, 협력업체 생산성 높은 수준, 협력업체에 대한 유연한 계약 가능하여 안정적인 품질을 유지하고 있다. 그리고 일본의 경우에는 협력업체를 파트너로 생각하고, 지속적인 협력관계를 유지하여 품질 수준 최상을 보이고 있다.

(3) 가격

〈표 6〉 가격 세부 평가 항목별 점수

구분	한국	중국	일본
신조 가격경쟁력	100	106	100
중고 가격경쟁력		86	100
평균	100	96	100

① 신조가격 경쟁력: 한국은 가격대비 품질 우수, 중국은 가격경쟁력 탁월, 일본은 기본선종 가격경쟁력 우수

한국은 가격 대비 품질이 우수하고, 직접 운항할 선주는 한국 선박을 선호하나, 중국뿐 아니라 한국 대형 3사간 과잉경쟁으로 적정 가격을 요구하기 어려운 상황이며, 중국은 벌크선 등 기본 선종 신조가격이 한국 대비 10% 이상 저렴하나, 선박금융 등 제약으로 운영비 보다 선가를 중시하는 선주가 다수이므로 기본 선종의 경쟁력이 우위를 보이고 있다. 일본의 경우에는 표준선박으로 설계비 절감하고, 자국발주문화로 저가수주 유인 낮으며, 수요 변동성이 적은 벌크선에 집중하고 있다. 그리고 반복설계 및 규모의 경제로 가격경쟁력을 확보중이다.

② 중고가격 경쟁력: 한국은 중고선 연비 품질 우수, 중국은 내구성 미흡, 일본은 내구성과 관리 편의성 우수

한국은 연비 및 품질이 우수하고, 중국선박 대비 20% 가량 높은 수준이며, 연비를 중시하는 환경이 조성되었으나, 내구성과 관리 편의성은 일본보다 열위인 것으로 평가되고 있다. 중국의 경우에는 내구성 등 품질 차이로 중고가격 한·중·일 중 최저 수준이며, 일본은 관리 편의성, 조선기자재 내구성이 우수하고 설계와 선박이 완벽히 일치하며, 운항 중 기름 유출, 부식, 외판 굴곡 등 문제 발생 적어 중고선가에서 우위를 나타내고 있다.

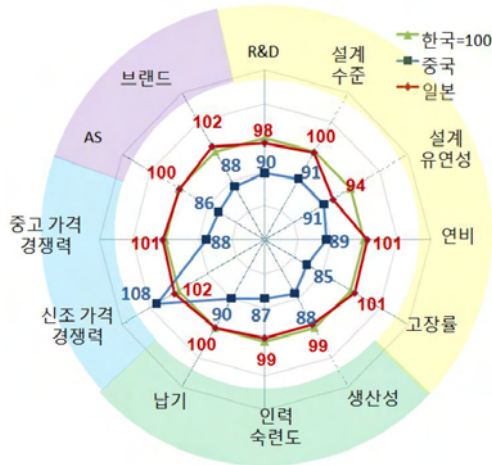
(4) 기타

<Table 7> Scores in other evaluations by item

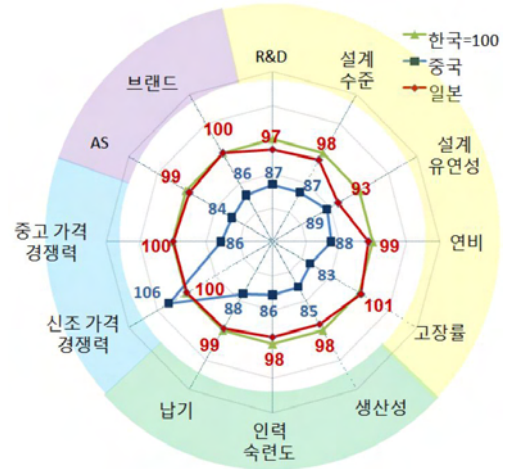
구분	한국	중국	일본
AS(사후서비스)	100	85	99
브랜드 이미지		86	100
평균	100	85	100

① AS: 한국은 고장률 낮으나 수리조선소 부재, 중국은 잦은 고장과 부품수급의 어려움, 일본은 기자재 내구성 우수

한국은 고장률이 낮고, AS 양호하나 수리조선소가 부재한 실정이며, 중국은 잦은 고장, 부품 수급과 AS가 어려운 상황이다. 한편, 일본은 기자재 내구성이 우수하고, 수리가 용이한 편으로 평가되고 있다.



〈그림4〉 벌크선 요소별 평가 점수



〈그림5〉 탱커선 요소별 점수

② 브랜드 이미지: 한국은 높은 생산성, 중국은 잦은 고장, 일본은 내구성

한국은 가격 대비 품질이 우수하고, 높은 생산성으로 브랜드 이미지가 양호한 편이며, 중국은 잦은 고장, 낮은 품질, 사후서비스 미흡 등으로 브랜드 이미지 낮은 편이다. 그리고 일본의 경우에는 내구성 우수, 관리 용이, 품질에 대한 강한 신뢰로 브랜드 이미지가 높은 편에 속한다.

3. 선종별 경쟁력

(1) 벌크선

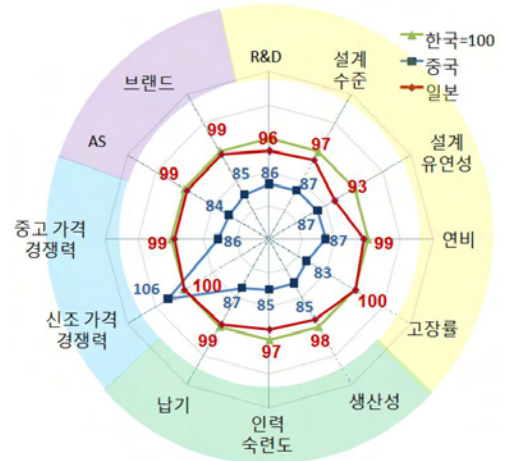
한국은 중일 대비 경쟁력이 열위이며, 중국은 가격경쟁력에서 우위를 보이고, 점유율이 가장 높다. 일본은 가격·품질이 우위이나, 자국 발주 위주이다.

(2) 탱커선

한국은 중소형 탱커선 열위·VLCC 우위, 중국은 중소형 탱커선 우위·VLCC 열위를 보이고 있다. 한편 일본은 자국 발주 위주로 소폭 열위인 상황이다.

(3) 컨테이너선

한국은 초대형 컨테이너선이, 중국은 중소형 컨테이너선이 경쟁 우위이다. 한편, 일본은 자국 발주 위주로 열위를 나타내고 있다.



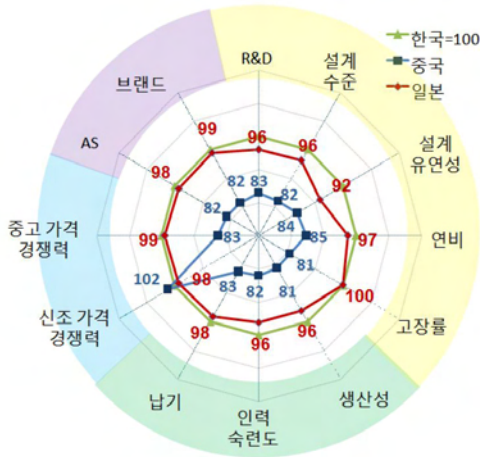
〈그림6〉 컨테이너선 요소별 평가 점수

(4) LNG/LPG선

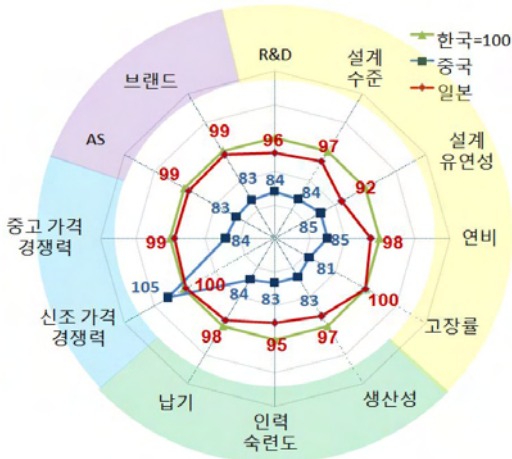
한국은 기술·품질 등 모든 항목이 우위이며, 중국은 소형 LPG선과 자국 발주 LNG선 위주이다. 일본의 경우에는 소형 LPG선 위주와 LNG선이 열위이다.

(5) 해양플랜트

3국 모두 미흡하나, 한국이 상대적 우위를 보이고 있다. 중국은 소형 FPSO·해양플랜트지원선에서 우위를 나타내며, 일본은 건조경험 부족으로 열위인 상황이다.



〈그림7〉 LNG/LPG선 요소별 평가 점수



〈그림8〉 해양플랜트 요소별 평가 점수

4. 한국·중국 기술 격차

한국은 중국대비 고부가 선종에 대한 기술 우위를 가지고 있으며, 전체 선종의 평균 약 5.2년의 기술 격차가 존재하는 것으로 조사됐다. 벌크선 2.5년, 컨테이너선 4.2년, 탱커선 4.2년, LNG/LPG선 7.0년, 해양플랜트 8.3년으로 나타났다.

III. 결론

1. 한국 조선산업은 초대형 컨테이너선·VLCC·LNG/LPG선·해양플

랜트 등을 중심으로 향후에도 당분간 경쟁력을 유지할 것으로 전망
한국은 초대형 컨테이너선·VLCC·LNG/LPG선·해양플랜트에서 큰
기술격차를 유지 중이며, 기술·생산 개선 노력과 가격격차 축소 등
으로 인해 향후에도 당분간 경쟁력 유지 가능할 것으로 예상되고
있다. 중국은 구조적 문제로 인한 한계로 경쟁력 상승폭이 크지 않
은 바, 전반적인 시스템이 혁신되지 않는 한, 격차가 유지될 것으로
추정되고 있다.

〈참고〉 중국의 구조적 문제로 인한 한계

1. 통합 설계에 따른 현장 설계능력 부진
 - 독자 개발 능력 부족, 선진국 선형 모방
 - 동일 오류 반복 발생 (현장 오류 피드백 시스템 부재)
2. 노동생산성 향상 부진
 - 장기근속이 불가능한 고용시스템(연속 2번 고용 또는 연속 10년 이상 근무 시 종신고용 의무)
 - 로열티 부족으로 인한 높은 이직률
3. 비효율적 관리시스템
 - 설비 수준 향상에 비해, 인력·공정·정도 관리 등 소프트웨어 개선 부진

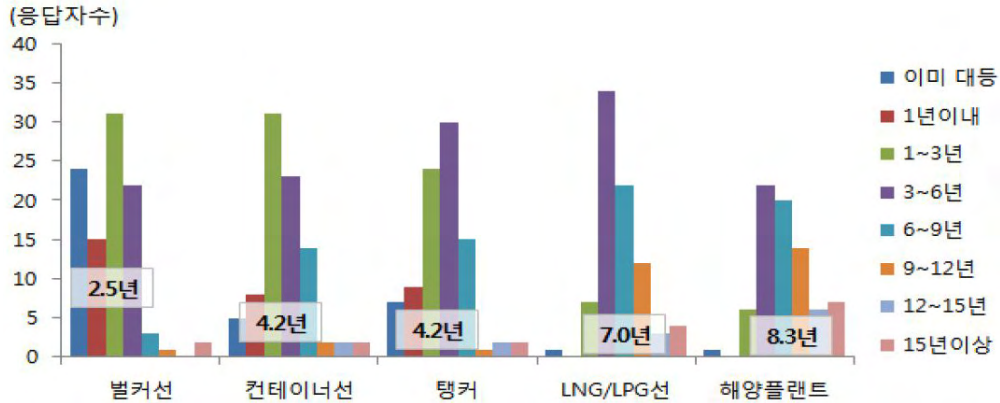
2. 한국 조선업 경쟁력 유지를 위해 공동 연구개발 체계 구축, 지능형 선박건조 시스템 구축, 핵심 기술인력 풀 유지, 조선·해운 민간 협의체 확대 및 활성화 필요

(1) 공동 연구 개발 체계 구축

- 선박해양플랜트연구소의 확대 개편을 통해 공동 연구개발 및 연구 성과 공유, 과다 경쟁관계 완화 및 연구개발비 절감
- 중소조선사의 전략선종 육성을 위해 선박해양플랜트연구소 등에서 R&D 지원, 기술 이전
- 선박기자재 표준화, 모듈화 공동 연구 및 제품 개발을 통한 원가 절감

(2) 지능형 선박건조시스템 구축(스마트 k-yard) → 원가 10% 절감 목표

- 답보상태인 생산성 개선 돌파구 마련 위해 ICT기술·빅데이터·딥러닝을 활용한 지능형 선박건조시스템 구축 → 원가 10% 절감



〈그림9〉 한국과 중국 선종별 기술격차

(주: 각 구간의 중간값 사용, 예를 들어 3~6년은 4.5년. 단 15년 이상은 20년으로 적용)

목표

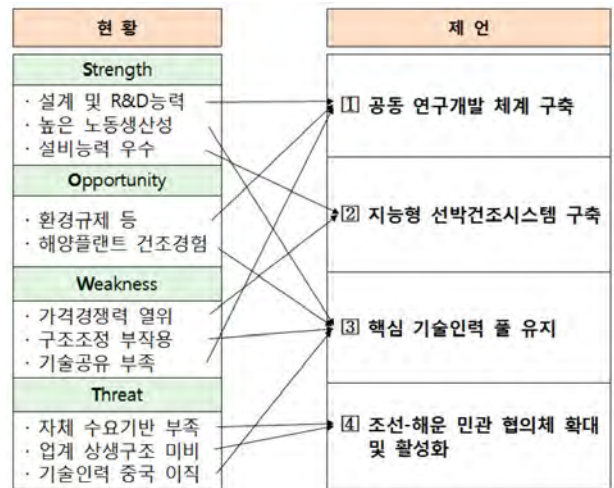
- 벌크선, 탱커선, 컨테이너선 등 발주량이 많은 기본선종 시장에 대한 가격경쟁력 회복

(3) 핵심 기술 인력풀 유지

- 대규모 구조조정 지속으로 인한 설계인력 및 기술인력 공백, 경쟁국으로 인력 및 기술 유출 방지
 - 우수 기술인력을 선박해양플랜트 연구소로 흡수, 해양플랜트 등 백서발간, 기술 인력 데이터베이스 관리, 네트워크 유지

(4) 조선-해운 민관 협의체 확대 및 활성화를 통한 상생구조 구축

- 자국 화주 물량 → 자국 해운사 운송 → 자국 금융기관 선박금융 제공 → 국내조선사 건조 → 한국 보험사 부보, 한국선급 입급의 순환구조 구축
 - 조선-해운 민관 협의체에 금융기관 참여 유도
 - 과잉 경쟁으로 인한 출혈 수주 방지, 적정 설비능력 관리할 수 있도록 컨트롤 타워 구성
 - 호황기 여유자금으로 화주·해운사·조선소간 상호지분 매입을 통한 상생 구조 정립



〈그림10〉 경쟁력 유지를 위한 제언

ClassNK Archive Center(NKAC) stores the first IMO GBS Ship Construction Files of NACKS-built VLCC



ClassNK Archive Center(NKAC) has stored the first Ship Construction Files(SCF) complying with IMO Global Based Standards(GBS) for the NACKS-built 311,000 DWT VLCC delivered on 26 October 2018, managed by MOL Tankship Management(Asia) Pte. Ltd.

To encourage design transparency and help ensure safety throughout the life of vessels, SOLAS regulation II-1/3-10 entered into force in 2012, requiring SCF complying with IMO GBS to be provided by shipyards on a new ship's delivery and kept on board and/or ashore. The SCF provides the vessel design and construction information needed to ensure the safety of the ship throughout its operational life. The regulations are applicable to bulk carriers and oil tankers of 150m or more in length for which building contracts have been placed on or after 1 July 2016. In the absence of a building contract, the regulations apply to keels laid on or after 1 July 2017, or delivery made on or after 1 July 2020.


