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Go through the cold winter and meet the arrival of spring

As long as we stick to value and focus on innovation, we will change and get rebirth. We firmly believe that as long as we are hand in hand, the future will have the power to change the world.

In 2015, let us stick together and wait for the blossom.

CCS
CHINA CLASSIFICATION SOCIETY
中国船级社

The first issue in 2015
(The 13th issue in total)

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CCS 2015 Work Conference Held in Beijing

CCS 2015 work conference was held on January 21, 2015, in Beijing. Based on summarizing the work in 2014, the conference re-identified comprehensively and deeply CCS' responsibility and position, development objectives and strategic measures, and carried out analysis of the current new circumstance and new tasks as well as those that will be faced in the near future. The conference says that in the context of the new trend, CCS will follow the general requirement of "internationalization, socialization, modernization and good service" and accelerate the steps of building first-class international classification society, in order to play in a much better way the unique and key leading and facilitating role in the global competition, transformation and upgrade of China's shipping, shipbuilding and offshore engineering industry, to actively fulfill its mission of serving national strategy, and make new contribution to the construction of China as a strong power in maritime affairs, shipping and shipbuilding.

In his report to the conference, CCS President Sun Licheng pointed out that the development of maritime industry has been upgraded to become the national strategy. Speeding up the building of first-class international ship survey body is the requirement of the national strategy and related industry, it is even more the

sacred mission of CCS. Standing at the new historical starting point, CCS should deepen its recognition of the first-class international classification society, identify the direction of development, fulfill well the important responsibility entrusted by national mission, and become the irreplaceable and important support in leading the development of related industries and promoting the construction of shipping and shipbuilding power. As the main national ship survey force, CCS will play an important role in the construction of marine, shipping and shipbuilding powers from the perspectives of guarantee capability, capability of competition, power of influence and sustainable development.

Yang Yong, CCS Party Secretary delivered a concluding speech, requiring the cadres and staff of the whole system to study and implement the spirit of the party working style and clean governance construction work meeting of the national transportation system and this conference, unify ideology and thoughts, enhance confidence, identify the situation, clarify tasks, strengthen implementation and promote the completion of various work in 2015. He also requires to ensure stable development, muster new energy and promote and deepen reform to make steady progress in new normal and accelerate the construction of first-class international classification society.

CCS Paid a Return Visit to The First 250,000dwt Series VLOC

On December 29, 2014, Zhu Kai, CCS Vice President and Chief Engineer and 5 other people paid an on-board visit to the first 250,000dwt series VLOC "harmony Shandong" of Shandong Shipping on its return from its maiden journey at Qingdao Qianwan port.

During its first voyage, the ship had 251000 tons of iron ore loaded at Port Hedland, Australia, and returned to the port of Qingdao. Zhu Kai and the others firstly enquired with ship owner and the crew about the berthing and handling situation of the ship during its first voyage, had a detailed enquiry about the operation of the machinery and electrical equipment, and then made a field inspection of the ship. No structural deficiency and equipment problem was found in the whole process.

As the first 250,000dwt series VLOC, this ship was built by Qingdao Beihai Ship Heavy Industry Co Ltd for Shangdong Shipping, it is the new generation

of large ore carrier specially designed for iron ore transportation between China and Australia. The ship has attained many latest additional notifications from CCS such as EL100, Green ship II, AMPS, GPR, BWMS, Clean, GWC etc., and is the most advanced among ships of this type in terms of safety, green environment protection and marine pollution prevention.

During the visit, Zhu Kai had a meeting with Fu Jian, Deputy General Manager of Shandong Shipping. The two sides had in-depth exchanges on international shipping, shipbuilding and the future development. Shandong Shipping said that CCS' concept of "safety, environmental protection, creating value for society and its customers" has been fully reflected in the project. Finally, the two sides made expectations for cooperation on machinery, maritime and shipping management software on the basis of the classification work.

2014 International Shipbuilding Technology Training for Southern China Was Held In Fuzhou

Co-sponsored by the Ministry of Industry and Information Technology, Ministry of Transportation, the National Development and Reform Commission, and co-hosted by China Classification Society (CCS), CNSI, Economic and Information Technology Commission of Fujian province, the 2014 technical training of new convention and new standard for international shipbuilding for southern China was held in Fuzhou on December 4, 2014.

This training is to carry out the requirement of the "implementation plan of speeding up shipbuilding structural adjustment and promoting transformation and upgrade (2013-2015)", and was held according to the "detailed specifications for implementation of technical training on new conventions, new rules and new standard for international shipbuilding" (hereinafter referred to as the "implementation rules"), the training was held in a centralized manner for five divided area. 60 students of 23 units took part in the training. 8 experts sent by CCS and the shipbuilding industry made in-depth and detailed explanations on the contents and technical implementation instruction of the four special

subjects including EEDI, HongKong Convention, the regulation of ship noise level, IACS CSR-H and GBS etc. Question and answer section also helped participants to solve the practical difficult points and puzzles in understanding and implementing the related rules and regulations.

The training deepened participants' understanding of the four new conventions and standards and their grasp of the key and difficult points in the implementation. The timely notification of the latest development of the subjects will provide important guidance for the effective implementation of relevant conventions, rules and regulations by the relevant units.

