

Features of COSCO Shipping Bulk Carrier Fleet and Development Trend Analysis

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ABSTRACT. *The dry bulk shipping trade plays an important role in the development of waterway transportation, so the research on the fleet of dry bulk cargo is especially necessary. Firstly, this article analyzes the dry bulk freight price and the demand of the main cargo. Secondly, it summarizes the characteristics of all aspects of the COSCO Shipping bulk carrier fleet. Finally, according to the fleet size, structure, operating mode, routes Based on this aspect, the development trend of the bulk carrier fleet is analyzed.*

KEYWORDS: *Dry bulk fleet, Transportation market situation, Fleet characteristics, Development trend*

1. Introduction

With the continuous development of the global industrial economy, trade between countries is more frequent, and the volume of world seaborne trade has also increased year by year. The dry bulk transportation of the bulk carrier fleet is an important part of international shipping trade, and its shipping volume accounts for more than 1/3 of the world's total shipping volume.

Among the top 10 dry bulk transportation companies in the world, COSCO Shipping Bulk Transportation Co., Ltd. ranks first, mainly for the transportation of bulk dry bulk cargoes such as coal, iron ore and grain, which is the first in the world in terms of capacity Bulk carrier fleet. At present, the global dry bulk market is showing a high state of prosperity. By the end of 2018, the total international dry bulk shipping trade had reached 5.22 billion tons, an increase of 2.6% compared to 2017. And in 2019, the world's dry bulk trade volume will continue to grow. In recent years, the average value of the dry bulk freight index (BDI) has been rising, the transportation volume of iron ore and coal has also gradually increased, and the market situation has gradually improved.

Since its establishment, COSCO Shipping Bulk Transportation Co., Ltd. has attracted much attention from all sides. In recent years, despite the unpredictable

changes in the international and domestic dry bulk shipping market, COSCO Shipping bulk carrier fleet has stood out in the market and is developing well. As the demand for the dry bulk shipping market continues to increase, the size of the bulk carrier fleet is also expanding, and competition is becoming more intense. Therefore, this article mainly analyzes the transportation structure, routes, ship characteristics and the development trend of COSCO Shipping bulk carrier fleet.

2. Overview of COSCO Shipping Bulk Group

COSCO Shipping Bulk Transportation Co., Ltd. was formally established in June 2016 in Guangzhou. The company is formed by the reorganization and integration of COSCO Bulk Transport Co., Ltd. and China Shipping Bulk Transport Co., Ltd. It is a large state-owned shipping company mainly engaged in dry bulk transportation, and the largest bulk shipping fleet in the world.

COSCO Shipping Bulk Transportation Co., Ltd. manages and controls more than 400 bulk carriers with a capacity of nearly 40 million dwt, including four types of bulk carriers, including ultra-large ore vessels, Capesize vessels, Panamax vessels, and Handysize vessels. The transportation cargo covers all categories such as iron ore, coal, grain, and bulk cargo, and the annual freight volume exceeds 350 million tons. The company operates routes covering more than 1,000 ports in more than 100 countries and regions around the world.

Adhering to the service concept of "safety, integrity, high quality, and high efficiency", COSCO Shipping Bulk Carrier Co., Ltd. actively expands domestic and overseas trade markets. Based on the "Belt and Road" policy, it establishes shipping routes and marketing networks in various regions around the world to provide global customers with excellent service. Through strategic positioning adjustments and complementary resource advantages, it will enhance international competitiveness and brand influence. The company is committed to creating a world-leading and world-class dry bulk shipping company.

3. Demand analysis of dry bulk transportation market

3.1 Analysis of dry bulk shipping rates

In the dry bulk shipping market, the dry bulk freight index can be said to be the fastest and most unexpected index. According to the data of International Shipping Network, it can be seen from Fig.1 that in 2016, the BDI index showed the lowest development trend, which seriously affected the development of the dry bulk market. Then, with the improvement of the global economic recovery and the recovery of the maritime market, the BDI index in 2017 began to pick up. In 2018, affected by the Sino-US trade dispute and the Australian railway accident, the BDI index showed a volatile trend, but the annual average value increased by 18.2% compared to 2017 and reached 1352 points. It can also be seen from Fig.2 that the average freight index of dry bulk cargoes has been rising in the past two years, and the

market situation is gradually improving, which will be beneficial to the development of the fleet.

Changes in dry bulk shipping rates are risky for the operation of dry bulk fleets. By analyzing the changes in the Baltic Dry Freight Index, the COSCO Shipping bulk carrier fleet can predict market freight changes in advance, thereby increasing the feasibility of fleet operations.