According to the SCF guidelines, this information must be stored on board. Other information, including the high-level intellectual property (IP) drawings belonging to the shipyards such as the yard plan, lines and detailed structural calculations, is kept confidential and does not need to be carried on board.

To supplement the regulation, the Industry Standard was also developed by cross-industry groups including the Shipbuilders' Association of Japan (SAJ) and other organizations such as CANSI, CESA, KOSHIPA, SCA, ICS, INTERCARGO, INTERTANKO, BIMCO, OCIMF and IACS.

NKAC, launched in 2016, is a world-first onshore digital archive

center that fully complies with IMO-GBS requirements and the Industry Standard. To ensure confidentiality of intellectual property (IP), shipbuilders can set the desired IP security levels for each drawing. High IP-level drawings such as the lines plan are only stored ashore in NKAC and, as a rule, the shipowner is required to ask NKAC for permission to access these files. NKAC then notifies the IP-holder (shipbuilder and/or equipment manufacturer) of the request for their permission.

The shipowner can also access the onboard SCF via the internet 24/7, 365 days a year. Electronic access to all SCF documents stored on board is logged by the operating system and recorded at the end of each session for secure storage, with the access log being encrypted and accessible only by the shipowner.

NKAC simplifies the storage of important files by offering a paperless, user-friendly way to manage drawings, thus enabling effective communication between shipbuilders, shipowners and ship management companies by bringing them all under one umbrella and providing a central resource through which files can be exchanged. Speaking on the occasion, Dr. Toshiro Arima, ClassNK Corporate Officer, Director of Rule Development and ICT Division said, "ClassNK is pleased to store the first GBS-SCF data in its NKAC storage two years after launching the service. I would like to extend my appreciation to NACKS not only for their decision to outsource their important data storage to NKAC, making it the world's first GBS-SCF stored in an onshore datacenter, but also for their cooperation in providing an online system trial and demonstration. I wish to further draw the industry's attention to this IMO requirement as ClassNK is ready to provide secured, convenient, and viable solutions for improving safety". 

Thordon offers guidance to ship owners on VGP 3.0 delay

Thordon Bearings has advised its customers with newbuilds under construction to make sure they have the necessary documentation in place permitting operations in US waters prior to 18th December 2018. The advice follows the 10th October announcement by the US Environmental Protection Agency that the 2013 Vessel General Permit, due to expire in December 2018, will now be administratively continued till at least March 2019, when an updated version, VGP 3.0, will be introduced.

"The delay in introducing VGP 3.0 means that operators of existing

vessels looking to operate in US waters for the first time, or newbuilds with a keel laid after 18th of December 2018, must file a Notice of Intent (NOI) before this date if they are to be covered by the existing VGP 2.0," said Jeffrey Butt, Thordon Bearings' Business Development Manager -



Marine. Currently, more than 61,000 US-flagged commercial vessels and some 8000 foreign flagged vessels require a Vessel General Permit to safeguard US waters against operational oil pollution from oil to sea interfaces.

“Shipowners operating our COMPAC seawater lubricated propeller shaft bearings will never be flagged for stentube-related oil pollution, but a VGP remains a legal requirement. A significant number of our customers have newbuilds nearing completion and they will need to submit their NOIs to the EPA soonest if they are to operate in US waters. There is not much time,” said Butt.

Recent owners operating Thordon’s COMPAC water-lubricated propeller shaft bearings include Matson, Tropical Shipping, Lomar, MSC Cruises, Alaskan Ferries, Polsteam, and Groupe Desgagnés.

The EPA stipulates that all US-operating vessels must use an approved Environmentally Acceptable Lubricant in all oil-to-sea interfaces and has singled out water, in particular, as the optimum sterntube lubrication solution for eliminating the discharge of oil to the marine environment.

Thordon Bearings representatives are available to advise shipowners how water-lubricated bearing systems can guarantee compliance with current and anticipated Vessel General Permit requirements. 



Lomonosov Prospect, a new-generation LNG-fuelled Aframax tanker, successfully completes a voyage along Northern Sea Route



On 30 October 2018 at 23:59 Moscow time, Lomonosov Prospect, Sovcomflot’s large-capacity tanker using LNG fuel as its primary fuel, successfully completed a commercial voyage along the Northern Sea Route (NSR) to deliver a cargo of petroleum products from the Republic of Korea to Northern Europe.

The high-latitude voyage from Cape Dezhnev at Chukotka to Cape Zhelaniya of the Novaya Zemlya archipelago took the Arc4 vessel 7.8 days to complete, during which the tanker covered a distance of

2194 nautical miles.

During the voyage, the crew successfully tested the operation of the ship engines and controls of the fuel systems using LNG, as well as the operation of navigation equipment and machinery in ice conditions and sub-zero temperatures.

The successful voyage has confirmed the vessel’s high manoeuvrability and icebreaking capabilities, as well as being a highly safe, environmentally friendly and efficient vessel.

The tanker travelled almost the entire NSR without any icebreaker escort, having covered some 950 nautical miles in ice conditions. She was escorted by Atomflot’s nuclear-powered icebreaker Taimyr only when traversing the most


navigationally and hydrographically challenging area of the Ayon ice massif in the East Siberian Sea.

The tanker’s Master was Dmitry Belozarov, a captain with extensive high-latitude navigation experience. In 2010, Dmitry Belozarov served as Chief Officer on Sovcomflot’s tanker SCF Baltica – the first-ever large-capacity vessel to complete a transit voyage along the NSR. The results obtained during that experimental voyage provided the foundation for developing marine transportation solutions

for major industrial projects in the Arctic, such as Yamal LNG and Novy Port.

During the voyage, the crew was bolstered with the addition of a second Master/ice advisor, whose extensive experience was very

helpful both during the preparations for and throughout the voyage itself.


At the moment, the vessel is proceeding towards her destination port. 

MacGregor signs Letter of Intent on strategic cooperation with CSSC

MacGregor and China State Shipbuilding Corporation (CSSC) have signed a Letter of Intent (LOI) on strategic cooperation. The LOI was signed on 29 October, 2018 at an executive level meeting in Beijing led by Lei Fanpei, the CSSC Chairman and Michel van Roozendaal, MacGregor President.

MacGregor sees that this cooperation will further strengthen its presence in Asia and specifically in China, the world's biggest shipbuilding market. CSSC is a very important partner for MacGregor, as it is the primary shipbuilding group in China and well positioned as a global leader in the industry.

The LOI relates to MacGregor's planned acquisition of the marine and offshore businesses of TTS Group and future cooperation potential between the two groups. The acquisition is subject to regulatory approvals in China, Germany and South Korea, and MacGregor is expecting to receive these approvals by the end of 2018.

The mutual trust built between MacGregor and CSSC during the 30 years of partnership will be a solid foundation for the new chapter of strategic cooperation. 

OceanManager opens office in Singapore to expand Asia market presence

Vessel operations planning software specialist continues growth phase with appointment of Sanjeev Mathur as APAC Managing Director

San Ramon, CA, Nov 6, 2018. OceanManager, one of the leading providers of maritime software solutions, has opened a new office in Singapore and appointed Capt Sanjeev Mathur as Managing Director to lead its planned expansion in the APAC region.

A Master Mariner with an MBA from INSEAD, Capt Mathur has built up extensive shipping industry experience over three decades. He has held several senior positions ashore, most recently with Rio Tinto Shipping at Singapore. Mathur brings broad-based experience in HSEQ, operations, business development and training within ship management and ship owner companies to OceanManager.

"We are thrilled to have attracted such an impressive marine and business-focused

talent as Sanjeev and it could not have been timed better as we launch our vision for maritime digital transformation", said Rajan Vasudevan, CEO OceanManager. "Sanjeev will help us take our strong presence in the APAC region to the next level; this is an important commitment to a critical region."

Capt Mathur explained the Company's strategy: "I am very excited to have joined OceanManager and look forward to leading the business forward. We have timed the setup of our Singapore operations to launch vesFMS, our full technical management solution. We have a large number of existing clients in this region and this office will focus on managing existing relationships as well as developing new business and partnerships in the region."

vesFMS is the first cyber-secure fleet management solution that provides all required modules for technical management and is a constantly evolving platform that provides



all the tools that vessel operators need to improve technical management, planning and execution. Designed for ease of use and low human touchpoints, vesFMS reduces administrative burden while improving quality of data and reporting.





New partnerships strengthen WinGD's global training network

The appointment of two new WinGD training partners will provide easier access to high quality training for ship operators and crews.

Strategically chosen for their high qualifications and location in prime maritime geographical areas, WinGD has signed agreements with Giga Mare Inc. in the Philippines, and BlackSea Training in the Ukraine.

By partnering with these training facilities in these key global locations, WinGD extends their services offered to ship owners in support of their low-speed dual-fuel and diesel engines.

"The appointment of Giga Mare and Black Sea Training as official WinGD engine training partners is an important step in our plan to provide the highest level of training and support for operators of our engines on both a global and a local basis. With these key partnerships, we ensure that training programmes for engines developed by WinGD can be accessed where it is most convenient for the end users of our engines, reducing and in some cases eliminating the costs and hassle of travel." Said Rudolf Holtbecker, Operations Director for WinGD.

High quality training is essential to ensure that ship operators can truly optimize their vessels' performance. With a deeper understanding of the main engine and its applied technologies, through comprehensive training, operators and supervisors of various levels are able to enhance the performance of the engine room by increasing its efficiency and reliability to reduce maintenance costs and lower emission levels.

"WinGD Training Partners are carefully chosen based on their ability to deliver the high-quality training our customers expect from WinGD," continues Holtbecker. "This involves the capability to explain the theory and functionality of the dual-fuel X-DF,



Generation X and RT-flex engines, as well as practicing real-life scenarios using our W-Xpert engine simulation software or the Full Mission Simulator hardware."

To achieve this high standard of teaching competence, all Training Partners participate in WinGD's "Train-the-Trainer" programme and have full access to the WinGD training resources and state-of-the-art simulation software developed by WinGD as used in the WinGD Training Centres.

Jari Ullakonoja, President & CEO at GigaMare, commented on the new partnership: "We are proud to be one of WinGD's inaugural Training Partners and are confident we can fulfil expectations. We have extensive experience with both two and four-stroke marine engines and our key location and excellent existing training facilities, means we can offer top quality

training to WinGD's customers."

Valeriy Pushchin, Managing Director of BlackSea Training added; "Offering WinGD training programmes in the Ukraine means that we are reaching a significant population of crew managers and seafarers, ensuring they are equipped with the skills and knowledge needed in today's vessels."





Palau marks its presence in Dubai


Palau International Ship Registry, the world's fastest growing flag, added yet more vessels into its fleet with the signing of two new ship registrations during Seatrade Middle East 2018 (STMM) held last month in Dubai.

Jamal S Khalil, General Manager, of Al Rafedain Marine Services signed the documents on the Palau stand at STMM to register two ships and was supported by Global Marine Consultants Group (GMCG) one of the valued partners of PISR and which helped facilitate the new signings.

Panos Kiriadis, CEO of the registry welcomed the new signing as another example of how far PISR has developed in just a few years.

"This is yet another example of how far Palau International Ship Registry has come in such a short few years. From being the newest registry in the industry just over five years ago, we are now recognised as the fastest growing flag and also as a SMART registry. Having Al Rafedain Marine Services and their vessels as part of the Palau fleet means we are increasing our services in the shipping sector. Our relationship with our agents, registrars and maritime consultants such as GMCG means we have an even greater presence in the maritime world. We work closely with our partners and GMCG has been a valued and reliable one for PISR. Their connections and clients have been developed over many years because of their experience,



knowledge and commitment and at Palau International Ship Registry we are delighted to work with them in maritime matters. We had an excellent reception in Dubai and we were surprised by the reaction to our presence with so many ship owners and operators wanting to know about our IT-led services. As we approach the end of 2018 we are definitely sailing on the right course to become one of the world's leading flags." 




LUKOIL Marine wins Supplier of the Year Award by Incentra



At the annual Council Meeting of the Norwegian procurement organisation, Incentra in Oslo, LUKOIL Marine Lubricants was announced to be the winner of their Supplier of the Year 2018 Award.

The Award was received by Mr. Arild Vartdal, LUKOIL's representative at the Council Meeting, who explained: "We have been working with Incentra for two years and are already supplying 20–25% of their volume now, which is continuously increasing. We are striving to provide the very best service to our customers and we are very proud to receive this award."

Every year, Incentra evaluates their suppliers' service levels and after coming very close to the top last year, LUKOIL Marine Lubricants was elected Supplier of the Year in 2018.

Laila Hansen, Acting Managing Director of Incentra, comments: "We are very satisfied with the excellent cooperation with LUKOIL Marine Lubricants, and we are impressed by their increased volume in such a short time. The Supplier of the Year award is based on several different criteria, among them is the annual supplier evaluation survey, increased turnover and active participation." 



IMRF and The Nautical Institute sign MOU

The IMRF (International Maritime Rescue Federation) and The Nautical Institute have signed a memorandum of understanding (MOU) agreeing to work together on projects that support both organisations' shared objective to improve safety at sea.

The IMRF is the international charity that brings together the world's maritime search and rescue organisations to share lifesaving ideas, technologies and experiences, to work to prevent loss of life in the world's waters, and The Nautical Institute is the international representative body for those involved in the control of seagoing ships.

Theresa Crossley, CEO of IMRF, said: "I am delighted to sign this MOU with The Nautical Institute, as our organisations' objectives are closely aligned. I am sure that there will be many opportunities to collaborate and share expertise moving forward

which will benefit both organisations. Our 112 members come from 50 countries around the world and their maritime search and rescue operations save the lives of national and international mariners around the world every day, every week, every year."

Captain John Lloyd, CEO of The Nautical Institute, said: "Safety at sea and supporting those in peril is a key component of maritime tradition and professionalism. Through this MOU we will increase awareness in shared areas of concern and be stronger at promoting best practice."

The MOU commits both organisations to exchanging information and technical cooperation in areas of mutual interest, and to harmonise training standards and guidelines across the industry while jointly promoting issues which relate to the safety of



mariners and others at sea.

Representatives from the IMRF and The Nautical Institute will also participate in each other's workshops and seminars and will work together in the future on joint proposals and initiatives. The Nautical Institute will be represented at the IMRF's World Maritime Rescue Congress, which will be held in Vancouver, Canada in June 2019.



ForSea(formerly HH Ferries Group) completes conversion of the world's largest battery ferries, powered by ABB

Inauguration of Tycho Brahe and Aurora marks successful completion of a high-profile conversion project with ABB's technology at its heart.

The largest emission-free ferries in the world have been officially welcomed into service after guests boarded Tycho Brahe in Helsingborg, Sweden and Helsingør, Denmark on November 9 for a special inauguration ceremony marking completion of an all-electric conversion.

"We are delighted that the entire system is in place to support the emissions-free operations we envisaged from the outset," said Johan Röstin, CEO, ForSea. "This is a truly groundbreaking project and the work we have done with ABB will offer invaluable lessons for those following our lead. In shipping, innovation takes time and



patience, and we always kept sight of the environmental benefits at stake."

"This project signals a profound shift for the maritime industry, and shows a path towards zero-emission operations, aligned with International Maritime Organization's goals for decarbonization," said Marcus Höglblom, Head of Passenger, Dry Cargo and Ice Segment, ABB Marine & Ports. "We congratulate ForSea on the inaugura-



tion of these vessels, and we are proud to have worked closely with them to deliver this pioneering solution."


Tycho Brahe and Aurora have been converted from conventional diesel engine operations to battery power at Öresund Dry Docks, as part of ForSea's strategy to reduce the environmental footprint along the 4km route between Sweden and Denmark. The vessels operate on a high

intensity ferry route that transfers over 7.4 million passengers and 1.9 million vehicles between urban port terminals in Denmark and Sweden.