The training indicates that the five centralized trainings of new international shipbuilding conventions, rules and standards in 2014 have been completed as planned, the the training was completed with success.

In accordance with the plan of "implementation rules", a new round of nationwide centralized training will be held for areas divided in sections. It will be initiated in the first quarter of 2015, and will focus on the special subjects of regulation for polar ships, international safety regulations of gas fuel powered ships, and etc.

CCS Obtained the Qualification of Certification for the Inspection and Test Body of Logistics and Military Products



Recently, China Classification Society (CCS) was formally given the certification qualification for the inspection and test body of logistics and military products by the PLA General Logistics Department. The qualification covers the inspection and test of military ships and equipment, offshore installations, marine containers, marine life-saving equipment and etc.

The inspection and test of the basic performance of logistics and military product is an important link in the research and manufacturing, appraisal and modeling of military products, it is the necessary measure to ensure quality and performance of military products.

This certification qualification for the inspection and test body of logistics and military products is obtained subject to application, qualification re-verification, field inspection and expert assessment, and its objective is to regulate the management of inspection and test of the basic performance of logistics and military product. CCS is one of the first batch of units to obtain the qualification, and will provide excellent service for China's logistics and military products.

Key Points and Quality Control of Semi-submersible Drilling Unit Structure

By Lu Hai

The main hull structure of semi-submersible drilling unit generally consists of the lower hull, upper hull, pillars and cross arm. Of which, the pillar connects two buoys of lower hull respectively to the upper hull, and the pillars of port and the starboard are respectively connected by cross arm. Thus, what are the key points of the unit with such structural type? How to carry out quality control in the process of building?

■ Distribution of key points of semi-submersible drilling unit structure

The key points of semi-submersible drilling unit structure generally include the following key areas: the special structural members specified in rules; the area of high stress (generally refers to exceeding by 85% of the material allowable yield stress); the fatigue critical node; Z direction steel area; areas that are inaccessible during the survey of ships in service.

Take a typical deepwater semi-submersible drilling unit as an example, the key points of structure are mainly distributed in the following areas: (1) the connection of pillar and the lower floating body; (2) the connection of pillar and cross arm; (3) the connection of the pillar and upper hull; (4) moon pool corner on the upper hull; (5) the connection of crane pillar and main deck; (6) anchor cable guide base; (7) rig base. Of which, (5) to (7) belong to the heavy equipment base, and other types

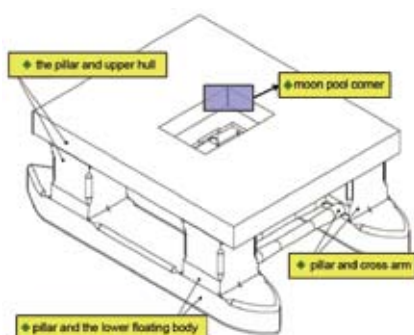


Figure 1: schematic diagram of critical areas of main hull structure of the typical semi-submersible drilling unit

of units are basically the same. (1) to (4) belong to the key structure areas peculiar to main hull of semi-submersible unit, and the typical distribution is shown in figure 1.

■ The characteristics of the key points of the structure

The key point of the structure generally has characteristics of being subject to large stress, bearing and transferring concentrated load, liable to produce fatigue damage, and causing serious consequences after the structural failure. The steel plate used in such areas is generally thicker, with high strength and high toughness level. Continuous members often make extensive use of Z direction steel, and with its complex structure, it is easy to produce stress concentration. Special attention should be given to the key node area in building process.

Here take the connection of the pillar and cross arm as an example, explaining the structural characteristics of this area in detail. Figures 2, 3 and 4 show that this area has structural intersect of the cross arm planking, internal cross bracing, pillar plate and the longitudinal bulkhead of pillar and the node type is complex. The plate thickness of this area is up to 65 mm, the material grade is up to F420 and cross arm planking and internal cross brace plate are the Z direction steel.

■ Construction quality control of the structure key points

Based on the structural feature of the area of key nodes, quality control should be conducted in building process with regard to the following aspects:

One is the construction technology. Before the construction, the shipyard shall prepare detailed and reasonable construction technology.

Overall Strength Assessment of “Exploration 3” Semi-submersible Drilling Unit

By Liang Yuanhua

“Exploration 3” semi-submersible drilling unit is designed by China ship and offshore engineering design and research institute, built in Shanghai shipyard in 1984 and put into operation. At present, it has been used for nearly 30 years. The thickness measurement data showed that the main structure corrosion rate is close to 10%, and excessive corrosion area of upper pillar and main deck were renewed during the repair in recent years. But for the lateral brace, diagonal brace and other brace strut system, as there is permanent deformation, it is worried that the overall renewal may cause risk.

Considering that the design of main structure adopted the conservative design of manual calculation, the owner wants CCS to be able to use more accurate assessment technology, in order to check whether strut brace system can still meet the requirements of strength under certain assumptions of corrosion amount and provide the economic and reasonable suggestions for maintenance of the unit structure according to the checking result.

