The Present Situation and Prospect of Marine Manufacturing in China

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**Abstract.** Marine engineering equipment manufacturing is one of the most important industries in marine economy, which is listed as the marine strategic emerging industry. After the self-reliance development stage and the introduction of international standards and foreign technology, it is facing challenges to dedicate itself to international market competition. This article reviewed the development of marine engineering equipment manufacturing industry in China, analyzed the international competition situation and discussed the prospects. It is concluded that, marine engineering equipment manufacturing industry of China was undergoing transformation and upgrading stage with the trend towards deep water, large scale and automation in the world, strategies and actions were carried out from the top plan to the company level collaboration, it would make a fast increasing in the near future with the increasing international and domestic needs of deep sea exploit.

**Introduction**

As an important support for the development of Marine resources, marine engineering equipment manufacturing has been listed as a strategic emerging industry by the state, and is facing the golden opportunity of development. In the 21st century, the ocean century, the vast ocean has become a hot spot for human resource development in the situation of increasing population and exhaustion of land resources. To this end, the report of the 18th national congress of the communist party of China (CPC) has clearly stated that it is important to improve the development capacity of Marine resources, develop the Marine economy and build a maritime power. As an important support for the development of Marine resources, Marine engineering equipment manufacturing has been listed as a strategic emerging industry.

Recent research showed that the development of Marine engineering equipment manufacturing enterprises in our country the government planning problem is studied, the characteristics of Marine engineering equipment manufacturing enterprises are analyzed, problems in the further analysis of the current government planning, and then put forward the corresponding countermeasures and Suggestions[1]. Sun points out that technical innovation and industrial clusters, puts forward to an early from the manufacturer into a manufacturing power, need to introduce high-end equipment manufacturing industry, drive the whole country with the rapid development of industry and national economy [2, 3]. From the current situation of global Marine equipment construction, Europe and America are the first team, mastering the core technology of design and focusing on high-end Marine products. South Korea and Singapore are the second tier, with the general contracting capacity of the project and are developing into the high-tech equipment field. Our country already has certain basic condition, but the product also belongs to medium and low end, high technology is our country's weak link [4]. This article reviewed the development of marine engineering equipment manufacturing industry in China, analyzed the international competition situation and discussed the prospects.
China's Marine Engineering Equipment Manufacturing is Undergoing Transformation and Upgrading

The development of China's Marine engineering equipment industry started in the 1960s, in more than 50 years of development, has experienced three stages roughly: self-reliance development stage, the introduction of international standards and foreign technology and sustainable development phase towards the international market.

With the growth of the Marine equipment requirements in recent years, China marine engineering equipment manufacturing industry to seize the market peak of strategic opportunities, to undertake a batch of order of be influential and achieved rapid development, ability is apparent, though the healthy development of the Marine engineering equipment manufacturing industry in our country is, but we need to be vigilant against possible excess capacity, so as to avoid the industry make the mistake the shipbuilding industry. Earlier in the field of Marine engineering equipment manufacturing in our country, made a lot of tuition fees into the industry enterprises, a strong sense of risk, but the new businesses tend to risk awareness is poor, therefore, the domestic engaged in Marine engineering equipment manufacturing enterprises need to enter this industry may face the risk of stay awake, don't rush.

In 2013, China's orders for various kinds of Marine engineering exceeded us $18 billion, accounting for 29.5% of the world market share, up 16 percentage points from 2012 and surpassing Singapore as the second largest country in the world. There are 61 new ocean engineering platforms and one drilling ship, among which 49 are self-elevating platforms, accounting for more than half of the world's total.

From the perspective of the general layout of Marine equipment industry in our country, the construction of power concentrated in the coastal several large area, such as Bohai sea Marine engineering equipment manufacturing base, a group of ship manufacturing enterprises, Yangtze river delta pearl river delta have a Marine engineering equipment manufacturing base, in addition, There is a Marine engineering equipment manufacturing base in Hainan province.