The conversion of these over 100-meter ferries, both built in 1991, required installation of a 4160 kWh battery on each vessel, as well as battery racks, energy storage control systems and ABB's award-winning Onboard DC Grid™ power distribution technology.

Additionally, ABB supplied automated shore-side charging stations using an industrial robot to optimize the connection time and maxi-

mize the charging period, leveraging 3D laser scanning and wireless communication between ship and shore.

"This is a landmark project, and we are convinced it will come to be seen as a critical step in shipping's environmental revolution, as well as a milestone in rolling out ABB's 'Electric, Digital, Connected' strategy for shipping," said Marcus Höglblom, ABB Marine & Ports. INEA, the European Union's executive agency for innovation and network, has supported the project. 



ClassNK and TÜV Rheinland Sign Partnership Agreement for Cybersecurity Services

Leading classification society ClassNK and TÜV Rheinland have concluded a worldwide partnership agreement for cybersecurity services.

ClassNK is a classification society which carries out surveys to help ensure the safety of vessels and marine structures, and has many achievements involving the certification of ship equipment. TÜV Rheinland is a global leader in testing, inspection and certification services providing digital services for safety, cybersecurity and privacy. Earlier, ClassNK and TÜV Rheinland built a cooperative relationship through the signing of partnership agreements in 2012 for wind turbine certification and in 2015 for test and product certification.

With their most recent partnership agreement, both parties have agreed to comprehensively collaborate in jointly developing and delivering a cybersecurity certification scheme for the maritime industry. Utilizing the knowledge and strength from the services they each provide, they will collaborate globally in the field of cybersecurity in order to further ensure the safety of vessels. Under the agreement, ClassNK will first team up with TÜV Rheinland to work on the cybersecurity guidelines that target onboard software currently being developed by the society. This partnership will also bring efficient and pragmatic cybersecurity certification services to meet the mar-



itime sector's needs.

ClassNK President and CEO Koichi Fujiwara said, "I am pleased to be able to further strengthen our collaborative relationship with TÜV Rheinland. Digital transformation is changing the way that business is conducted and offering more opportunities, while cybersecurity is an essential factor to its promotion and adoption in the maritime industry. Through the new partnership, we will do everything possible to overcome the cybersecurity challenges of the industry by combining TÜV Rheinland's abundant expertise and our society's accumulated knowledge and experience on management systems for ship operations as well as the structure, machinery and other components of ships themselves."

TÜV Rheinland's Chairman Dr. Michael

Fübi said "Combining our expertise and experience in Industrial Services and Information Technology (IT), Operational Technology (OT) and cybersecurity, we are one of the few organizations developing deep capabilities to offer this level of cybersecurity expertise to maritime industry which is concerned with the safety onboard vessel, compliance with regulatory requirements for cybersecurity, risk assessment and certification. The priority for TÜV Rheinland is to continue delivering its mature cybersecurity services to maritime sector across the globe to protect shareholder investment from cyberattacks and strengthen confidence of regulators and governments." 



Inmarsat enhances cyber security offering for Maritime industry

Inmarsat has introduced two new components to its maritime cyber security service, Fleet Secure, as it continues to develop solutions that combat ever-increasing cyber threats faced by ship owners and ship managers.

Vessel operators will benefit from a powerful, multi-layered endpoint security solution, Fleet Secure Endpoint, which is based on industry leading technology from ESET, a world leader in digital security, and powered by Port-IT and protects desktop computers and other systems connected to a vessel's network.

Fleet Secure Endpoint has been developed to remove infections and thwart hackers before damage occurs to onboard endpoints and connected systems. The solution will be available for commercial use from January 2019 and is compatible across Inmarsat's maritime portfolio of services, including Fleet Xpress, FleetBroadband and Fleet One. It also complements the resilience of Inmarsat's own satellite and ground network enabling consistent cybersecurity standards to be maintained.

Peter Broadhurst, SVP of Safety and


Security for Inmarsat Maritime said: "It is a priority for every fleet operator and ship manager - shore-side and at sea - to ensure their systems are properly protected. As this enhancement to Fleet Secure demonstrates, Inmarsat is constantly monitoring the ever changing cyber security landscape and devising new tools and approaches for addressing potential problems; ensuring that ships and their crew remain safe –physically and virtually."

Inmarsat has also launched a training app for mobile devices, Fleet Secure Cyber Awareness. This enables seafarers to educate themselves on the tactics that cyber criminals might employ in attempting to infiltrate a company's IT infrastructure.

Addressing the human element is essential to maintaining a strong security posture, says Mr Broadhurst: "Many attempts to gain unauthorised access to IT infrastructure require some sort of activation by an end-user in order to infect a system and cause further damage. These attacks are often heavily disguised so as to trick and manipulate end-users into unwittingly granting permission.

"However, there are nearly always tell-tale



signs that, if spotted in time, would prevent escalation. Crew education is therefore an indispensable component in realising a well-rounded security strategy and the reason behind teaming up with Stapleton International and Marine Learning Alliance to launch our Fleet Secure Cyber Awareness module." 




VIKING's LifeCraft™ passes toughest ever test at sea

Rough seas with wave heights up to 50% above the stipulated heavy weather testing requirements proved no obstacle for VIKING's innovative LifeCraft™ system, paving the way for cruise ship operators worldwide to benefit from all the advantages that this new hybrid - intended to replace lifeboats/liferafts - has to offer.

It is considered to be the most exciting innovation in passenger evacuation systems in decades ? and now, despite unusually challenging test conditions, the

VIKING LifeCraft™ system has passed an important milestone in its journey to commercial use following the conclusion of a demanding full-scale Heavy Weather Sea Trial (HWST). Developed and extensively tested by leading maritime safety equipment and servicing provider VIKING Life-Saving Equipment over the past 10 years, the new evacuation system unites the advantages of modern lifeboats ? such as self-propelled maneuverability ? with the flexibility, comfort and smaller footprint of

today's liferafts combined with marine evacuation systems.

The solution comprises two main elements: four inflatable VIKING LifeCraft™ survival crafts each with a capacity of 203 persons, so 812 in total, and a fully self-contained stowage and launching appliance either placed on deck or built into the ship's side. And it's packed with a long list of innovations that take the system far beyond the capabilities of existing lifeboats, marine evacuation systems or liferafts. 



현대중공업그룹, 사장단 인사 단행



한영석사장



가삼현사장

현대중공업그룹은 11월 6일(화) 주요 계열사 사장단 및 현대중공업 사업본부 대표에 대한 인사를 단행했다. 이번 인사에서는 현대중공업, 현대미포조선, 현대삼호중공업 등 그룹내 조선계열사와 정유부문을 대표하는 현대오일뱅크 사장을 신규 선임하는 등 주력 계열사 대표이사에 대한 세대교체 인사가 단행되었다.

현대중공업 공동 대표이사 사장에는 현대미포조선 한영석(韓永錫) 사장과 그룹선박해양영업본부 가삼현(賈三鉉) 사장이 내정되었다. 한영석 사장은 1957년생으로 충남대 기계공학과를 졸업하고, 현대중공업에서 설계 및 생산본부장을 역임한 뒤, 2016년 10월부터 현대미포조선 사장으로 재직해 왔다. 부임이후 현대미포조선을 3년 연속 흑자로 이끌었으며, 합리적인 의사결정으로 조직을 안정적으로 운영해 왔다. 가삼현 사장은 1957년생으로 연세대 경제학과를 졸업하고, 현대중공업 선박영업본부에서 근무하였으며, 런던지사장, 서울사무소장 등을 거쳐 2014년부터 그룹선박해양영업대표를 맡아왔다.


현대미포조선 대표이사 사장에는 현대중공업 신현대(辛鉉大) 부사장이 사장으로 승진, 내정되었다. 신현대 사장은 1959년생으로 충북대 전기

공학과를 졸업하고, 현대중공업 조선사업본부 계약관리, 의장, 시운전 담당을 거쳐 군산조선소장을 역임하였으며, 2016년 11월부터 현대중공업 조선사업본부 사업대표를 맡아 왔다. 다양한 업무경험을 바탕으로 조선사업에 대한 해박한 지식과 노하우로 현장 중심의 경영을 펼치고 있다.

현대삼호중공업 대표이사 사장에는 이상균(李相鈞) 부사장이 사장으로 승진, 내정되었다. 이상균 사장은 1961년생으로 인하대 조선공학과를 졸업하고, 현대중공업 선박건조 분야에서 오랜기간 근무한 현장 전문가이다. 2015년 8월부터는 현대삼호중공업으로 자리를 옮겨 생산본부장을 맡아 왔으며, 현대삼호중공업의 생산공정을 안정적으로 이끌어 왔다.

조선사업과 함께 현대중공업그룹의 한 축인 현대오일뱅크 대표이사 사장에는 강달호(姜達鎬) 부사장이 사장으로 승진, 내정되었다. 강달호 사장은 1958년생으로 연세대 화학공학과를 졸업하고, 현대오일뱅크 대산공장에서 생산부부장, 중앙기술연구원장 등을 역임했으며, 2014년부터 안전생산본부장을 맡아 왔다. 대산공장의 안전가동은 물론, 직원들과의 끊임없는 소통을 통해 공정개선과 혁신에 앞장서는 등 현대오일뱅크 성장의 숨은 역할을 해 왔다. 또한, 이번 인사에서는 지난 7월 현대일렉트릭 대표에 취임한 정명림 부사장이 사장으로 승진했다.

이밖에 현대중공업 사업본부 대표에 대한 인사도 함께 단행되었다. 현대중공업 해양플랜트사업 대표에 박준성 전무, 엔진기계사업 대표에 이기동 전무가 각각 부사장으로 승진, 선임되었고, 현중지주 로봇사업 대표에는 현대중공업 서유성 전무가 선임되었다.

이번 인사에 대해 현대중공업 관계자는 “대내외적으로 어려운 경영환경 속에서 기존 경영진들이 생존을 위한 위기극복에 매진했다면, 새로운 경영진들은 성장을 위한 변화와 혁신을 추진해 나가게 될 것”이라며, “이번 인사를 통해 현대중공업그룹은 재도약을 위한 새로운 출발을 선언한 것”이라고 밝혔다. 



삼성 SDS, ABN AMRO 및 로테르담 항만 공사와 손잡고 컨테이너 물류 블록체인 시범 프로젝트 출범

물류 분야에는 디지털화를 이용하여 더욱 높은 투명성과 효율성을 실현할 수 있는 부분이 아직 많이 남아 있다. 이러한 상황을 반영하여 ABN AMRO, 로테르담 항만공사, 그리고 삼성의 물류 및 IT 담당 기업인 삼성SDS는 블록체인 기술에 기반한 시범 프로젝트 출범 협약을 체결했다. 최종 목표는 국제적인 유통망 내의 물리, 관리, 재무 스트림을 사무 자동화된 형태로 완전하게 통합하는 것이다.

로테르담 항만공사의 최고재무책임자(CFO) Paul Smits는 “화물 및 용역의 수송, 모니터링, 재무관리 업무는 온라인으로 책을 주문하는 것만큼 쉬워야 한다”며, “현재 컨테이너의 결제, 관리, 물리적인 수송은 여전히 각각 분리된 경로를 통해 이루어진다. 여러 업체가 관여하는 특성상 이러한 점은 비효율성을 초래하며 모든 일이 서류 작업을 통해 준비된



다. 예를 들어, 중국에서 로테르담까지 컨테이너를 수송하는 데 관여하는 업체만 해도 평균 28곳으로, 화물 및 용역의 수송, 모니터링, 재무 관리 업무는 온라인으로 책을 주문하는 것만큼 쉬워야 한다”고 설명했다.

이 시범 프로젝트를 개발하는 업무는 로테르담 항만공사에서 설립한 BlockLab에 배정되었다. ⚓

LS전선, 미얀마 전력 케이블 공장 준공

LS전선(대표 명노현)은 10월 14일 미얀마에서 전력 케이블 공장(LSGM; LS-Gaon Cable Myanmar) 준공식을 가졌다고 밝혔다. 준공식에는 구자엽 LS전선 회장, 명노현 LS전선 대표, 유재인 가온전선 대표, 신용현 LS전선아시아 대표, 손태원 LSGM 대표, 이상화 주(駐)미얀마 한국대사 등 내외빈 150여 명이 참석했다.

LS전선은 2017년 11월 약 2,200만 달러(약 250억 원)를 투자, 미얀마 최대의 경제도시 양곤 인근 툴라와(Thilawa) 경제특구 66,000㎡(20,000평) 부지에 19,800㎡(6,000평) 규모의 공장 건설을 시작했다. 자회사인 LS전선아시아와 가온전선이 각각 50%씩 투자했다. LSGM은 미얀마 최대 규모의 전력 케이블 공장으로서, LS전선은 전력청과 건설사 등을 대상으로 마케팅을 강화, 현지 시장 공략에 본격적으로 나설 계획이다.

미얀마는 빠른 산업화와 도시화로 전력 케이블 시장이 연평균 10% 이상 성장하고 있으나, 송전 인프라에 쓰이는 가공 케이블은 100%, 고압(HV)과 중압(MV), 건축용(LV) 등을 포함한 전체 전력 케이블은 60% 이상을 수입하고 있다. LSGM은 우선 가공 케이블과 건축용 케이블을 생산하고, 향후 MV와 HV 케이블로 사업을 확대한다는 전략이다.

명노현 LS전선 대표는 “미얀마는 10여 년 전의 베트남과 비교될 정도로 높은 성장 잠재력을 갖고 있다”며 “LSGM은 현지 업체들보다 앞선 설비와 생산능력, 본사와의 협업 등을 통해 시장을 선점, 5년 내 미얀마 1위 전선기업으로 자리매김할 것이다”라고 기대를 밝혔다. 이상화 주미얀마 대사는 축사에서 “글로벌 기업인 LS전선이 LSGM 준공을 계기로 전력망 구축 등 인프라 사업을 통해 미얀마 경제 발전에 기여할 것으로 기대한다”고 말했다. LS전선은 최근 베트남 케이블 시장 1위인 LS전선아시아를 통해 현지 투자를 확대하고, 인도네시아에도 합작 법인을 설립하는 등 전력 수요가 급증하고 있는 아세안 시장 공략에 적극 나서고 있다. ⚓



부산항만공사, 마스블락테 서측에 공동물류센터 건립을 위한 협력의향서 체결



부산항만공사는 네덜란드 로테르담 항만의 마스블락테 서측에 5~10 헥타르에 달하는 공동물류센터 부지를 위해 로테르담 항만공사와 협력의향서(LOI)를 체결했다. 벌써 물류센터 건립을 위한 두 번째 LOI로, 이미 얼마 전 한 차례 LOI를 체결한 바 있다.

부산항만공사는 마스블락테 공동물류센터에 지속 가능한 물류창고를 건립하여 여러 기업, 특히 한국의 물

류 및 제조 기업들이 이용할 수 있게 할 예정이다. 이전에 체결된 계약과 더불어 이번 LOI를 통해 이제 물류센터 건립에 사용할 수 있는 100헥타르 중 15~20헥타르를 확보하게 된 셈이다.

접근성

로테르담 항만공사의 유통 및 물류창고 사업 관리 담

당자인 Maarten de Wijs는 로테르담항의 유일한 ‘개발 가능’ 부지의 지리적 이점에 대해 주목하면서 다음과 같이 설명했다. “이곳은 육로, 철로, 해로 등 다양한 경로로 접근할 수 있고 이용 빈도가 높은 심해뿐만 아니라 연근해와도 매우 가까운 거리에 있다. 또한 마스블라테 플라자의 화물 전용주차장인 A15, 기존 마스블라테 물류센터 및 마스블라

테와 유럽 배후지를 연결하는 화물 철도를 편리하게 이용할 수 있다”

시공 높이

마스블라테 서부 공동물류센터는 다양한 크기의 여러 구획들로 나누어질 예정이다. De Wijs에 따르면 시공 높이 제한이 없어 마스블라테 서부 물류

센터는 대규모 물류에 매우 적합하다. 그는 “이 물류센터는 화학 산업, 냉동 창고 및 고급 화물 유통에 특히 유리할 것으로 생각된다”라고 말했다.