The main technical points which need to be solved in the overall strength analysis are as follows:

Firstly, the unit’s design data, the modification situation, service, repair and maintenance information is sorted out, striving for the final model which can reflect the actual condition of the unit, especially in the aspect of structure and center of gravity of weight;

Secondly, carry out the analysis of environment load of service area. If it is not higher than unit’s original design environment conditions, it can be checked according to such conditions; if it is higher than unit’s design environment conditions, it should adopt

the updated higher environmental conditions;

Thirdly, according to the requirements specified by the owner, for the shell plating of the unit strut system, respectively deduct 8%, 10% and 12% of the original thickness of plate, and then carry out the overall strength check of the unit under the condition of the original design;

Fourthly, carry out full probability spectrum fatigue analysis of the unit’s key nodes based on the S-N curve, and for nodes whose fatigue life calculated by using the method of spectrum fatigue calculation did not meet the requirements of continual use for a fixed number of year, carry out the crack propagation life prediction based on fracture mechanics by combing the special survey data;

Fifthly, based on the assessment results, conduct classification of the safety status of key nodes of unit structure, and develop more economic and reasonable plan for structure maintenance in connection with the life for continual use and under the premise that safety of the unit is guaranteed.

Calculation model

Finite element models for semi-submersible unit’s overall strength analysis adopts spatial plate girder composite structure (sub models of spectrum fatigue analysis all adopt thin shell element, and the crack propagation analysis model based on fracture mechanics all adopt the three-dimensional entity element).

Of which, the flat plate structure is simulated with four nodes or three nodes of shell element, and unit’s frame structure including girder, stiffener, frames and face plate of floors etc. are simulated

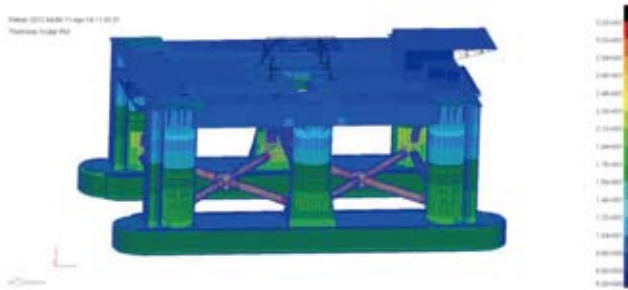


Figure 1: diagram of as-built plate thickness of computing model of the unit



Figure 2: diagram of as-built thickness of lateral brace and diagonal bracing of the unit

with two-nodes beam element. The entire model includes 213,992 shell elements and 11,574 beam elements. In addition to using the above structural element to simulate unit structure, fixed equipment and ballast water and other main weights are simulated using 0 dimension quality point elements, while unit's mast, burning arm and other large equipment are simulated using MPC point.

Because of the need to check the strength of the lateral brace and diagonal bracing after corrosion, thus four models are established, of which one model's aggregate size and thickness are obtained according to the drawings (initial model) and the other three models are obtained by corroding 8%, 10% and 12% of the strut system plating thickness on the basis of the initial model. Unit's overall finite element model can be seen in figure 1, and unit's strut system model can be seen in figure 2.

Load case

Load case of the overall strength analysis includes the hydrostatic condition, working condition of migration, normal operation condition and self-existence working condition. Semi-

submersible unit is mainly affected by the environmental load and static load during the migration, normal operation and self-existence working conditions. Environmental load adopts the maximum wind, wave and current loads and mooring positioning load allowed in the operating manual, while static load includes unit's weight, fixed device, supplies, ballast weight, work load and buoyancy.

But in the overall strength assessment of the unit, due to the fact that wind load, current load and the mooring load account for

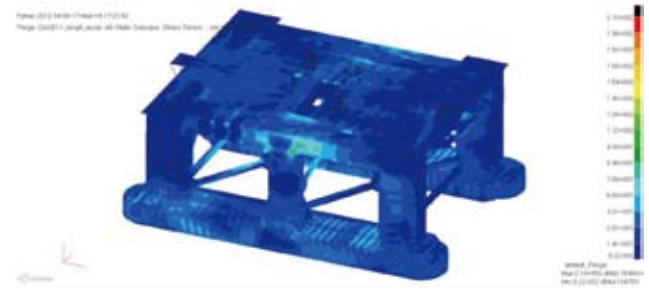


Figure 3: Von Mises stress nephogram of overall model of unit (storm self-existence, load characteristics is the longitudinal acceleration)

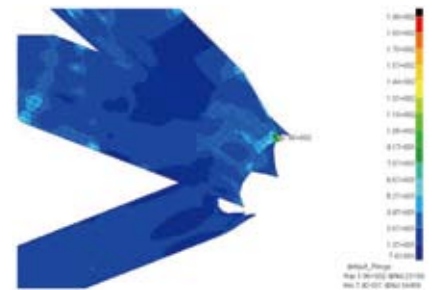


Figure 4: Von Mises stress nephogram of unit's poles system and pillar (storm self-existence, load characteristics is the longitudinal acceleration)



Figure 5: maximum stress of unit's strut system (storm self-existence, load characteristics is the longitudinal acceleration)

a very small proportion in the environmental loading relative to the wave load, overall strength assessment only considers the wave load acting on the unit. In addition, according to the calculation report of the unit in 2009, the working condition of unit migration doesn't have control function on overall strength assessment, so this overall strength assessment doesn't consider the working condition of migration.