On current situation of the development of Marine engineering equipment technology in our country, at present our country in the jacket, jack-up, semi-submersible platform and FPSO, train platform supply vessel, etc. have certain basis, mainly in the jack-up platform has formed a series of products, such as "offshore oil 921", its biggest operation depth of 60.96 meters, the maximum drilling depth of 7000 meters, the biggest variable load 2268 tons. In addition, the maximum operating depth of "JU2000E" is 122 meters, the maximum drilling depth is over 10000 meters and the maximum variable payload is 6,486 tons. Semi-submersible drilling platform "offshore oil 981" maximum depth of 3000 meters, maximum drilling depth of 10000 meters, level for DP3 dynamic positioning system, the platform can be used within 1500 meters water depth anchor position, the biggest variable load 9000 tons.

In addition, China's jacket technology has developed better, with the maximum weight of the jacket platform reaching 32,000 tons and the height of 210 meters, which is the first in Asia. In the field of FPSO, our country has the design and construction capability of shallow FPSO hull and upper process module, which can carry up to 300,000 tons. In the aspect of Marine engineering ships, China has built a ship "ocean oil 201" and "blue whale" of the floating crane. The development prospect of energy utilization equipment is broad, but its technology is still in the research stage at present. In this field, China has been developing research and development in terms of tidal energy and wave energy.

The International Competition Situation Faced by Chinese Maritime Industry Equipment

The world's major Marine engineering and equipment builders are currently focused on Singapore, South Korea, the United States and Europe, and Singapore and South Korea, which are mainly built in deep and shallow waters, are also developing into deep water. Countries such as the US and Europe are at the centre of research and development and building platforms for deep-water super-deep water.
At present, we are divided into three camps, the first of which is mainly the European and American companies, which monopolize the development and design of Marine engineering equipment, the supply of total engineering packages and key supporting equipment. The second camp is South Korea and Singapore, which is developing rapidly in the manufacturing sector and has a place in it. Our country is still making some low-end products, so we are in the third camp.

European and American companies are leading the world in equipment design and high-end manufacturing. As the world manufacturing industry shift to Asian countries, Europe and the United States enterprise gradually out of the mid-range Marine engineering equipment manufacturing sector, but at the high end of the Marine engineering equipment manufacturing and design still monopoly, Marine engineering equipment manufacturing mature Asian countries, in Asia, Korea, Singapore, China and the united Arab emirates (UAE) is a major Marine engineering, Asia while in equipment manufacturing, is now developing faster, but in terms of equipment design, there is a larger gap with Europe and the United States. Such as in our country since 2000, a total of platform was built more than 40 seats, but more than 70% is European and American companies design, including the design of jack-up platform is mainly the United States, the Netherlands, semi-submersible platform designed with companies such as America, Norway and Italy.

China's strengths are its own needs, rapid development of the Marine economy, and the development and utilization of Marine resources. The rapid development of Marine economy has given rise to the demand for the exploitation and utilization of Marine resources. According to the preliminary results of the third national petroleum resource evaluation, China's Marine oil and gas resources account for about 30% of the total oil and gas resources in China. However, the average proven rate of offshore oil resources in China is only 12.3%, and the average proven rate of natural gas is 10.9%, well below the world average. The ocean has become an important way to relieve the pressure of resources. At present, offshore wind power and deep-sea engineering are at a preliminary stage and can form the advantages of scale economy based on strategic trade theory.

Prospects of Marine Engineering Equipment Manufacturing Industry of China

Deep sea Marine engineering equipment and technology of China industry association was held in Shanghai organization scheme symposium on Marine engineering equipment manufacturing industry innovation center construction, the ministry of industry and information technology equipment industry department concerned comrades, the innovation project demonstration center construction expert group members, representatives and related units and so on attended the meeting.