한국이구스, 첨단 지식산업 도시 송도 신사옥으로 이전



인력을 유치하고 육성하기 위해 송도 신사옥 이전을 결정했다.

한국이구스가 새롭게 동지를 틀 송도 신사옥은 연면적 6,941.97m²로, 사무동 3층과 공장 2층 규모의 신축 건물이다. 이를 통해 국내 현지 생산이 가능해짐은 물론,

R&D센터를 신축해 4차 산업혁명을 이끌 로봇 자동화 기술 및 스마트 플라스틱에 대한 연구를 강화할 계획이다.

우수한 인재를 유치하기 위한 편의 시설을 고려한 것도 특징이다. 건물 내에 사내식당과 휴게실을 위치시켜 직원의 부담을 덜고 업무에 보다 집중할 수 있는 환경을 조성해 인천시의 인재를 적극 유치 할 계획이다.

한국이구스 김종언 대표는 “이번 사옥 이전을 통해 R&D센터 신축 및 생산 능력 확대로 아시아 지역의 연구 개발 및 수출 중심지로 성장하는 것이 목표”라고 말했다.

한편 지난 10월 30일 IFEZ와 계약을 마친 한국이구스의 송도 신사옥은 곧 착공을 시작해 2019년 말 입주 예정이다.

와 관련해, 인천경제자유구역청장과 독일 이구스 본사의 Artur Peplinski 부사장 공동주관으로 미화 1.3천만불 규모의 외국인 직접 투자 조인식을 개최했다고 10월 30일 밝혔다. 독일 쾰른에 위치한 히든 챔피언 igus GmbH의 한국 지사인 한국이구스는, 이구스 그룹의 아시아 허브로의 성장을 목표로 이번 사옥 이전을 계획했다. 2001년 국내 지사를 세운 한국이구스는 창립 17년이 지난 현재, 임직원 수 20배, 매출 150배 이상의 규



(주)한국이구스(대표 김종언)는 송도 지식정보 산업단지내 9,498m² 규모 대지 신사옥 입주

모로 성장했다. 이에 따라 국내 생산능력 확보를 위한 공장의 건립은 물론, 앞으로 우수

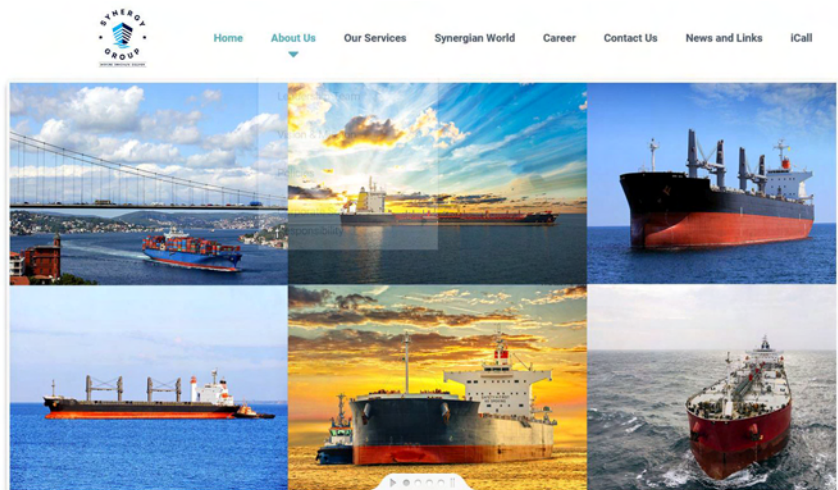
N2Tankers Aframax tanker pool launched by Reederei Nord and Synergy Group

Reederei Nord and Synergy Group, on behalf of Nissen Kaiun, have officially launched N2Tankers, a new Aframax tanker pool the two shipowning companies have set up as a joint venture.

N2Tankers brings the shipowning and operational expertise of Nissen Kaiun and Reederei Nord under one central umbrella administration for the first time. It will focus on generating commercial and technical management efficiency benefits for clients and owners by streamlining fleet operations and improving vessel financial performance.

The combined fleet currently pooled under N2Tankers consists of 13 state-of-the-art Aframax tankers built to the highest standards over 2007-2018 in Japanese yards Universal Shipbuilding Corporation, Sumitomo Heavy Industries Marine & Engineering Co., Tsuneishi Holding Corporation, Sumitomo Heavy Industries, Ltd, and Tsuneishi Shipbuilding Co. Singapore-based ship manager Synergy Group has been charged with commercial management of N2Tankers for vessels deployed East of the Suez Canal and will also provide technical management services for Nissen Kaiun's vessels in the joint venture on a global basis.

Capt. Rajesh Unni, CEO and Founder of Synergy Group, said: "N2Tankers brings together two of the most renowned owners in world shipping in a sector of the tanker market that has



seen a lot of consolidation in recent years. We are delighted we have been entrusted with management of the pool's state-of-the-art, modern tankers all built to the highest quality.

"This is recognition of our unique ability to meet the commercial and technical ship management requirements under one roof for the most demanding owners."

The fleet will be further expanded, with Nissen Kaiun and Reederei Nord currently seeking out similar-minded owners of top quality Aframax tankers to join the N2Tankers pool. The pool's size will be limited to 20-30 vessels to optimise cost efficiency and competitiveness.

"Our two companies have earned themselves outstanding reputations for the world class efficiency and reliability of their fleets," said Captain Katsuya Abe, President of Nissen Kaiun. "I believe our clear focus on our customers' requirements will satisfy

the needs of both cargo and tonnage owners, with the fleet providing operational flexibility for cargo owners, and voyage expenses falling due to the optimisation of vessel selection based on proximity to cargo.


"We are confident that managing the pool as a joint venture with commercial and technical ship management clearly aligned in the most cost-effective and efficient manner possible will help attract in additional ships to further bolster the effectiveness and competitiveness of N2Tankers.

"We are also delighted that Synergy Group, a long-term ship manager partner of Nissen Kaiun, is bringing its experience and expertise to this new venture. We fully expect N2Tankers to quickly be recognised as the world's leading Aframax tanker pool."

Adriaan Rüppell, Managing Director Reederei Nord B.V, said the focus of the commercial platform of N2Tankers would be purely on servicing the

requirements of customers - cargo and tonnage - safely and efficiently. "We will operate the platform based on aligned interest and clear incentives," he added. "There will no third-party commercial interest to interfere

with the best interests of the owners of the ships and the platform. "The two offices in Amsterdam and Singapore will be in fact the extended commercial department of the shipowners - Singapore managing the ships in the

East, Amsterdam the ships in the West. "We will actively be seeking like-minded owners to become our partners." 

KR's SeaTrust-HullScan software wins 2018 Tanker Safety Award

The Korean Register of Shipping(KR) has won the 2018 Tanker Safety Award for its specialist software - SeaTrust-HullScan.

The annual award is presented to a company that has shown excellence and found a solution to a significant safety challenge or problem facing the tanker industry.

The KR's SeaTrust-HullScan is a dedicated software package developed for the structural strength analysis of bulk carriers, double hull oil tankers, containers ships based on KR's Rule and the Harmonized CSR.

It's widely used by Korean shipyards, marine research institutes, design companies and universities and this is the second award the software has won this year. Earlier this month SeaTrust-HullScan's developer, Mr. Park Ho-gyun, principle surveyor of KR, was awarded with the Wolae Award by The Society of Naval Architects of Korea, recognizing the software's exceptional technical merit.

First released in 2012, SeaTrust-HullScan was upgraded this year. V2 version has been further developed and tested by shipyards and design companies, demonstrating KR's efforts to support better ship and offshore structure design through the provision of faster and more accurate software.

KR's executive vice president Mr Hyungchul Lee said: "We are very honored to accept the 2018 Tanker Safety Award for our SeaTrust-HullScan software.

KR's number one priority is its customers and with technical support like SeaTrust-HullScan, we can support every aspect of our customer's detailed technical needs, while



enhancing the wider safety of the tanker industry."

KR's SeaTrust software series covers; rule scantling checks, safety checks by direct methods, full spectral fatigue analysis, shaft alignment analysis, ship's lifecycle management and many more technical areas.

The specialist software range, which is applicable to all vessel types, has been developed by KR's inhouse engineers, all of whom have extensive knowledge of shipbuilding challenges and issues.

ABB signs breakthrough contract for marine automation in China



First marine automation system contract signed in China for a cruise ferry sets new benchmark for systems integration.

ABB has won its first marine automation system contract for a cruise ferry in China, after the technology package for Chinese-built Viking Line vessel has been extended to include the ABB Ability™ System 800xA.

ABB Ability™ System 800xA integrates power, propulsion and vessel management systems into one platform, enabling both crew and onshore teams to get a comprehensive overview of all the information needed to operate the vessel in the safest and most efficient manner. Adding marine automation to the technology package will improve project management, as well as result in greater vessel efficiency and digitalization.

“On her delivery, this vessel will be the most efficient cruise ferry operating in the Baltic, if not the world,” says Jan Hanses, President and CEO, Viking Line. “Extending our arrangement with

ABB to include the full automation package made perfect sense, given that ABB has the dedicated local automation team and access to global engineering resources that will ensure both responsiveness and delivery of a vessel benefiting from the highest levels of systems integration.”

The 63,000 GT LNG-fueled cruise ferry, which is being built at Xiamen Shipbuilding Industry co., Ltd, will have space for 2,800-passengers when she joins services connecting the Finnish port of Turku in Finland, the Åland Islands and Stockholm, Sweden, in 2020.

“Chinese shipbuilding is one of the most significant markets for ABB’s power, propulsion and automation system,” says Alf Kåre Adnanes, head of ABB’s Marine and Ports business in China. “Chinese shipyards are diversifying their portfolios, and ABB’s long history in the cruise sector is particularly relevant to China’s shipbuilders. We are part of an existing shipping cluster and can support Chinese ship-

yards in their strategy to build cruise vessels for China and for global customers.”

As well as the ABB electrical power generation, distribution systems and bow thruster motors, the vessel will be the first cruise ferry in the world to feature twin XO 2100-type Azipod® units – the propulsion solution of choice in the cruise ship market.

“As ABB’s first marine automation contract for a cruise ferry in China, this is a breakthrough in a crucial territory where our marine business continues to increase, but it also confirms that our ‘Electric. Digital. Connected’ strategy is gaining traction in a growing number of sectors and markets,” says Juha Koskela, Managing Director, ABB Marine & Ports. “Integration that is available from the ground up meets today’s requirements and positions ABB to incorporate future technologies in a straightforward way.”

ABB’s vision for an “Electric. Digital. Connected.” maritime industry is based on the principles of simplicity, efficiency and safety, and seeks to leverage the power and automation group’s comprehensive bridge to propeller expertise to set shipping’s course towards the vessels of the future.

ABB Ability™ is the company’s unified, cross-industry offering extending from device to edge to cloud, integrating data to and from products, systems, solutions and services to deliver actionable information. The ABB

Ability™ platform uses Microsoft Azure as the cloud for its integrated connec-

tivity, so users can access enterprise-grade infrastructure that benefits from

Microsoft's significant investment. 

Ballast water market drives revenue hike for BIO-UV Group

Sales of the BIO-SEA ballast water treatment system have contributed to an increase in third quarter revenue for France-based BIO-UV Group. The Group reported a Q3 2018 revenue of €3.4m, an increase of 30% on the same period last year.


"The expanding ballast water market is the main driver underpinning growth, and one that is expected to continue over coming months," said Benoît Gillmann, President and CEO, BIO-UV Group. "We are currently experiencing a ramp-up in order intake following our USCG certification and anticipate BIO-UV Group total revenue growth in 2018 of at least 15%, driven in particular by a sharp acceleration of the ballast water treatment market, which should secure

growth of at least 60% over the full year."

To date, BIO-UV Group has supplied its BIO-SEA Ballast Water Treatment System to more than one hundred vessels worldwide, with more orders in progress. Owners operating the UV-based BIO-SEA includes Maersk Lines, MSC Cruises, CMA CGM and Louis Dreyfus Armateurs.

A strategy to increase its global footprint has also contributed to revenue growth. International expansion, which accounted for 50% of the Group's revenue in 2017, saw the company establish a network of sales and distribution agents in more than 65 countries, with focus on key geographical areas in the Asia-Pacific region. This year, the Group opened a subsidiary in Hong

Kong to oversee future sales growth and ramp-up manufacturing in the region: BIO-UV Asia.

BIO-UV Group's current orderbook is valued at €6.4m. Beyond 2018, the company reiterates its ambitions for 2022 to achieve revenue of around €40m. Across all the available technologies, eleven ballast water treatment systems have received IMO and USCG approval. BIO-UV Group is one of only three manufacturers of UV-based BWTS to have obtained approvals from both the International Maritime Organisation and the US Coast Guard. 

현대중공업, 세계 첫 사이버보안 적용 선박 건조

현대중공업이 초대형 선박에 대한 사이버 보안 기술을 세계 최초로 인정받았다.

현대중공업은 최근 미국 선급협회인 ABS로부터 초대형 원유운반선(VLCC)에 대한 사이버 보안 기술 인증(Cyber Security Ready,

CSR)을 획득했으며, 이달 말 이 선박을 유럽 선주에 인도할 예정이라고 11월 12일(월) 밝혔다.

이번에 인증 받은 것은 선박 내외부 사이버 보안 위협요소로부터 주요 제어시스템을 보

호함으로써 선박의 안전성을 높인 보안 기술이다. ABS 선급은 지난 10월 말 선박 내 주요 제어시스템 및 통신시스템에 대한 사이버 보안 상태를 철저히 검증했다.

최근 선박의 운항 기술에 ICT(정보통신기술)


가 융합되면서, 해킹 등 외부 사이버 공격으로부터 선박시스템과 데이터를 보호하는 보안의 필요성이 강조되고 있다.

실제 세계 최대 해운회사인 머스크는 지난 2017년 랜섬웨어 공격으로 물류시스템이 마비돼 화물 선적과 하역 작업이 중단, 약 3천억 원의 손실을 입기도 했다.

ABS의 글로벌 사이버 안전총괄책임자인 폴 월터스(Paul R. Walters)는 “현대중공업은 사이버 보안 기술을 세계적으로 공인받아 선주들에게 한층 더 안전성을 높인 선박을 제공할 수 있게 됐다”면서 “증가하는 사이버 보안 위협에 대응할 수 있는 차세대 선박이 될 것”이라고 말했다.

현대중공업 주원호 중앙기술원장은 “이번 인증 획득으로 보다 엄격해진 사이버 보안 기준에 선제적으로 대응할 수 있게 됐다”며, “향후 건조 예정인 선박에 사이버 보안 기술을 적용해 선박 품질을 높여 시장 선점에 나설 계획”이라고 밝혔다.



한편, 현대중공업은 선박 운영시스템과 연계 소프트웨어의 통합 사이버 보안 인증을 추진하는 등 선박 사이버 보안 기술에 대한 표준을 선도해나가고 있으며, 2011년 세계 최초로 스마트십시스템을 개발해 현재까지 300여 척의 선박에 탑재했다. 

현대중, 해군 첫 훈련함 ‘한산도함’ 진수

현대중공업이 우리나라 해군의 첫 훈련함을 성공적으로 진수했다.

현대중공업은 11월 16일(금) 울산 분사에서 한영석 사장을 비롯해 안규백 국회 국방위원회 위원장, 심승섭 해군참모총장, 왕정홍 방위사업청장 등이 참석한 가운데 훈련함의 진수식을 가졌다.

이 함정은 임진왜란 시 이순신 장군이 왜군을 크게 물리쳤던 한산도대첩의 배경인 한산도(閑山島)에서 이름을 따, ‘한산도함’으로 명명됐다.