The hydrostatic condition does not consider the environment load effect. For wave load of normal operation condition and the self-existent conditions, the following seven corresponding sub-conditions controlling load characteristics are considered respectively: separating force between the shell; the longitudinal shear force between the shell; the torque about horizontal transverse axis; the vertical wave bending moment on the shell; the longitudinal acceleration of the deck mass; the transverse acceleration of the deck mass; the vertical acceleration of the deck mass.

Stress calculation and strength assessment

The unit is a steel structure, of which secondary members make use of 3C level steel and the primary and special members make use of 5C (equivalent to grade E steel) level steel. Steel yield stress all are $\sigma_s=248\text{Mpa}$,

(1) Yield strength assessment: according to CCS rules for classification of offshore mobile unit, structural allowable stress is $\sigma_s/1.43(173.6\text{MPa})$ for the hydrostatic conditions, and $\sigma_s/1.11(223.2\text{MPa})$ for normal operation and working condition of storm self-storage.

According to the above CCS rules requirements, to carry out assessment of the yield strength of the unit and comparative analysis of the structural strength changes before and after corrosion of the plate strut system. Figure 3 is Von Mises stress distribution condition of a typical unit, Figures 4 and 5 are the corresponding Von Mises stress nephograms for the unit's strut system, and Figure 6 and 7 respectively are trend charts of Von Mises maximum stress changing with spacer thickness reduction for each region of the unit.

(2) Buckling strength assessment: according to CCS rules requirements, to carry out the buckling strength assessment for

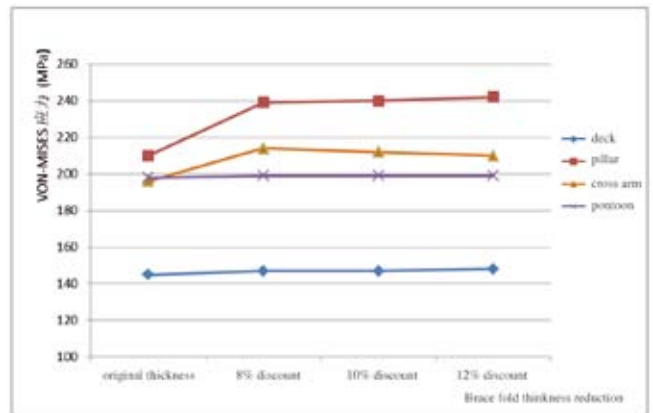


Figure 6: trend charts of stress changing with spacer thickness reduction for each region of the unit under normal operation working condition

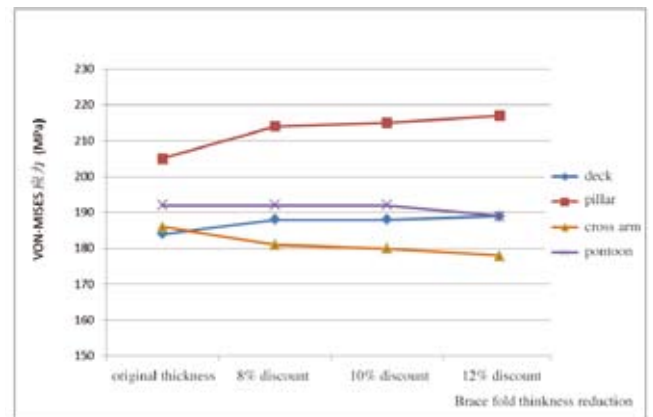


Figure 7: trend charts of stress changing with spacer thickness reduction for each region of the unit under self-existence working condition

the unit. The result shows that the UC maximum is 0.988, which occurred on the shell main deck near the mouth of the well field in the self-existence condition, but UC values are relatively low in most of the area, which is related to this unit using the ordinary strength steel for construction.

The analysis result shows that the unit's overall yield and buckling strength meet the requirements of CCS rules. The maximum stress value of lateral brace, brace plate is 214 Mpa, and the corresponding working condition of maximum stress value is the vertical acceleration under storm self-existence working condition. After plate strut system corrosion according to the proportion, there is no obvious change for the stress of the brace system and the stress is slightly down.

Crack Growth Analysis of Key Nodes of Aging Semi-submersible Drilling Unit

By Liang Yuanhua

For the older unit, the fatigue damage is one of the main failure modes. How to accurately and reasonably forecast the fatigue life has become a hot topic in the field of offshore engineering industry.

At present, the fatigue analysis applied by the industry consists of S-N curve method and fracture mechanics method. As a traditional analysis method for fatigue strength, the S-N curve method has been quite mature and widely used in offshore engineering industry. However, fatigue analysis method based on the S-N curve and the linear cumulative damage theory can't consider the influence of initial defects, and can't reasonably explain a problem frequently encountered in fatigue assessment of aging unit:

For the node with cumulative fatigue damage close to or even greater than 1.0, how long can the node still be used when the crack hasn't been found or after crack repairing? So fatigue assessment method based on the principle of crack propagation is usually used as means of assistance and support for calculating the fatigue strength, to carry out the fatigue life assessment of structures for which cracks have been found.