Made in China 2025 will be ocean engineering equipment and high technology listed as one of the top ten key development fields, ship manufacturing innovation center construction as one of the five key projects, the construction of Marine engineering equipment manufacturing industry innovation center, to promote Marine engineering equipment manufacturing industry innovation ability, and promoting sustainable and healthy development is of great significance. Experts attending the meeting on behalf of the surrounding Marine engineering equipment manufacturing industry innovation center construction scheme, the innovation center location and layout, organization and operation mechanism, the production, use the collaborative model, forming conditions and steps such as question has carried on the discussion, and further perfecting the innovation center construction plan put forward opinions and Suggestions. China Shipbuilding Heavy Industry Corporation is the state-owned assets supervision and administration commission of the state council for approval, by the China Shipbuilding Heavy Industry Corporation, ANSHAN iron and steel group corporation, China Aerospace Science and Technology Group Corporation, LTD. According to the laws and regulations of modern enterprise system and capital market, the company has established a scientific and perfect management system and governance structure. Company headquarters has eight functions of 28 wholly owned and holding subsidiaries of research and development, production and operation, finance, investment, capital operation business such as the management, and according to the requirements of the regulations of the competent department of the securities, set up specialized
agencies and unified management of investor relations work, information disclosure etc., and capital market has formed a good interactive relationship. These important corporate restructurings form a synergy of capital and technological superiority.

At present, the world's Marine equipment technology presents a trend towards deep water, large scale and automation, and the demand for Marine engineering equipment, which has been matched at home and abroad, has shown rapid growth. As an important part of seven strategic emerging industries, the Marine engineering equipment industry has great potential.

International deep-sea launched by China south locomotive equipment industry development on the BBS, the participating experts agree that the deep sea exploration, cooperation and common research and manufacture will become a new trend of the industry. At present, it is urgent to accelerate the integration of China's deep-sea equipment industry.

The global seabed market forecast, shows that total global seabed system capital expenditure will total $117bn between 2014 and 2018, up more than 80 per cent over the past five years. Since 2013, the world deep-sea robot job market has been spending more than $9.7 billion, and the Chinese market has grown by more than 40 percent annually. It is estimated that by 2020, the annual sales volume of Marine equipment manufacturing in China will reach 400 billion yuan.

In recent years, under the call of "ocean power" strategy, China has made some progress in deep-sea equipment. In the field of offshore oil and gas development, after decades of technical accumulation, China has now formed a series of "five type seven ships" of offshore oil exploration, and the "deep-sea fleet" of CNOOC has begun to take shape. But in the expert opinion, compared with the international advanced level, our overall deep-sea equipment technology there is still a big gap, especially in deep water, green, safety of Marine high-tech fields, foundation is weak in our country, the products are lack of innovation ability, the core technology, equipment and system mainly rely on imports.

China south locomotive should give full play to the SMD company in the depths of the equipment, technical strength and experience of industrialization, at the same time with domestic universities, research institutes and excellent enterprise cooperation, to promote the rapid development of deep-sea equipment industry in China.

Conclusion

The design and development ability and the gap of foreign countries can only design some of the shallow sea Marine engineering equipment, while the front end design of the deep-sea Marine equipment is still blank, mainly to carry out production design work. The high-end Marine equipment design and construction of basic blank domestic enterprises have overlapping areas of competition, mainly focusing on the shallow water and low-end deep-water equipment competition. Backward development of Marine engineering equipment form a complete set of all kinds of function modules and all kinds of form a complete set of equipment for the offshore platform specification variety, the technical performance, the material, the accuracy, reliability, life is very strict and environmental adaptability, patented technology, high value-added high-end equipment, more than a monopoly by foreign suppliers. China only has a certain share of low-end supporting products. Deep polar resources development and competitiveness and the lack of equipment, lack of deep sea exploration in China polar surface and the corresponding test base, such as deep sea trial base, ice load laboratory, steel low temperature toughness laboratory, etc. Under the current situation of overexploitation and utilization of global resources, the ocean has become a new choice for coastal countries to solve energy problems and is listed as an important strategic emerging field.
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References