4천500톤급인 한산도함은 우리나라 해군 역사상 처음으로 교육·훈련 목적으로 건조된 함정으로, 길이 142미터에 최대 속력은 24노트(44.4km/h)다.

한산도함은 사관생도의 연안실습, 순항훈련, 보수교육 과정에서 함정실습을 전담하게 되




며, 400명 이상의 거주공간과 함께 200명을 수용할 수 있는 대형 강의실 등 3개 강의실과 조함·기관 등의 실습실을 갖췄다.

또 기본 전투함의 임무를 수행할 수 있도록 76mm 및 40mm급 함포와 대유도탄 기만체계 등이 장착되며, 해난사고 시 의무지원 인

원시송 등의 구호활동 지원도 가능하다.
특히, 국내 군함 중 최대 규모의 의무실과 병상을 갖춰 해상에서 발생하는 대량 전상

자(戰傷者)의 초기 처치와 후송을 담당하는 전상자 구조·치료함 역할도 수행할 수 있다.
한편, 지난해 8월 착공해 이날 진수한 한산

도함은 인수평가, 전력화 등을 거쳐 오는 2021년 초 임무에 투입될 예정이다. 

삼성중, 친환경 도료 세계 최초 상선 적용



삼성중공업은 노르웨이 도료 제조사인 요툰(Jotun)과 공동으로 개발한 무용제 도료(Solvent Free Coating)를 상선 분야에서는 세계 최초로 7,500㎡급 LNG 운반선에 적용 완료했다고 11월 21일에 밝혔다.

삼성중공업이 개발에 성공한 무용제 도료는 휘발성 유기화합물(VOC, Volatile Organic Compound)의 일종인 용제(Solvent) 성분이 제로(Zero)에 가까워 화재 및 폭발 사고의 위험이 없고, 인체에 무해해 안전한 작업이 가능할 뿐 아니라 표면 보호능력이 우수해 선박의 엄격한 품질 기준에도 만족하는 친환경 도료이다.

또한, 용제 성분 없이도 점도가 낮아 작업성이 좋고, 1회 도장(1 Coating)만으로 원하는 두께를 구현할 수 있어 공사 기간을 획기적으로 단축하는 등 생산성 향상이 기대된다.

그 동안 조선업계에는 무용제 도료가 많은 장점에도 불구하고 점도가 높아 도장 작업을 위해 고가(高價)의 전용 장비 구매가 필요하고 예열 및 건조 시간도 오래 걸리는 등 생산성이 매우 떨어져 상선 적용이 어렵다고 알려져 왔다.

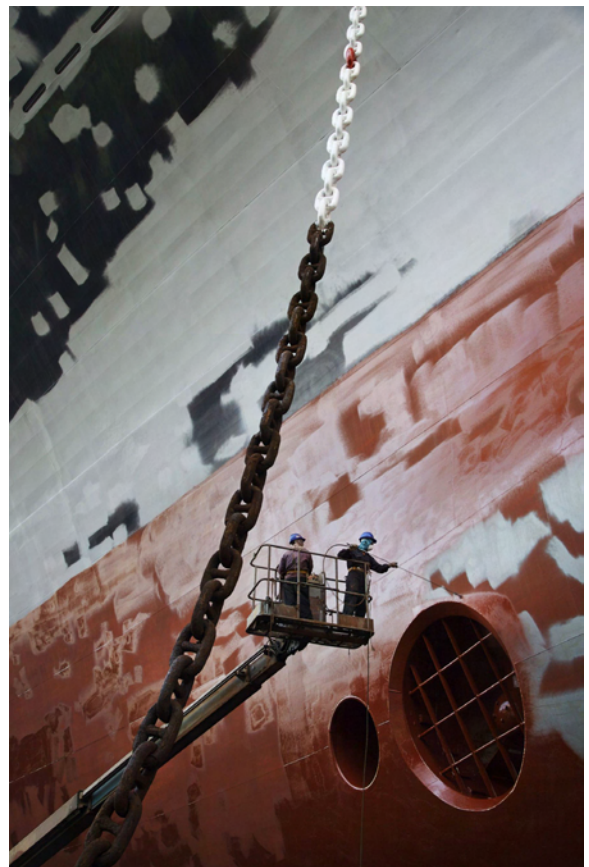
삼성중공업은 이러한 기존 무용제 도료의


기술적 한계를 극복한 친환경 도장 기술을 보유하게 돼 선박 건조에서 차별화된 경쟁력을 확보하게 되었다.

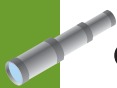
삼성중공업 생산기술연구센터 남성길 센터장(기술위원)은 “도장 작업은 기존 용제형 도료의 폭발 위험성으로 인해 자동화 기술이 매우 낙후된 분야”라며, “무용제 도료의 상선 적용으로 도장 로봇 등 자동화 장비 개발에 탄력을 받게 돼 도장 생산성은 더욱 높아질 것”이라고 강조했다.

한편, 한국 조선업계는 정부의 유해대기오염물질(HAPs, Hazardous Air Pollutants) 규제 강화에 따라 2022년까지 단계적으로 수 백억원의 대기오염방지시설을 의무적으로 설치해야 하는 상황으로 이번 무용제 도료 적용이 환경 규제에 대응할 수 있는 대안으로 주목받고 있다.

조선해양플랜트협회 유병세 전무는 “조선



소에서 배출하는 유해대기 오염물질 중 대부분이 기존 용제형 도료에서 생성되는 휘발성 유기화합물”이라며, “무용제 도료는 대기오염을 줄일 수 있는 대안이 될 수 있어 향후 확대 적용을 위한 논의가 필요할 것으로 보인다”고 설명했다. 



Transport of Russia 2018



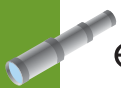
Russian Maritime Register of Shipping (RS, the Register) will be a participant to the XII International Exhibition Transport of Russia to be held on 20 – 22 November 2018 at Gostiny Dvor Complex, Moscow, Russia.

The services aimed on implementation of innovative engineering solutions in transportation industry will be presented at the RS stand. One of the most telling examples of such implementation under the RS technical survey is expansion of the practice of using gas fuel on ships as an alternative to oil fuel, which is extremely relevant in the context of new MARPOL requirements regarding control of NOx and SOx emissions into the atmosphere. Thus, operation on both oil and gas fuel is one of the technical characteristics of Aframax tankers of project 114K DWT Crude Oil Tanker being constructed to the RS class at shipbuilding complex Zvezda (town of Bolshoy Kamen). Construction of such series of ships sets new standards for the environmental safety of commercial shipping.

Advanced technologies are constantly being implemented during construction of Arctic ships to the RS class including those intended for hydrocarbon crude transportation under extremely low temperatures, and during manufacture of materials, products, equipment and systems for such projects. For instance, dual-fuel engines and main electric podded Azipod azimuth thrusters intended for innovative Arctic gas carriers and shuttle tankers constructed under the Novy Port and Yamal LNG projects with the Register involved, are being manufactured under the RS technical survey.

Today, RS is effectively cooperating not only with marine industry companies, but also with companies of related industries, by carrying out recognition of industrial enterprises and laboratories, approval of manufacturing processes, products and services, certification of quality management systems as well as by contributing to the development of international normative base to promote innovations to the world market of transportation services, in

particular, engaging tank-containers with FRP vessels in multimodal transportation. Construction of the fixed offshore ice-resistant platform and living-quarter platform for the Rakushechnoye field development in the Northern Caspian is one of the most advanced projects related to offshore oil and gas production with the Register involved. Besides, offshore facilities for the field development include three subsea pipelines of various purposes, the design, manufacture of all components and laying of which will be carried out in accordance with the requirements of the RS rules. ⚓



Novatek named winners & great opportunities unveiled in the Asian LNG market at the CWC World LNG & Gas Series: 10th Asia Pacific Summit

Novatek were named winners at the prestigious CWC Asia Pacific LNG Innovation Award Ceremony held in conjunction with the 10th edition of the CWC World LNG & Gas Series: Asia Pacific Summit.

The award was presented to Novatek for the successful start-up of two trains at the Yamal LNG project, a project which was delivered on budget and time and has successfully delivered to Asia through a North polar route. The Summit opened with a welcome drinks reception hosted by SLNG and CWC, bringing together over 350 of the most senior LNG and gas individuals from across the APAC region. Following this was the opening keynote panel, featuring extremely senior representation including Philip Olivier, General Manager- Global LNG, Total, Jonty Shepard, Global Head of LNG, BP, Andrew Walker, VP Strategy, Cheniere Marketing Ltd. and Ajay Shah, VP Energy - Asia, Shell.

Ajay Shah said of the Summit "It's a powerful and effective way to meet a lot of people in a short space of time." Nine sessions of panel discussions and presentations over two days reaffirmed strong ongoing profitable growth potential throughout the Asia Pacific region of over 100Mtpa by 2030. The wider global industry is depending on consistent growth year on year from




Asian markets to provide the platform for growth in liquefaction, market liquidity and overall profitable market development.

LNG Canada, the World's largest proposed LNG project taking FID, was met with lots of enthusiasm from the audience at the Summit and the unique business model is something that

other LNG project developers should look to roll out. In a conclusive remark it was noted that the industry has a lot of issues to manage to steer the LNG business to remain attractive and profitable. A consequence of growing such an attractive business is that it will inevitably become embroiled in geopolitics. This means there is yet more work to do as an industry to keep momentum. The CWC World LNG & Gas Series: 11th Asia Pacific Summit will return to Singapore from 24 – 27 June 2019. Next year is a crucial year for the LNG industry, particularly in Asia; with lots of projects expecting to take FID and demand from both the key existing and new emerging buyers set to rise the CWC LNG & Gas Asia Pacific Summit



is the industry event you must attend to keep abreast of developments in the region. 

BULK SECTOR PROSPECTS POSITIVE BUT CHALLENGES AHEAD



The bulk sector is navigating its way out of the doldrums but market correction has come at a price, delegates attending Bulk Terminals 2018 learned last week.

Speaking in Hamburg at the annual conference of the Association of Bulk Terminal Operators, Frachtcontor Director Frank Grone said that while the bulk segment is slowly but steadily working its way out of the doldrums with a positive cash flow, he reminded delegates that 60mdwt was scrapped in 2015 and 2016 at “ridiculous prices”, while financing banks took serious “haircuts” leaving bulk carrier owners faced with a complete wipe out of their invested capital.

The trigger for recovery, he said, has been a healthy growth in demand, which in 2017 was in order of 4% with 3% expected for this year. Fleet growth was moderate in 2017. Congestion and slow steaming have been two ingredients for recovery as it kept tonnage off the market. Slow steaming is still the flavour of the month, but a 3 to 4 knot increase in speed could kill the upturn, Grone warned.

As far as bulk commodities are concerned demand for iron ore has been the major driver and the iron ore market should increase by about 2% this year and continue upwards with suppliers in Brazil and Australia ramping up production. Demand from the Chinese market is still there he said, and locally produced product is nowhere near the quality of imports. Coal is also a market driver with a 7% increase in Chinese imports and Indian imports up 6%. The overall increase in seaborne coal trade is 3-4% which is in stark contrast to Europe where imports have fallen. China, India, Japan and Korea import approximately 900mt of

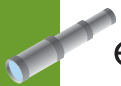
coal per year compared to the two biggest importers in Europe – the UK and Germany – which import approximately 110mt annually. The music, he said, is “clearly being played in the Pacific Rim”. The challenge for European terminal operators is the fact that Germany now uses 36% energy derived from renewables. The fact that Australian coal port Newcastle is now planning an ultra large container terminal to cater for a projected massive increase in movement of containerised cargo may be an indication of market attitudes going forward.

In summary, Grone said growth looks positive and fleet growth manageable but there are a number of challenges. These include the trade conflict between China, the US and EU, which, he said, will affect the shipping market negatively. “The market is not only driven by hard facts, but also by sentiments”.


While the immediate impact of restrictions on soya bean trades may be positive in the short term for South American suppliers, ultimately China will have to turn to the US for supplies, Grone believed. Trade barriers are generally negative in the longer term, he added. Another area of uncertainty is what will happen as a result of the global sulphur cap due to come into force in 2020. Commenting on the options available to meet the requirement, Grone estimated, on the basis of current use, that 66% of all fuel burned will have to be switched by 2020 to comply with the rules. Owners can either continue to burn high sulphur fuels and risk fines and port state control detentions and trade bans, or install scrubbing technology or switch to gasoil, he said, adding that scrubbing technology is expensive while switching to gasoil may also be expensive as the price will be substantially higher.

Grone told ABTO delegates that suppliers are likely to reduce stocks of high Sulphur fuel because of falling demand. Only 1200 owners have decided to retrofit scrubbers and there are 60,000 vessels that need to be dealt with. For the remainder of vessels needing to move to low sulphur products, delivery can be expected to be tight. The upside for tanker owners is that there is likely to be movement of gasoil from the Middle East, he said.

The challenge for shipowners will be how to pass the costs on to charterers and to realise the competitive advantage of installing scrubbers. Another strategy may well prove to be partnerships between charterers and owners of ships with scrubbers. Grone's market appraisal followed a key note speech from Axel Mattern,



CEO of the Port of Hamburg Marketing Association, who informed attendees that Hamburg has now received the green light to dredge and rebuild the entrance channel to the port. He explained it has taken 17 years and “many battles with regulators” to get the go ahead for work on the Elbe, which up until now has meant ships with a beam of 15m or more have been unable to pass each other and have had to wait to enter the port. “Hamburg is back in the game”, he said. In his closing remarks, Ian Adams, ABTO Chief Executive, com-

mented: “Bulk Terminals 2018 had a very broad agenda, but a common theme running throughout the two-day conference was that market near-term prospects appeared to be positive, which is good news for everyone involved in the bulk industry. ABTO continues to provide a valuable service to its members and to the industry as a whole.” 


덴포스, 친환경 선박을 위한 드라이브 솔루션 주제로 강연!

– 실시간 시뮬레이션 기반의 3D 설계 트렌드 방향성 제시



덴포스 드라이브는 지난 10월 25일, 부산 한국 선급 사옥에서 열린 사단법인 한국마린엔지니어링학회의 기술 세미나에 참석하여 친환경 선박을 위한 드라이브 솔루션을 주제로 강연을 진행했다. 마린엔지니어링 학회는 조선해양기자재 및 관련 산업에 관한 학문 및 기술의 향상과 보급에 공헌하고, 산·학·연·관·언의 정보교류 활성화와 싱크탱크 역할을 수행하는 학회로서 설립 이래 선박기관관련 기자재 개발 및 연구에 많은 노력을 통해, 국내 조선기자재산업을 성장 산업으로 발전시키는데 많은 공헌을 한 기관이다. 마린엔지니어링학회에서는 매년 전기 후기 학술대회를 진행하고 있으며, 이번 후기 학술대회에서는 학회의 사업이사인 한국 해양대학교 기관시스템공학부 김종수 교수의 초청으로, 작년에 이어 올해에도 덴포스가 기술 세미나 발표를 진행하

게 되었다. 이날 행사에서는 최근 친환경 선박의 트렌드인 샤프트 제너레이터 시스템에 대한 높은 관심으로 덴포스의 기술 세미나 세션에 70여명의 학계 및 산업의 여러 전문가 여러분들이 참석해 자리를 빛냈다. 발표의 주요 내용은 돌입전류를 최소화해 선박의 발전기 부담을 경감시켜 주는 모터 스타터 기능의 드라이브 캐비닛을 포함하여, 현재 친환경 선박 분야의 메가 트렌드인 샤프트 제너레이터 시스템의 PTH, PTO 및 PTH 기능에 대한 설명, 덴포스 NXP 그리드 컨버터의 모델 특징과 기능, 덴포스 특허기술로 DNV-GL 인증을 취득한 DC 그리드용 DC Guard, 전기 추진 및 샤프트 제너레이터의 시스템의 이해도 통하여 덴포스 드라이브의 종합적인 솔루션을 소개했으며, 한국 해양과학 조사선 등에

납품된 드라이브의 국내의 적용 사례를 소개하는 시간도 가졌다. 또한, 덴포스 드라이브를 적용하여 제작한 샤프트 제너레이터 데모를 실시간 동영상 스트리밍으로 시연해 시스템 구성 및 테스트 방법에 대하여 설명했다. 이날 발표를 담당한 덴포스 드라이브 사업부 Marine&Offshore 영업 담당, 김대근 차장은 “보다는 미래와 환경을 위해 글로벌 친환경 선박에 적용되는 덴포스 친환경 기술을 여러 분야의 전문가와 공유 및 공감할 수 있는 소중한 뜻깊은 시간이었다”라고 소감을 밝혔다. 참석자들은 발표 후 많은 질문을 통해 산업의 트렌드를 선도하는 덴포스의 제품 및 솔루션에 대한 관심을 보여, 향후 마린 비즈니스의 밝은 미래를 기대할 수 있는 뜻깊은 시간이었다는 평이다. 