Take "exploration 3" aging semi-submersible drilling unit as an example, the crack propagation life prediction is made to the connection of unit pillar and stray tube by combining the S-N curve method with fracture mechanics method.

With regard to 54 hot spots screened by target unit, fatigue assessment firstly carried out spectrum fatigue analysis of S-N curve based on the previous operation history. According to the results of the 54 hot spots spectrum fatigue analysis, select hotspots which has larger cumulative fatigue damage to carry out the crack propagation

life forecast based on fracture mechanics, by combining a single curve model and considering the load ratio, stress intensity factor threshold value and the influence of welding residual stress.

For typical node of unit subject to the fatigue assessment based on the crack propagation, the main research contents and conclusions are as follows:

Firstly is for the aging mobile unit, key nodes' spectrum fatigue life can be obtained by traditional method based on S-N curve.

Secondly, for the node where the traditional spectrum fatigue analysis method adopted cannot meet the requirement of the life, the conventional fatigue spectrum analysis can be combined with the fatigue crack propagation theory, and by using a single curve model predict crack extension curve, life prediction based on the crack propagation is conducted.

Thirdly, currently the result indicates that the crack propagation life of the fatigue hot spot for the unit calculated meets the requirements of continuous operation of the unit.



China Accelerates Standard System Construction for Offshore Engineering Equipment

By Zhang Benwei

With key projects of “Offshore Oil 981”, “Liwan 3-1” and “COSL PROSPECTOR” having been consecutively delivered and brought into operation in recent years, China’s offshore engineering equipment manufacturing capability has been promoted in an all-round way. A batch of excellent offshore engineering equipment manufacturing enterprises has come into being, breakthroughs have been made in the manufacturing technology of high-tech equipment, and a relatively complete offshore engineering equipment industry has been formed.

Statistics showed that China has overtaken South Korea in orders of semi-submersible drilling platform in 2010 and took the second place in the world; China has also overtaken Singapore and UAE in orders of self-elevating platform and took the first place in the world. At the same time, China takes an important position in the global market in terms of engineering construction equipment manufacturing and is among the foremost in terms of undertaking the orders of engineering construction equipment manufacturing. Of which, orders of offshore engineering equipment taken by Shanghai 708 Institute, Shanghai Waigaoqiao Shipbuilding Co., LTD, DSIC, Nantong COSCO, CIMC Raffles, Shanghai Shipyard, CMIH and some other enterprises have a turnover of nearly 5 billion dollars (excluding offshore auxiliaries and working ships), accounting for about 10% of the global amount.

With the promotion of offshore engineering equipment manufacturing industry in China, China’s capability of R&D and production in equipment manufacturing industry has also been strengthened. The equipment industry will have a golden development period during the 12th five-year plan period. In product structure, the current low and medium level equipment will gradually be replaced by higher value-added high-end one. In terms of market coverage, import will be gradually replaced. In the future, export will be increased and China will take the share of the global market.

Though China has realized quantum leap development in offshore engineering equipment manufacturing industry, it still lacks its own offshore engineering technical standard system as compared with western developed countries. Therefore, a scientific, comprehensive and accurate offshore engineering equipment standard system will be beneficial for guiding the healthy and continuous development of China’s offshore engineering equipment manufacturing industry, for realizing design on its own and construction of offshore engineering and equipment and for supplying equipment with no dependence on others. It will also be beneficial for the promotion of China’s voice in the global offshore engineering market, as well as for the acceleration of the internationalization of China’s offshore engineering industry.

Under the above macro-situation, the National Standard Committee, the National Development and Reform Commission (NDRC), the Ministry of Finance, the Ministry of Industry and Information Technology (MIIT) and the State Oceanic Administration (SOA) are preparing to establish national standard system including marine engineering standard system. The Equipment Department of the Industry and Information Ministry takes the lead of this project, China established the research subject of Top level research of offshore engineering equipment design and construction standard system. At the same time, an expert group of the experts from CCS, CNPC, Sinopec, CNOOC and CSSC is established, the group is carrying out exploration and exchange on issues related to the framework of offshore engineering standard system.

After the instruction of this research subject is issued, CCS will carry out the development of task statement together with other related units. The following four aspects will be covered for research:

The first is the analysis and study of the applicability and application requirements of international conventions and regulations related to offshore engineering equipment design and construction. This study will

mainly include sorting out international conventions and regulations related to offshore engineering equipment design and construction, study the conventions and regulations issued by IMO, ICAO, ITU and IACS applicable for offshore engineering equipment design and construction, as well as the need for further international and foreign industry standard as technical support in the process of application.

The second is analysis and study of applicability and application demand of important flag state and coastal state regulations. At present, the important offshore engineering equipment design and construction area is Gulf of Mexico in the US and the Norway's North Sea. These two areas have started to carry out offshore oil and gas exploration study as early as the 50's and 60's of the last century, and their government supervision regulations are good examples for the world from the aspects of safety, environmental protection and risk control. Research on applicability from main flag countries and littoral countries, as well as the complementary industrial standards required as technical supports.

The third is study of offshore engineering rule system of overseas class societies, by way of sorting out the offshore engineering rule system of main societies, and studying the applicability of their rules and the industry standards needed as technical support in the application process.