INTTRA 아시아 기술 서밋: 디지털화 팽창, 표준 필요성 증가



세계 최대의 중립 전자 거래 플랫폼으로서 해양운송업계의 중심에서 소프트웨어 및 정보를 제공하고 있는 INTTRA는 이번주 싱가포르에서 행동을 위한 혁신이라는 주제에 초점을 두고 연례 아시아 기술 서밋을 주최했다. 서밋에서 INTTRA는 인트라 파일럿 요금 개시와 계획했던 Avantida의 북미 지역으로의 확장, 그리고 최상의 전략적 이슈들을 강조하는 업계 설문조사의 결과를 발표했다.

이번 서밋에는 200명이 넘는 선임 선박 및 기술 경영진이 참석했는데, 그들 중 70%는 C 수준급 혹은 해양 물류담당 SVP를 담당하고, 30%는 기술 및 물류 전문가를 대변하는 사람들이었다. 회사별로는 42%가 화물 운송업체 및 BCO, 41%는 기술관련 회사, 17%가 캐리어 업체였다. 이 행사는 컨테이너 운송 전반의 협업을 위한 포럼이라는 인식과 함께 해운 업계의 디지털 전환을 촉진하기 위한 것이었다.

올해의 싱가포르 테크 서밋에서 나온 몇 가지 중요한 주제가 있는데, 그 중 하나는 해상 공급망에서의 주요 난제인 데이터 사일로 및 비호환성이다. 공급망 전체에서 데이터를 공유하며 상호 운용할 수 없는 것이 업계에서 여전히 많은 어려움을 겪고 있는 근본원인이다. 기존의 사

일로는 데이터를 공유하고 공동작업 프로세스를 만드는 것을 너무 어렵게 하고 있다. 컨테이너 가시성 부족, 컨테이너 공간 확보의 어려움, 배달시간 예측가능성 빈약 및 심지어 예약부도와 같은 것은 핵심 문제의 증상으로, 정보가 거래 당사자간에 자유롭게 흐르지 않기에 나타나는 문제들이다. 서밋참석자를 대상으로 한 설문조사 결과 (아래 참조) 거의 50%가 실시간 컨테이너 가시성을 화물 운송업체의 주요 관심사로 나타냈다.

업계는 거래 파트너 간의 자유로운 정보의 흐름을 보장하기 위한 데이터 표준을 필요로 한다. 데이터 표준 및 데이터 공유 프로토콜을 갖추면 캐리어, 항구, 화물 운송업체 및 BCO간의 정보 흐름이 크게 향상될 것이다. 업계는 API, EDI, 실시간 컨테이너 상황, 문서 전송, IoT 데이터 및 블록 체인 연결성 등을 포함한 다양한 영역에서 표준 개발의 필요를 갖고 있다. 설문조사에 응한 참석자의 91%에 의하면 동의된 표준 및 프로토콜을 작성하는 것이 필수적이다.

네트워크는 해상 운송에서 진정으로 지능적인 공급망을 달성하는 열쇠가 될 것이다. 네트워크의 핵심적 약속은 한번 연결하면 모든 네트워크 구성원과 원활하게 상호 운용할 수 있다는 기능이다. 설정된 데이터 공유 표준을 기반으로 한 해양 네트워크는 컨테이너 해운업체로 하여금 변화를 예측하고 예기치 못한 사건을 자동으로 감지하고 대응할 수 있게 하는 디지털화의 다음 단계로의 도약을 가능하게 할 것이다. 좋은 소식은 응답자의 71%가 완전한 디지털화를 추진하고 있다는 설문 조사를 통해 알 수 있듯이 디지털화가 이미 증가하고 있다는 사실이다.

INTTRA의 CEO 존 페이씨는 “올해 초 INTTRA는 업계가 혁신에서 행동으로 옮겨갈 준비가 되었다고 선언했다”고 말하고 이어서 INTTRA가 세계에서 가장 큰 공급망인 e2open과 합병한 것을 포함하여 업계에서는 짧은 지난 몇 개월 동안 이미 행동으로 나아갈 수 있도록 하는 많은 변화가 있어왔다. 컨테이너화물 업계에서 가장 큰 중립 네트워크인 우리 회사는 실시간 컨테이너 가시성 및 향상된 요금관리를 비롯한 오랜 도전 과제들을 해결하고 해양운송 생태계 전반에 걸친 디지털화를 더욱 진전시키는 데 도움을 줄 수 있는 위치에 서있다”고 말했다. 🚢

When Salvage becomes Wreck Removal

Alistair Johnston, Director, Campbell Johnston Clark, offers guidance on the issues facing a salvor when a salvage operation becomes a wreck removal

It is easy to think that in circumstances where a salvor has contracted to salvage a vessel and her cargo, in the event that the vessel becomes a total loss under its hull insurance, the contract moves into a wreck removal contract fairly seamlessly. Of course, that can be the case but very often there are a number of discussion points between owners, hull insurers and P&I insurers that can mean that the salvor can be left in a period of 'unknown' whilst decisions are made behind the scenes. There is nothing sinister in this; indeed everybody on shipowners' side will generally want to move things along as fast as they can and ensure that a total loss vessel is removed as efficiently and economically as possible. There are numerous extraneous factors though that need to be considered and, whilst it is impossible to anticipate every single one and many of the criteria for decisions depend on the facts of the factual scenario, there are some rules of thumb that salvors ought to think about when faced with this situation.

Let's try and put this into context by assuming a casualty of a general cargo vessel (approximately 20 years old) that has grounded on a fairly remote coast line*. She is in ballast and grounded due to bad weather, having dragged anchor. Her market value is somewhere in the region of US\$3 million but her insured value is US\$5 million under an English law hull insurance policy.

Salvors attend promptly and enter into an LOF contract with the Owners. Seeing that the vessel is quite badly damaged



Alistair Johnston

but not impossible to salvage, Salvors invoke SCOPIC. Initial hopes to refloat the vessel are hampered by bad weather and as a result the vessel's ground reaction increases; ultimately it becomes clear that she is going to become further damaged with repair and salvage costs increasing significantly. Owners' surveyors are not completely sure how much repair work is going to be needed as, due to weather conditions, a dive survey cannot be carried out. They take the view, however, that the vessel is almost certainly going to be uneconomical to repair in terms of her commercial value. Their question is whether or not the repairs

are going to exceed the insured value of the vessel and therefore whether she is a constructive total loss under her hull insurance policy. Various factors need to go into that calculation, including cost of repairs but also cost of salvage and, under a recent Court of Appeal decision of the *Renos*, SCOPIC costs are also a factor to be considered in assessment of constructive total loss under a hull insurance policy in the UK. It is worth noting at this juncture that the decision in the *Renos* is subject to appeal in the Supreme Court early next year.

The Owners submit Notice of Abandonment under their hull insurance policy to their underwriters for consideration and notify their P&I insurers but the hull underwriters need a little time to assess whether or not the vessel is actually a constructive total loss under her hull insurance. In the meantime, the salvage contract continues to run and SCOPIC increases

on a daily basis. Of course the salvors continue to make every attempt to save the vessel under the LOF contract. Ultimately, though they also have to accept that notice will be given by P&I of five days to terminate SCOPIC or the possibility that the salvage contract itself can come to an end as there is no prospect of successfully salvaging the property with value. Local authorities may, however, insist that the LOF

involved in the project does have a slight advantage over other potential bidders for a wreck removal contract and the P&I club will be well aware of this. Familiarity with the status of the casualty and having equipment already mobilised and on site can result in a financial saving for P&I insurers funding the wreck removal. If the P&I insurers and the owners decide to put the entire wreck removal contract out to bid

That is one of the risks but salvors will look to counter the financial impact of this and endeavour to use the advantages that they have in terms of being on site and familiarity with the vessel etc to their advantage to put themselves forward for a wreck removal contract utilising that knowledge in their bid.

contract remains in place and salvors need to ensure that they have good dialogue with the owners, hull underwriters and particularly the P&I insurers to constantly assess costs and progress generally, plus what spread of equipment should remain on site.

In our scenario, after a period of a week or so, the underwriters accept that the vessel is a constructive total loss under the hull policy and agree to pay her hull insurance value to the owners.

We should just mention here that not every insurance regime works the same as in the UK. Insurance policies subject to other laws and jurisdiction deal with assessment of total loss in slightly different ways and it is always worthwhile, if you are a salvor and faced with a likely total loss of a vessel when you have a salvage contract in place, endeavouring to try to find out as best you can what insurance regime applies to the hull insurance policy itself so that you can take advice as necessary.

With a total loss now agreed with the hull underwriters, the P&I club will now want to take a very active role in terms of wreck removal and also want to discuss with the salvor bringing the LOF contract and SCOPIC to an end and move towards a wreck removal. Different factors here impact the speed of that decision and in particular the local authorities will play a significant part in that. A salvor who has been

then some of that advantage falls away. The key therefore for any salvor and any sub-contractors is to ensure that throughout the operation there is full and proper dialogue with the owners and their insurers And to anticipate likely scenarios and work to them in terms of offering alternative services with a view to keeping outlay down but also ensuring that, sufficient equipment etc is there and on site in the event that a decision is promptly made for a wreck removal. Everybody wants results and obviously it is always disappointing for a salvor who has secured an LOF contract to find that that contract comes to an end as a result of bad weather etc causing further damage to a vessel unexpectedly. That is one of the risks but salvors will look to counter the financial impact of this and endeavour to use the advantages that they have in terms of being on site and familiarity with the vessel etc to their advantage to put themselves forward for a wreck removal contract utilising that knowledge in their bid.

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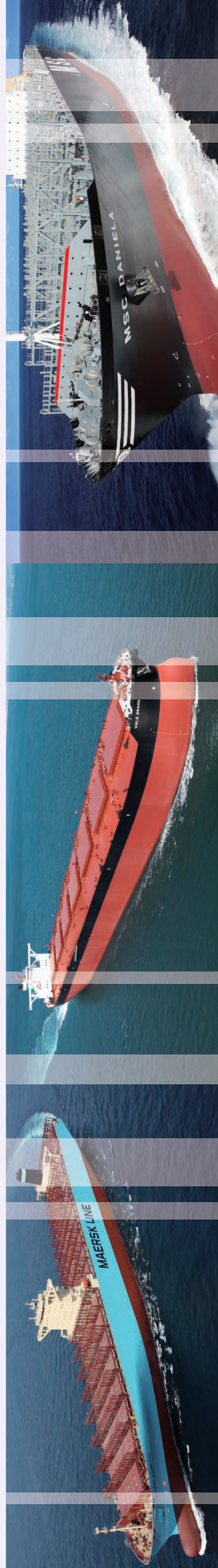
Korea Shipbuilding Orders awarded to domestic shipyards in 2015~2018

Korea Shipbuilding Orders

Data	Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard
Jan	174,000m³ LNG carriers	2 vessels	USD 400 million	Korea Line Corporation, Korea	The end of 2017	Daewoo Shipbuilding & Marine Engineering
	174,000m³ LNG carriers	2 vessels	USD 400 million	Hyundai LNG Shipping, Korea	The end of 2017	Daewoo Shipbuilding & Marine Engineering
	19,200 TEU container ships	3 vessels	USD 450 million	Scorpio Group, Monaco	-	Samsung Heavy Industries
	LNG carriers	2 vessels	USD 416 million	SK shipping, Korea	The end of 2017	Samsung Heavy Industries
	319,000 DWT VLCCs	2 vessels	USD 198 million	Maran Tankers Management, Greece	-	Daewoo Shipbuilding & Marine Engineering
	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	Valies 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)	-	Cosmospin Management S.A, Greece	-	Dae Sun Shipbuilding & Engineering
Feb	180,000m³ LNG carriers	1 vessel	-	Mitsui O.S.K Lines, Japan	2018s	Daewoo Shipbuilding & Marine Engineering
	38,000m³ liquefied petroleum gas and ammonia carriers	2 vessels	-	Asian ship owner	-	Hanjin Heavy Industries & Construction
	20,100 TEU container ships	4 vessels	USD 619.57 million	Mitsui O.S.K Lines, Japan	2017, August	Samsung Heavy Industries
	LR1 tankers	2 vessels	KRW 320 billion	BW, Singapore	2016 ~ 2017	STX Offshore & Shipbuilding
	319,000 DWT VLCCs	2 vessels	USD 198 million	Maran Tankers Management, Greece	The end of 2016	Daewoo Shipbuilding & Marine Engineering
	20,600 TEU container ships	3 vessels	-	CMA CGM, France	The end of 2017	(HIC)-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
2015	156,000 tons oil tankers	2 vessels	-	Maran Tankers Management, Greece	-	Daewoo Shipbuilding & Marine Engineering
	5,200 ton training vessel	1 vessel	-	-	-	Hanjin Heavy Industries & Construction
	74,000 tons LR1 tankers	8 units (4 optional vessels)	USD 375 million	Marshall Islands-based ship owners	The end of 2016	STX Offshore & Shipbuilding
	300,000 DWT VLCCs	10 units (5 optional vessels)	USD 1 billion	The National Shipping Company of Saudi Arabia	2017s	Hyundai Samho Heavy Industries
	19,630 TEU container ships	11 vessels	USD 1.1 billion	Maersk Line A/S, Denmark	2018s	Daewoo Shipbuilding & Marine Engineering
	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
	Product Carriers	4 vessels	USD 144 million	Scorpio Tankers, U.S.A	The first of 2017	Hyundai Mipo Dockyard
	84,000m³ LPG Carriers	2 vessels	-	Asia ship owner	2017s	Daewoo Shipbuilding & Marine Engineering
	74,000 tons LR1 tankers	4 units (2 optional vessels)	-	Greece ship owner	The second half of 2017	STX Offshore & Shipbuilding
	173,400m³ LNG Carriers	2 vessels	USD 400 million	BW Group, Singapore	The first half of 2019	Daewoo Shipbuilding & Marine Engineering
	84,000m³ LPG carriers	2 vessels	-	Asia ship owner	2017s	Daewoo Shipbuilding & Marine Engineering
	319,000 tons VLCCs	2 vessels	-	Maran Tankers Management, Greece	2017s	Daewoo Shipbuilding & Marine Engineering
	114,000 tons products carriers	2 vessels	-	Sea Tankers Group	2017, September	Daehan Shipbuilding
	158,000 DWT oil products carriers	2 vessels	-	Ditas Shipping, Turkey	2018s	Hyundai Heavy Industries
2016	40,000 DWT products carriers	2 vessels	-	Greece ship owner	-	Hyundai Mipo Dockyard
	159,000 DWT oil tankers	2 vessels	-	AMPTC, Kuwait	2018s	Hyundai Mipo Dockyard
	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	-	Ishin Marine Transport, Korea	The end of 2017	Hyundai Mipo Dockyard
	31,000 tons Car ferry	1 vessels	-	Weidong Ferry	The end of 2018	Hyundai Mipo Dockyard
	180,000m³ LNG carriers	2 vessels	USD 367 million	Europe ship owner	-	Samsung Heavy Industries
	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
Oct	157,000 DWT oil tankers	2 vessels	-	Viken, Norway	-	Samsung Heavy Industries
	113,000 DWT oil tankers	2 vessels	USD 220 million	-	-	Samsung Heavy Industries