The last is analysis and study of application of international and foreign advanced standard in the design and construction of offshore engineering equipment in China. By way of summarizing the international standards and foreign standards currently being used in the design and construction of various offshore engineering equipment in China, benchmark with the domestic standard system and standards will be made in order to improve the current standard system in China.

To sum up, it is to provide solid technical basis and foundation for the scientific establishment and improvement of a new offshore engineering standard system by way of a comprehensive sorting out and study of the foreign standard system related to offshore engineering equipment and corresponding standards, and by summarizing the existing standard system and standards related to offshore engineering equipment, as well as by benchmarking.

At present, an interim framework of standard system of offshore engineering project has been formed after discussion and exchange in the expert group. All in all, a clearly structured, comprehensive, scientific framework will comply not only with the global technology development trend, but also with the factual development requirements in the future.

CCS “Classification Rules for Offshore Floating Device”(2014)

By Li Ling

CCS “Classification Rules for Offshore Floating Device”(2014) was formally published in 2014. The Rules was compiled on the basis of 2003 version and incorporated the valuable experience summarized over the last 10 years in the aspects of classification of floating installations, third party business, computing, plan approval, scientific research and others. The Rules have gone through three years, experiencing the stages of project establishment, research, study, preparation, approval and publication. The Rules consists of 9 chapters:

- Part one Classification Regulation
- Part two Structure and Equipment
- Part three Stability, Holds Subdivision and Load line
- Part four Well Flow input, Well Flow Process, Crude Oil Storage and Output System
- Part five General System
- Part six Electric Installation
- Part seven Automation, Safety and Communication System
- Part eight Fire and Explosion Safety

Part nine Other Types of Floating Device and Special Systems

The Rules cover three main aspects of hull, turbine and electrics related to floating device classification, focusing on the widely used ship-type floating device and give considerations to other types like column stabilized floating device, deep-draft floating device, etc.

Part one “Classification Regulation” stipulates technical requirements related to classification process, classification policy, classification symbol and addition notification. In addition, requirements related to product inspection, the inspections under or after construction are also included.

Part two “Structure and Equipment” made extensive modifications to version 2003. It is the longest part of the rules, involving lots of theoretical researches and computational analyses. Based on the experience in drawing approval, construction and operation of floating devices CCS has had over the last 10 years, and the experience in drawing approval and operation of CSR oil tankers, a technical rule for floating device with complete specifications and clear theory has come into being, it has also been validated on existing devices and those under construction.

This part consists of 13 chapters. It is applicable to tanker-modified and new-build floating devices. Design methods of net scantling, corrosion weight grow and dynamic load are introduced, highlighting the calculation methods of hydrodynamic load direct prediction under site situation and structural finite element analysis. In the aspect of load application, starting from the basic principle of ocean engineering mechanics, the new rules, as compared with the old one, regulates various load arrangements and combinations according to different structures, locations, computing requirements and working conditions. Based on yielding failure models of simple panels and beams under compression, the forces, geometric characteristics and compressive strength standards in rule formulas are clear and can be easily mastered and used.

Part three “Stability, Holds Subdivision and Load line” is compiled in the same way as the new version of CCS Classification Rules for Mobile Platforms, fully embodying the characteristics of the function of the offshore floating structures. Applicable requirements of IMO MODU Code and MARPOL convention have been incorporated into requirements related to stability, stipulating clearly the requirements for freeboard types of ship-type floating devices. The combination of water-tight and weather-tight rule requirements with stability calculation highlights the design characteristics of offshore engineering structures.

Part four “Well Flow input, Well Flow Process, Crude Oil Storage and Output System” is a re-integrated part. It regulates the overall process of oil and gas production, from wellhead to the product output, including undersea system and the neutral tubes.

Part five “General System” provides supplement and improvement based on the old version rule. For instance, socket welding and branch pipe bearing are added to pipe design principles; practical supplements are made to load system, diesel system and saltwater system taking into account actual situations; ventilation system is given one single chapter and is regulated systematically to meet development demands. In addition, the part related to open-drain-off system and hot-oil system are systematic and complete and have its own characteristics.

Part six “Electric Device” removes some old inapplicable clauses, and updates the rule requirements according to the new requirements of IMO and other international organizations.

Part seven “Automation, Safety and Communication System” firstly proposes technical requirements for process control system (PCS), information management system (IMS, including production, plan management and spare parts management), in order to differentiate central control system of floating devices from conventional ship automation system. These technical requirements are also integrated with fire and gas detection alarm system (F&G) and emergent shutdown device (ESD).

Part eight “Fire and Explosion Safety” covers prevention and mitigating measures. This part mainly stipulates on hardware, but also provides some refined requirements for software. In accordance with the principle of adapting with time and objective demand, this chapter contains many supplements based on the compilation of the chapters of old version rules, e.g. contents like high-pressure water mist system, clean gas system, wet chemical system, hydrogen sulfide protection devices and ESD have been added.

Part nine “Other Types of Floating Devices and Special Systems” collects additional notifications for structural types other than ship type floating device and some optional additional notifications for customers’ convenience. The other floating device structural type and additional notifications for option include classification requirements for additional notifications of tension-leg-type floating devices, column stabilized-type (semi-submersible) floating device, deep-draft-type floating device, floating liquefied gas terminals, underwater inspection system, mooring positioning system and the helicopter deck.

Matters Requiring Attention When Applying “Specifications and Terms of Shipping Industry”

By Jiang Botao & Liu Lin



On Sep. 28, 2014, the list (the first batch) of 50 enterprises that meet the terms of “Specifications and Terms of Shipping Industry”(the Specifications) was published on the website of MIIT. On Dec. 9, MIIT published for comments the second batch of enterprises that meet the terms of the Specifications. Then, what is the “Specifications and Terms of Shipping Industry”? Why should enterprises apply to meet these terms? How to apply? What is the evaluation procedure?

Background of the “Specifications and Terms of Shipping Industry”

On Jul. 31, 2013, the Implementation plan of speeding up

structural adjustment, transformation and upgrading of shipping industry issued by the State Council clearly pointed out to “strengthen management of shipping industry and improve industry entry conditions”. The Guidance for resolving the problem of excess capacity issued by the State Council on 15 October further stipulated to “revise and improve the industrial policies of the steel and cement industry, as well as the industry entry conditions of aluminum, cement, sheet glass and shipping industry. To strengthen industry entry and regulated management, and to publish the lists of production lines and enterprises that meet the terms.”

MIIT published the “Specifications and Terms of Shipping Industry” (No.55, 2013) on Nov.13, 2013, in order to ensure implementation of policies issued by the State Council, strength management of shipping

industry, accelerate structural adjustment, improve technical level, promote transformation and upgrading, provide guidance for shipping enterprises to improve and develop, enhance technical management and innovation, develop comprehensively modern shipbuilding mode, improve ship design and construction level, productivity and quality, promote management levels of environmental protection, safety production and occupational health, reduce energy and resource consumption, and speed up the eradication of outdated production capability.

■ Main Content And Key Points Of The “Specifications and Terms of Shipping Industry”

The Specifications is mainly based on the Industrial transformation and upgrading project, the 12th five-year plan of shipping industry and MIIT Guiding idea about further promoting the establishment of modern shipbuilding mode, and selects the enterprise information indexes and production technical indexes that are representative, operational and easily evaluated.

The “Specifications and Terms of Shipping Industry” consists of 10 chapters, 38 clauses, including general rules, basic terms, metrology and testing terms of production facility and equipment and building technology terms. Compared with the former evaluation criteria for ship manufacturing enterprises, terms about technical innovation, building technology, safety production, occupational health, social responsibility, energy conservation and environment protection were added. Some of these terms are based on CB/T 3000 basic terms and evaluation method of ship building enterprises, CB/T 4335 evaluation method of ship building engineering level. The key points are 10 digital indicators and the establishment of 5 systems. The 10 indicators are: ERP reaches 80% in popularity; digital design tool reaches 85% in popularity, key process numerical control rate reaches 70%, ship building comprehensive energy consumption per ten thousand Yuan added value should be no more than 0.20 ton; rate of steel utilization reaches over 90%; welding automation and semi-automation reaches over 65%; coating coefficient is no higher than 2.2; stepwise ship construction with non-allowance reaches 70%; stepwise shipway carrying with non-allowance reaches 80%; pre-water outfitting accomplishment reaches 80%. 5 standard

systems include: Quality Management System established according to ISO 9000 or GB/T 19000 standards; Environment Management System established according to ISO 14000 or GB/T 24000 standards; Energy Management System established according to ISO 50001 or GB/T 23331 Energy Management System, Occupation Health Safety Management System established according to OHSAS18000 or GB/T 28000 standards; Safety production standardization required by AQ/T 7008 Safety production standardization basic terms of ship building and repairing enterprises and related regulations.

■ Application and evaluation procedure of the “Specifications and Terms of Shipping Industry”

According to “notification about carrying out the application work by enterprises to meet terms of “Specifications and Terms of Shipping Industry” of MIIT”, enterprises need to go through application, preliminary evaluation, expert review, publication for comments and announcement.

Application is done by enterprises. The enterprises should firstly affirm their management authority: local industry department or central enterprise, in order to decide whom to submit the application. At the same time, application report of “Specifications and Terms of Shipping Industry” should be filled out according to relative requirements, report and the supporting material should be submitted before May 30th of each year.

The preliminary evaluation is done by the local industry department or the central enterprise (group) the enterprise belongs to. The material of the applying enterprise that has passed preliminary evaluation and the evaluation comments should be submitted to MIIT.

Expert review of the application material is carried out by the experts of central enterprises, local enterprises and third-party organizations organized by CANCI and CCS as entrusted by MIIT. Based on justice and fairness, expert review should be carried out according to the detailed regulation of “Specifications and Terms of Shipping Industry” review. This detailed regulation is divided into 7 major categories and 17 sub-categories, consisting of 8 projects to meet the standards and 44 evaluation elements. The expert should also be divided into groups, carrying out review work

from the aspects of standard compliance and evaluation. If there is any question, experts may apply for site review according to workflow till final evaluation is accomplished. MIIT takes charge of publication for comments and announcement.

■ Standards for meeting the “Specifications and Terms of Shipping Industry” and follow-up management

The result of expert review should be submitted to MIIT, MIIT will carry out publication for comments and announcement.