	Oct	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 product carriers	6 vessels				Hyundai Mipo Dockyard
		LNG Bunkering Vessel	1 vessel		Bernhard Schulte, Germany	The end of 2018	Hyundai Mipo Dockyard
	Jan	114,000 tons product carriers	2 vessels		SFL, France	3th quarter of 2019	Daehan Shipbuilding
		50,000 tons oil tankers	1 vessel		Fukuji 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		Eneasel, Greece	The end of 2018	Hyundai Heavy Industries
		173,400m ³ LNG carriers	2 vessels		Europe ship owner	The end of 2019	Daewoo Shipbuilding & Marine Engineering
	Mar	114,000 tons oil tankers	4 vessels	USD 240 million	Sovcomflot, Russia	3th quarter of 2018	Hyundai Samho Heavy Industries
		21,000m ³ 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
		300,000 DWT VLCCs	2 vessels		Sentek Marine, Singapore	The first of 2019	Hyundai Samho Heavy Industries
	May	11,200 DWT product oil & chemical tanker	4 vessels		Oceania ship owner	The first of 2019	Samsung Heavy Industries
		7,500m ³ LNG carriers	3 vessels		Korea ship owner	The end of 2018	STX Offshore & Shipbuilding
		114,000 DWT oil tankers	2 vessels	USD 100 million	Korea Line, Korea	The end of 2019	Samsung Heavy Industries
	Jun	RO-RO Ship	2 vessels	USD 117.8 million	Metrostar Management, Greece	The end of 2018	Daehan Shipbuilding
		318,000 tons VLCCs	4 vessels		CLdN, Luxembourg	The end of 2019	Hyundai Mipo Dockyard
	Jul	84,000m ³ LPG carriers	2 vessels		Maran Tankers Management, Greece		Daewoo Shipbuilding & Marine Engineering
	Aug	300,000 tons VLCCs	5 vessels		Vitol	The first of 2019	Hyundai Heavy Industries
	Sep	81,000 DWT bulk carriers	4 vessels	USD 420 million	Hyundai Merchant Marine, Korea	The first of 2019	Daewoo Shipbuilding & Marine Engineering
		325,000 tons VLCCs	10 vessels	USD 800 million	Bahri, Saudi Arabia	The first of 2020	Hyundai Mipo Dockyard
	Oct	LNG carriers	5 vessels	USD 400 million	Polaris Shipping, Korea	The first of 2021	Hyundai Heavy Industries
		300,000 DWT VLCCs	1 vessel		Greece, Maran Gas Maritime		Daewoo Shipbuilding & Marine Engineering
	Dec	VLCCs	1 vessel		Greece, Eneasel		Hyundai Heavy Industries
		180,000m ³ LNG carriers	1 vessel	USD 190 million	Korea, Hyundai Glovis		Hyundai Heavy Industries
		170,000m ³ LNG carriers	2 vessels		Greece, Aeolos		Daewoo Shipbuilding & Marine Engineering
	Jan	170,000m ³ VLGCs	3 vessels	USD 370 million	Russia, Sovcomflot	2020s	Samsung Heavy Industries
	Feb	12,000 TEU container ships	8 vessels	USD 220 million	KOTC, Kuwait	The first of 2020	Daewoo Shipbuilding & Marine Engineering
		173,400m ³ LNG carriers	2 vessels	USD 370 million	Asian ship owner	2019s	Hyundai Heavy Industries
	Mar	180,000m ³ LNG carriers	1 vessel		Oceania ship owner	The first of 2021	Samsung Heavy Industries
		VLCCs	2 vessels	USD 260 million	Korea Line, Korea		Daewoo Shipbuilding & Marine Engineering
	Apr	VLCCs	1 vessel		Europe ship owner	The end of 2019	Daewoo Shipbuilding & Marine Engineering
		174,000m ³ LNG Carriers	2 vessels	USD 370 million	U.S.A ship owner	First quarter of 2020	Daewoo Shipbuilding & Marine Engineering
		152,700 DWT tankers	4 vessels	USD 360 million	Singapore, AET	July and October 2020	Samsung Heavy Industries
	Jun	173,400m ³ LNG carrier	2 vessels	USD 370 million	Greece, Alpha Gas S.A.		Samsung Heavy Industries
	Jul	173,400m ³ LNG carriers	1 vessel		Norway, Seatankers Management	2020s	Daewoo Shipbuilding & Marine Engineering

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





Offshore Plant Orders

Offshore plant orders awarded to domestic shipyards in 2011-2017

Data	Type	Number of vessel	Amount	Ship owner	Delivery	Shipyard	
2011	Jul	Drillship	2 vessels	USD 1.1225 billion	Maersk, Denmark	July 2014	Samsung Heavy Industries
	Aug	LNG-FSRU	1 vessel	USD 280 million	Excellerate Energy, U.S.A	First quarter of 2014	Daewoo Shipbuilding & Marine Engineering
		Semi-submersible Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Second half of 2014	Daewoo Shipbuilding & Marine Engineering
	Sep	Well Intervention Vessel	2 vessels	USD 420 million	Eide Marine Services AS, Norway	2013	STX Finland
		Drillship	1 vessel	KRW 600 billion	Noble Drilling, U.S.A	Second half of 2014	Hyundai Heavy Industries
	Oct	Fixed Offshore Platform	-	USD 1.4 billion	Chevron, U.S.A	Second half of 2014	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 unit	USD 550 million	Offshore drilling company, Americas	-	Daewoo Shipbuilding & Marine Engineering
		Platform Supply Vessel	1 unit	-	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	STX OSV
		Pipe Laying Support Vessel	2 units	USD 500 million	Odebrecht, Brazil	August of 2014	Daewoo Shipbuilding & Marine Engineering
	Nov	Offshore facilities (Gas platform and various facilities)	-	USD 900 million	Major multinational oil companies	2nd half of 2014	Hyundai Heavy Industries
CPF (Central Processing Facility)		-	KRW 2.6 trillion	INPEX, Australia	4th quarter of 2015	Samsung Heavy Industries	
Jan	Semi-submersible rig	1 unit	USD 620 million	Odjeil, Norway	by mid 2014	Daewoo Shipbuilding & Marine Engineering	
Feb	LNG-FSRU	-	-	Hoegh, Norway	-	Hyundai Heavy Industries	
Mar	Offshore Platform	1 unit	USD 560 million	DONG E&P AS, Danish	April 2015	Daewoo Shipbuilding & Marine Engineering	
	FFSO	1 unit	USD 2.0 billion	INPEX, Australia	April 2016	Daewoo Shipbuilding & Marine Engineering	
Apr	Drillship	1 vessel	USD 645 million	Enasco plc	Third quarter 2014	Samsung Heavy Industries	
	Semi-submersible Drilling Rig	2 units	USD 1.1 billion	Songa Offshore, Norway	Mid 2015	Daewoo Shipbuilding & Marine Engineering	
May	Drillship	1 vessel	USD 600 million	Seadrill, Norway	Second half of 2014	Samsung Heavy Industries	
	Drillship	1 vessel	USD 655 million	Diamond Offshore Drilling Limited., U.S.A	4th quarter of 2014	Hyundai Heavy Industries	
Jun	Semi-submersible drilling rig	1 unit	USD 700 million	Fred Olsen Energy, Norway	March 2015	Hyundai Heavy Industries	
	LNG-FFSO	1 unit	-	Petroleum Nasional Berhad, Malaysia	June 2015	Daewoo Shipbuilding & Marine Engineering	
Jul	Drillship	1 vessel	USD 645 million	Enasco 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	-	Excellerate, U.S.A	Between early 2015--2017	Daewoo Shipbuilding & Marine Engineering	
	Drillship	1 vessel	USD 620 million	Rowan, U.S.A	First half of 2015	Hyundai Heavy Industries	
Sep	Drillship	1 vessel	USD 623 million	-	-	Samsung Heavy Industries	
	Drillship	4 vessels	USD 2.06 billion	Transocean, U.S.A	One-by-one from mid 2015	Daewoo Shipbuilding & Marine Engineering	
Oct	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	
	Gas Production Platform (topside)	1 unit	USD 1.1 billion	Statoil, Norway	Mar 2016	Hyundai Heavy Industries	
Jan	LNG-FSRU	1 vessel	-	BW Maritime, Singapore	2015	Samsung Heavy Industries	
Mar	Floating Production Unit (FPU)	1 unit	USD 1.3 billion	Total, France	First half of 2016	Hyundai Heavy Industries	
	Tension Leg Platform (TLP)	1 unit	USD 700 million	Total, France	First half of 2015	Hyundai Heavy Industries	
Apr	FFSO	1 unit	USD 1.9 billion	Chevron, U.S.A	-	Hyundai Heavy Industries	
May	Semi-Submersible Drilling Rig	1 unit	USD 750 million	Diamond Offshore, U.S.A	Nov of 2015	Hyundai Heavy Industries	

		Ultra-deepwater Drillship	1 unit	USD 515 million	Enasco, United Kingdom	Third quarter of 2015	Samsung Heavy Industries
	Jun	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
		Ultra-deepwater Drillship	2 units	USD 600 million	Seadrill, Norway	Second half of 2015	Samsung Heavy Industries
	Jul	Semi-Submersible Rig	1 vessel	USD 718 million	Stena, Sweden	First half of 2016	Samsung Heavy Industries
		Ultra-deepwater Drillship	1 unit	USD 570 million	Atwood Oceanics, U.S.A	The end of 2015	Daewoo Shipbuilding & Marine Engineering
		Drillship	1 unit	USD 550 million	-	Dec of 2015	Samsung Heavy Industries
	Sep	Ultra-deepwater Drillship	1 unit	USD 600 million	Ocean Rig, Greece	Dec of 2015	Samsung Heavy Industries
		Jack-up Rig	1 unit	USD 530 million	Maersk Drilling, Denmark	The middle of 2016	Daewoo Shipbuilding & Marine Engineering
		Drillship	2 vessels	USD 1.24 billion	-	Second half of 2015	Daewoo Shipbuilding & Marine Engineering
	Oct	Drillship	1 vessel	USD 520 million	Transocean, U.S.A	The middle of 2016	Daewoo Shipbuilding & Marine Engineering
		LNG-FSRU	1 unit	-	Gas Sayago (Joint venture)	Sep of 2016	Daewoo Shipbuilding & Marine Engineering
		LNG-FSRU	1 unit	-	BW Maritime, Singapore	Early 2016	Samsung Heavy Industries
	Dec	LNG-FSRU	1 unit	-	Mitsui OSK Line, Japan	The middle of 2016	Daewoo Shipbuilding & Marine Engineering
		LNG-FPSO	1 unit	USD 1.45 billion	Petroleum Nasional Bernhad, Malaysia	2018	Samsung Heavy Industries
	Feb	Drillship	2 vessels	USD 1.29 billion	Oceania	First half of 2017	Samsung Heavy Industries
	Apr	Central Processing Platform	2 units	USD 700 million	Hess E&P Malaysia, Malaysia	The end of 2016	Hyundai Heavy Industries
	Jul	Fixed offshore platform	4 units	USD 1.94 billion	ADMA-OPCO, UAE	The end of 2019	Hyundai Heavy Industries
2014		Fixed Offshore Platform & Submarine Cable	4 units	USD 1.9 billion	ADMA-OPCO	Second half of 2019	Hyundai Heavy Industries
	Nov	Offshore Platform	1 unit	USD 700 Million	Royal Dutch Shell	-	Samsung Heavy Industries
		FPU	1 unit	-	-	-	-
	Jun	Offshore Platform	2 unit	USD 1.06 billion	Statoil, Norway	The end of 2018	Samsung Heavy Industries
2015	Jul	FLNG	3 unit	USD 4.7 billion	Royal Dutch-Shell	-	Samsung Heavy Industries
	Dec	LNG-FSRU	1 unit	USD 587 million	Maran Gas Maritime, Greece	First half of 2020	Daewoo Shipbuilding & Marine Engineering
2016		FPU	1 unit	USD 1.27 billion	British Petroleum, United Kingdom	Augst of 2020	Samsung Heavy Industries
	Jan	FSRU	1 unit	USD 230 million	Høegh LNG, Norway	May of 2019	Samsung Heavy Industries
	Feb	FSRU	1 unit	USD 230 million	Høegh LNG, Norway	4th quarter of 2018	Hyundai Heavy Industries
	Jun	FLNG	1 unit	USD 2.50 billion	Turkey	-	Hyundai Heavy Industries
	Aug	FSRU	1 unit	USD 290 million	ENI, Italy	-	Samsung Heavy Industries
	Oct	LNG-FSRU	1 unit	KRW 250 billion	Swan Energy, India	First half of 2020	Hyundai Heavy Industries
	Dec	LNG-FSRU	1 unit	-	Marubeni-Sojitz-Pertamina Consortium	-	Samsung Heavy Industries
	Jul	173,400m ³ LNG carriers	1 unit	-	Maran Gas Maritime, Greece	-	Daewoo Shipbuilding & Marine Engineering
					Maran Gas Maritime, Greece	The first of 2021	Daewoo Shipbuilding & Marine Engineering

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



Monitor your highly corrosive scrubber systems with ultrasonic technology

Coltraco

The International Maritime Organization (IMO) regulated that ships must cut their sulphur oxide emissions by 2020. As a result of this, shipping companies have turned to scrubber systems, which reduce the amount of sulphur emitted from burning fuels. Scrubber systems allow a ship to continue using cheaper bunker fuel than low sulphur fuel which reduces the switching cost to an entirely new fuel system. The sulphur in exhaust gas is neutralised in the scrubber tower by the

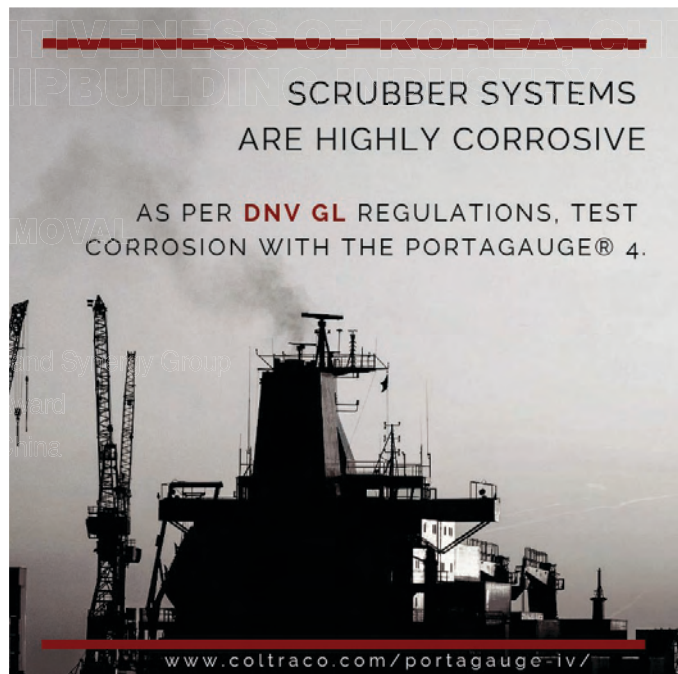
absorbent used such as sea water and passed out from the discharge pipe.

Unfortunately, scrubber systems come with their own issues. The piping in the scrubber system is very prone to corrosion, particularly in the discharge valve. This is due to the elevated temperatures of the exhaust gas scrubber discharge which creates a very corrosive environment. The risk is that a reduction in wall thickness would mean that corrosion is present.

Therefore, DNV GL has introduced a requirement whereby piping in scrubber systems should be annually checked for their thickness.