Enterprises listed in announcement should be under social supervision and dynamic management. Local shipping sectors and the related enterprises and groups should carry out follow up inspections. MIIT may organize experts of the industry to carry out sample checks. The qualification will be withdrawn if any serious safety and environment protection accidents happen, or any forgery and fraud are detected.

■ Service and organization of “Specifications and Terms of Shipping Industry” evaluation

Under the leadership of MIIT, CANIS and CCS are responsible to carry out specific service for expert review. These two organizations firstly established the office jointly to coordinate and push forward the service work. For the purpose of unification of evaluation standards, they developed the detailed regulations of “Specifications and Terms of Shipping Industry” review, which was finalized after going through three reviews by MIIT, local administration departments, central and local enterprises. Expert pool was established and special training was carried out in order to carry out well the organization of expert review. Internal trial evaluation was carried out to locate potential problems and summarize experience, which lay the foundation for the smooth carrying out of actual review work. Reasonable and fair procedures and expert avoidance system were established, human element and free judgment were eradicated by way of expert evaluation and centralized evaluation by expert group. The joint office promoted step by step

the review work by actively coordinating the schedule of experts. The evaluation result was submitted in time, the expert review was accomplished successfully and the list of enterprise meeting the regulations of “Specifications and Terms of Shipping Industry” was published in time.

■ Significance of “Specifications and Terms of Shipping Industry” and potential benefit for enterprises

The “Specifications and Terms of Shipping Industry” is a recommended standard without mandatory administrative permit or link with policies, shipyards are voluntary to apply for it. However, it can provide basis for the related national and local policies, and guide social resources to go to the quality shipyards that meet the terms. There are mainly two aspects for it to become the basis for the policy: the first is national policies, including national and local policies; the second is about social resources including banks and some other financial institutions. Under the present situation of excess production capacity, some financial institutions expect us to provide the list of normative enterprises to serve as reference for them to invest and provide loan. Enterprise that meet terms may be the destination for such resources.

To sum up, through the implementation of the “Specifications and Terms of Shipping Industry” and the carrying out of the review the establishment of “white list” for shipbuilding enterprises is a good policy for shipbuilding enterprises. The enterprises on the list will have more opportunities for development. Though the management of “white list” announcement is not mandatory, under the present fierce completion, the list has attracted some attention of enterprises. It is believed that more social resources will go to qualified shipyards through directional guidance and market operation. The qualified will survive whilst the underperforming ones will be phased out and the living space for backward shipyards will be squeezed. Overcapacity will be further absorbed, transferred, integrated and eliminated, backward enterprises will be encouraged to transfer and merge to improve industry centralization and to realize the sustainable and healthy development of China’s shipbuilding industry.

The Implementation of Ship Energy Efficiency Regulations

By Jia Jianxiong



The sixty-second IMO Environment Protection Committee meeting held on July 15, 2011 adopted the "amendments to MARPOL annex VI - introducing ship energy efficiency provisions", which came into force on January 1, 2013. The requirements of ship energy efficiency include new ship energy efficiency design index (EEDI), ship energy efficiency management plan (SEEMP) for all ships, and energy efficiency operation index (EEOI), etc.

CCS requirements related to additional energy efficiency notifications and energy efficiency regulations

In recent years, CCS has been launching continuously new products and services, so as to provide timely the forefront and most valuable technical support and value-added services to the customers. The additional notifications for energy efficiency covers SEEMP, EEDI, Green Ship, GPR etc..

The additional notifications of EEDI (I), EEDI (II), EEDI (III) are for EEDI attained complying with the CCS rule requirements and higher than convention requirements according to the second chapter of the green ship rule. I, II, III are three levels with III being the strictest.

Additional notification related to SEEMP:

1, Additional notification of SEEMP (I) -- ship holds SEEMP developed according to IMO relevant guideline.

2, Additional notification of SEEMP (II) -- in addition to SEEMP, the vessel's management company or ship operators should establish energy efficiency management system, and obtain SEEMC/CEEMC, CCS certificate of energy efficiency management system.

3, Additional notification of SEEMP (III) -- on the basis of SEEMP (II), ship should have real-time monitoring software such as route optimization, hull biological fouling monitoring, in order to monitor the related parameters which could influence ship energy efficiency and / or adjust the energy efficiency measures at any time.

The additional notifications of Green Ship I, Green Ship II, Green Ship III are based on the green ship rule, satisfying the corresponding requirements of EEDI(I), EEDI(II), EEDI(III) in terms of design, and the requirements of corresponding SEEMP (I), SEEMP (II), SEEMP (III) in terms of operation. Furthermore, it should meet the additional environment protection elements (such as oil pollution prevention, noxious liquid substance prevention, garbage pollution prevention, air pollution prevention, prevention of harmful aquatic organisms in ballast water and pathogen pollution transfer, 9 aspects in total).

The additional notification of GPR requires that the ship should hold the inventory of hazardous substances verified by CCS to comply with the requirement of "The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships"; GPR (EU) requires that the ship should hold the inventory of hazardous substances verified by CCS to comply with the requirements of EU 1257/2013. The above two notifications are not related to energy efficiency, and for discrimination only.