As stated in 2017 by DNV GL: "Newer SOx scrubber systems often are equipped with diffusers inside the distance piece. These diffusers themselves are vulnerable to corrosion attacks, but more important, their fixation to the distance piece, either welded or bolted, often forms a weak spot in the corrosion protection of the distance piece. For the safety of the crew and the vessel, we believe it is necessary that the condition of the distance piece be confirmed on a yearly basis."

DNV, GL - Survey requirements for fleet in service Part 7, Chapter 1, Section 2, 3.1.9: "The wall



thickness of distance piece(s) for SOx scrubber system discharge valve(s) shall be verified to be undiminished.”

The recommended solution is UTM (ultrasonic thickness measurement). Ultrasonics is the simple and effective solution for testing for corrosion, required by DNV GL. Coltraco Ultrasonics are proud industry experts in ultrasonic technology. Coltraco manufacture two industry leading ultrasonic thickness gauges, ideal for the regular testing of scrubber systems.

Portagauge® 3 is a low cost single-echo portable thickness gauge. The quick, simple and hardy Portagauge® 3 allows accuracy of ±0.1mm even on corroded, challenging and some plastic surfaces. With a 50 hour battery life, measuring thickness ranges between 1.5mm to 99.9mm and a variety of verified testing materials such as steel, quartz and glass PVC, the Portagauge® 3 provides the versatility to suit a range of safety needs. This easy to use, ighly dependable

handheld unit is ideal for scrubber systems.

For more advanced requirements - identifying the metal only thickness - Coltraco Ultrasonics also have the Portagauge® 4 which is an advanced thickness gauge. Offering unparalleled accuracy, the Portagauge® 4 uses triple echo technology which allows operators to inspect the underlying metal thickness, independent of any surface coatings such as paint. For applications where true metal readings and a higher degree of accuracy is required, the Portagauge® 4 is the ideal solution. With a variety of sensor options available and underwater variants, this range of units can easily be adapted to a variety of different roles and requirements.

- TEL: +44-207-629-8475
- <http://www.coltraco.com>

라인 스캔 비전 시스템 ‘인사이트(In-Sight®) 9902L’ 출시

코그넥스

머신 비전 분야의 세계적인 선도기업인 코그넥스는 라인 스캔 비전 시스템 ‘인사이트(In-Sight®) 9902L’을 출시했다고 밝혔다. 이번에 출시한 In-Sight® 9902L은 고해상도 비전 시스템으로, 카메라에서 이미지를 직접 처리하는 유일한 임베디드 산업용 라인 스캔 시스템이다. 특히 빠르게 움직이는 생산 라인의 대형 물체 또는 원통형 물체를 상세하게 검사하는 데 매우 적합하다.

32MP 해상도의 이미지를 제공하며, 이미지의 밝기를 높일 수 있는 In-Sight 9902L은 매우 정밀한 검사를 수행할 수 있어 미세한 결함까지도 감지할 수 있다. 그리고 67kHz의 매우 신속한 라인 스캔 주파수 속도를 갖추고 있어 각 데이터 라인을 14.9마이크로초 이내로 인식할 수 있다.

좁은 시야각으로도 대형 부품의 이미지 캡처가 가능하며, 공간이 협소한 생산 라인에 쉽게 마운트 가능한 In-Sight® 9902L은 시야나 마운트 공간이 제한된 환경에 특히 이상적이다. 별도의 제어기도 필요치 않아 설치하는 장비의 수도 줄일 수 있다. 혹독한 공장 환경에서도 액체나 먼지로부터 제품을 보호하는 IP67 등급의 하우징으로 외부 인클로저가 필요하지 않다.

In-Sight® 9902L은 이지빌더 인터페이스가 내장된 인사이트 익스플로

러 소프트웨어로 머신 비전 검사 설정 및 모니터링을 수행한다. 이지빌더 인터페이스는 작업자에게 비전 애플리케이션을 간편하게 설정할 수 있는 단계별 지침을 안내해 초보 사용자도 쉽고 빠르게 비전 애플리케이션을 구성할 수 있도록 해준다.

조재휘 코그넥스 지사장은 “코

그넥스는 어떠한 공정 환경에서도 높은 수준의 검사를 수행할 수 있는 비전 제품 및 솔루션 개발에 전념하고 있다. In-Sight® 9902L은 모든 기능을 갖춘 유일한 라인 스캔 시스템으로, 고성능 비전 툴을 내장해 이미지를 고해상도로 빠르게 인식하고 카메라에서 직접 처리한다. 특히 움직이는 대형 물체나 원통형 물체에 대한 검사가 가능해 다양한 고객 요구에 보다 적극적으로 대응할 수 있다.”라고 말했다.



- TEL: 02-539-9980
- <http://www.cognex.com>

Hypertherm introduces first for waterjet industry with HyPrecision predictive maintenance pumps

Hypertherm

Hypertherm, a U.S. based manufacturer of industrial cutting systems and software, introduces the industry's first predictive maintenance waterjet pumps to substantially reduce maintenance costs and disruption caused by non-planned service.



This new generation of pumps — called HyPrecision Predictive — are equipped with features such as Hypertherm's proven Advanced Intensifier Technology and new patented technologies like closed loop proportional pressure control that adjusts for pressure and temperature, oil viscosity, and hydraulic system wear parts; along with technology that enables customers to use seals up to 40 percent longer.

In addition to technologies to increase performance and reduce system downtime, the HyPrecision Predictive pumps are designed with ease of service in mind. Features such as a color-coded junction box, electrical cable harnesses, quick-disconnect fittings, and an easy access bleed-down valve all make maintenance faster and less expensive.

HyPrecision Predictive systems are also designed with safety in mind. A clear window cover lets the operator see the intensifier and attenuator. Optional electrical interlocks prevent unauthorized access and can automatically stop the pump when opened. Finally, Seal Maintenance Technology™ helps keep the top deck and shop floor free of oil and water.

"In engineering this system, we worked to really understand the pain points that companies using waterjet face. Without question, the number one issue was surprise system downtime," explains John Caron, waterjet product marketing manager. "Our new HyPrecision Predictive systems are engineered to eliminate that pain point, while delivering increased productivity and performance, improved serviceability and safety, and lower maintenance costs."

Hypertherm HyPrecision Predictive pumps are available now in six different models, ranging from 15 to 75 horsepower.

- TEL: +65-62207376
- <http://www.redbugpr.com>

Ocean Safety's full range of accredited Ocean SOLAS Ultralite liferafts now available

Ocean Safety

Ocean Safety are pleased to announce that their Ocean SOLAS Ultralite liferaft range is now available in 6, 8, 10 and 16-person models.

The first to be developed was the 12-person version of the rafts, causing a sensation last summer when they were chosen for the 2017/2018 Volvo Ocean Race in the quest to save weight. A vital 23% was shaved off the new Ultralite compared to previous similar liferaft models.

The full Ocean SOLAS Ultralite range has official MED Ship's Wheel accreditation and has now been added to Ocean Safety's extensive international catalogue of safety equipment for commercial and performance craft. While the rafts used for the Volvo race were already fully certified, the MED (Marine Equipment Directive) conformity means that the remaining liferafts in the range, the 6, 8, 10 and 16 person models can now be installed on commercial vessels throughout EU and other European countries and other flag states. The ability to provide a full range of accredited rafts is expected to open up the market potential for the Ultralite.

The Ocean SOLAS Ultralite compact liferaft is derived from Ocean Safety's original space-saving Ocean Ultralite



liferaft. It uses carbon composite technology to achieve the significant weight saving, a vital boost in the search for speed for performance yachts and other vessels where weight saving is a priority. The key areas of development have been in the inflation system, pack contents and the construction of the canister. Despite the weight reduction, the liferaft containers still offer the same strength qualities to withstand harsh marine environments.



- TEL: +44-(0)23-8072-0800
- <http://www.oceansafety.com>

Moxa Releases IIoT Edge Gateway for Microsoft Azure IoT Edge to Accelerate Edge-to-Cloud Integration

Moxa

Moxa Inc., a leader in industrial communication and networking, announced the availability of its Industrial Internet of Things (IIoT) Edge Gateway that pre-installs Microsoft Azure IoT Edge to provide

Microsoft Azure customers with an easy-to-use solution to extend their IT infrastructure and enable OT data connectivity within their industrial applications. To enable further OT/IT convergence, the industrial-grade edge gateway is also optimized for IIoT applications in the factory automation, intelligent transport system (ITS), energy, and oil and gas sectors.

Moxa's IIoT Edge Gateway also integrates Moxa's industrial protocol expertise, offers 10-year long-term Linux support, and facilitates optimized device management for large-scale deployments. Moxa will demonstrate the Azure enabled IIoT Edge Gateway at the IoT Solutions World Congress to be held in Barcelona, October 16-18, 2018. The demonstration will focus on solutions that provide cloud integration as well as multiple protocol conversions to IIoT applications while preserving their investments in existing industrial infrastructure.

"We are excited about our collaboration on Azure because this will enable our customers to take advantage of three decades of OT, industrial networking, and protocol expertise that Moxa offers while enabling tighter integration with IT expertise from Microsoft," said Andy Cheng, President, Strategic Business Unit at Moxa Inc. "The Azure cloud infrastructure with Azure Stream Analytics, machine learning, device provisioning, and security combined with device connectivity, configuration, and industrial protocols from Moxa offer an integrated starting point for our Industrial IoT customers."

Integrating Azure IoT Edge with Moxa's IIoT gateways, built on Moxa Industrial Linux, benefits customers through long product longevity, secure file system writing, and enables improved security through continuous security patches within a 10-year long-term supporting period. Combining this with Moxa's industrial protocol expertise provides cloud connectivity for existing brownfield applications.

"Moxa has worked closely with our team to integrate into our Azure IoT ecosystem with their IIoT Edge Gateways. We are pleased they will offer Azure IoT Edge pre-installed in order to



streamline customers' initial experience with development and, ultimately, deployment of Azure IoT solutions. Moxa brings a deep level of OT expertise to our Azure ecosystem," said Sam George, Director, Azure IoT at Microsoft Corp.

The compact edge gateway is based on a low-power Arm® Cortex™-A8 1 GHz processor and is built for industrial IoT environments with many advantages, which include:

- Moxa Industrial Linux based on Debian open platform with 10-year long-term support
- Industrial-grade fanless design and DIN-rail mounting
- -40 to 70°C wide operating temperature range with LTE

module installed

- Dual auto-sensing 10/100 Mbps Ethernet ports
Moxa's proprietary 10-year long-term Linux support with Moxa Industrial Linux addresses the needs of long-term software for the power, water, oil and gas, transportation, and building automation industries. It also offers an extensive range of security fixes, making IIoT projects secure and sustainable.

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

Moxa, 에지-대-클라우드 통합 가속화하는 Microsoft Azure IoT 에지용 IIoT 에지 게이트웨이 출시

산업용 통신 및 네트워킹 분야의 선도업체인 Moxa(모싸)는 IIoT 에지 게이트웨이 제품을 출시한다고 밝혔다. 이 제품은 마이크로소프트 애저 IoT 에지(Microsoft Azure IoT Edge)를 사전에 설치해 마이크로소프트 애저 고객들에게 IT 인프라를 확장하고, 산업용 애플리케이션에서 OT 데이터 커넥티비티를 가능하게 하는 편리한 솔루션이다. OT 및 IT 융합을 더욱 가능하게 하기 위해, 이 산업용 에지 게이트웨이는 공장 자동화, 지능형 교통 시스템(ITS), 에너지, 석유 및 가스에서 사용되는 IIoT 애플리케이션에 적합하다.

Moxa의 IIoT 에지 게이트웨이는 Moxa의 산업용 프로토콜 전문성을 통합하고, 10년의 장기적인 리눅스(Linux) 지원을 제공하며, 대규모로 구축된 디바이스들의 관리를 용이하게 한다. Moxa는 2018년 10월 16일~18일 바르셀로나에서 개최한 'IoT 솔루션 월드 콘그레스'에서 이 애저 지원 IIoT 에지 게이트웨이 데모를 선보였다. 이 데모를 통해 클라우드 통합은 물론, 기존의 산업용 인프라에 대한 투자를 유지하면서 IIoT 애플리케이션에 대한 다중 프로토콜 변환을 제공하는 솔루션을 보여줬다.

Moxa의 전략 사업부 사장인 앤디 첵(Andy Cheng)은 "우리는 애저와 관련한 이 협력을 통해, Moxa의 30년간 축적된 OT, 산업용 네트워킹 및 프로토콜 전문성과 마이크로소프트의 IT 전문성을 고객들이 모두 활용할 수 있게 되어 매우 기쁘게 생각한다"라고 말했고, "애저 스트림 애널리틱스(Azure Stream Analytics), 머신 러닝, 디바이스 프로비저닝 및 보안 기능을 포함한 애저 클라우드 인프라는 Moxa의 디바이스 커넥티비티, 구성 및 산업용 프로토콜을 결합함으로써, IIoT 고객들에게 사용하기 편리한 통합형 솔루션을 제공한다"고 덧붙였다.

애저 IoT 에지를 Moxa의 산업용 리눅스 기반의 IIoT 게이트웨이와

통합함으로써, 고객들에게는 장기적인 제품 지원을 보장하고, 보안적인 파일 시스템 작성할 수 있는 혜택을 주며, 10년의 장기적인 지원 기간 동안 지속적인 보안 패치를 통해 향상된 보안을 제공한다. 이를 Moxa의 산업용 프로토콜 전문성과 결합해, 기존의 브라운필드 애플리케이션에 클라우드 커넥티비티를 제공하게 된다.

마이크로소프트의 애저 IoT 담당 이사인 샘 조지(Sam George)는 "Moxa와 마이크로소프트의 담당 팀은 Moxa의 IIoT 에지 게이트웨이를 애저 IoT 에코시스템으로 통합하기 위해 긴밀하게 협력해 왔다. 우리는 애저 IoT 솔루션을 궁극적으로 개발 및 배치하고 고객의 초기 작업을 간소화하기 위해 사전에 설치된 애저 IoT 에지를 제공하게 되어 매우 기쁘다. Moxa는 우리의 애저 에코시스템에 깊이 있는 OT 전문성을 제공한다"고 말했다.

이 컴팩트한 에지 게이트웨이는 저전력 Arm® Cortex™-A8 1GHz 프로세서 기반의, 다음과 같은 다양한 제품 특징을 갖춘 IIoT 환경을 위해 설계되었다.

- 10년의 장기간 지원되는 Debian 오픈 플랫폼 기반의 Moxa 산업용 리눅스 채택
- 산업용급 팬리스 디자인 및 DIN 레일 탑재
- LTE 모듈 탑재로 -40°C~70°C의 넓은 동작 온도 범위
- 듀얼 자동 인식 10/100Mbps 이더넷 포트

Moxa의 산업용 리눅스를 채택하고 10년의 장기적인 리눅스 지원을 제공하므로, 전력, 수도, 석유 및 가스, 교통, 빌딩 자동화 분야에 있어 장기적인 소프트웨어 지원에 대한 요구를 충족한다. 또한 IIoT 프로젝트를 안전하고 지속 가능하게 만드는 광범위한 보안 픽스를 제공한다.

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

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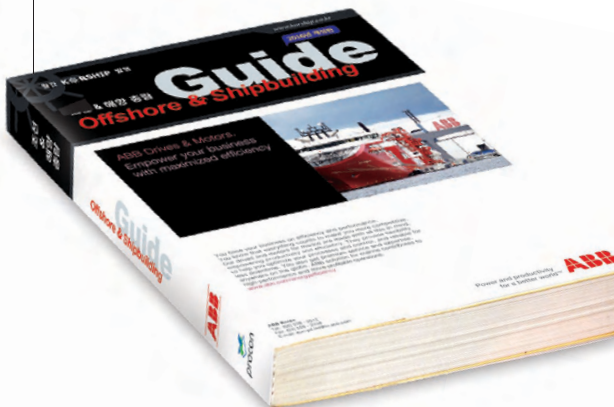
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