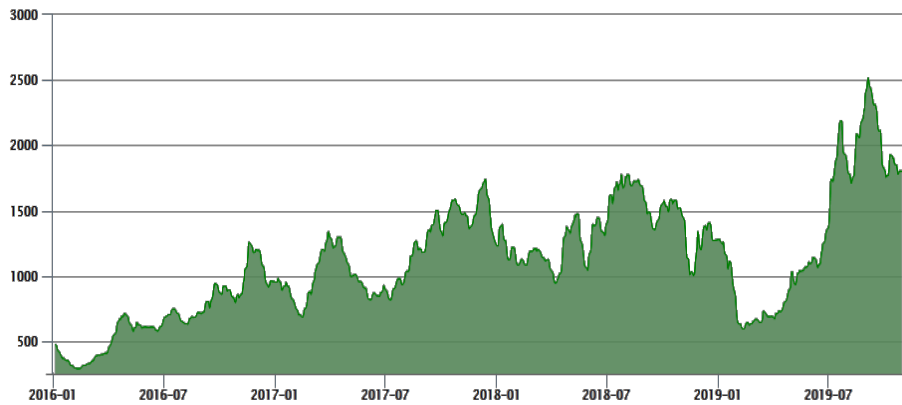


Figure. 1 BDI chart

Source: International Ship Network

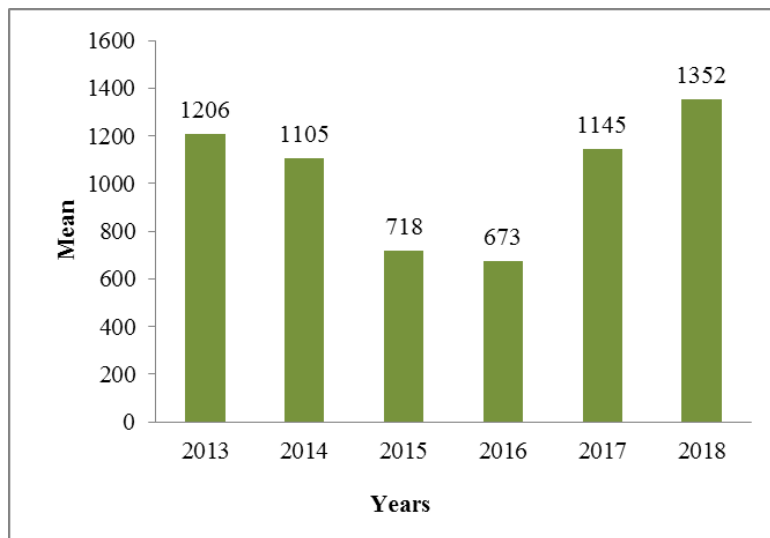


Figure. 2 BDI mean graph

3.2 Demand analysis of major goods

Since entering the new era, China's economy has developed steadily, and its overall national strength and international influence have continued to increase, becoming an important force to promote the development of global shipping trade. China plays an important role as an importing country in the dry bulk shipping market, especially the strong demand for major dry bulk cargoes such as iron ore, coal and grain, driving the demand for the international dry bulk shipping market.

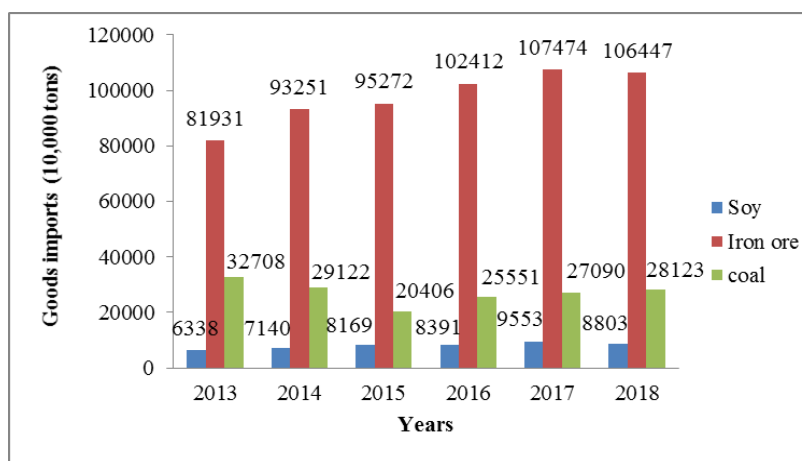


Figure. 3 Changes in China's major cargo imports

Source: China Statistical Yearbook

According to China Statistical Yearbook data, it can be seen from Fig.3 that since 2013, with the rapid development of the world's steel industry, China's iron ore imports have increased significantly, and iron ore imports in 2017 have reached 1.075 billion tons, an increase of 31.3% compared to 2013. Such a huge volume of iron ore shipments is bound to be beneficial to the development of ultra-large ore vessels of the fleet. Due to the influence of some policy factors, China's coal imports have remained relatively stable in recent years, with a small increase and decrease. From 2013 to 2017, China's soybean imports have been increasing, but due to the impact of the China-US trade war in 2018, China's soybean imports have begun to shrink. The control of the volume of coal imports and the reduction in the volume of soybean freight will have a certain impact on the development of the fleet of Handysize vessels and Panamax vessels.

According to relevant statistics, in recent years, the volume of iron ore shipping accounts for about 30% of the total dry bulk shipping, which is one of the most important dry bulk cargoes^[1]. And China is precisely the world's leading importer of iron ore, and has become a key factor in promoting the development of global dry bulk trade. Therefore, based on the gray prediction model, this paper uses MATLAB

software to predict the import volume of China's iron ore and coal in the next three years. Table 1 and 2 are tables of relative errors and predicted values of iron ore, respectively. Table 3 and 4 are tables of relative errors and predicted values of coal, respectively.

Table 1 Relative error table of iron ore

Years	Raw data	Forecast data	Relative error
2014	93251	93459	0.22%
2015	95272	97068	1.88%
2016	102412	100820	1.56%
2017	107474	104710	2.57%
2018	106447	108750	2.17%

The correlation test and posterior difference test on the gray prediction model are:

When $P = 0.5$, $r = 0.9927$, the accuracy is one level, which can be used for prediction.

The variance ratio $C = 0.2002 < 0.35$, the model is better.

Table 2 Forecast table of iron ore

Years	2019	2020	2021
Forecast value (10,000 tons)	112950	117310	121840

Table 3 Coal relative error table

Years	Raw data	Forecast data	Relative error
2014	29122	25070	13.91%
2015	20406	25554	25.23%
2016	25551	26047	1.94%
2017	27090	26549	2.00%
2018	28123	27062	3.77%

The correlation test and posterior difference test on the gray prediction model are:

When $P = 0.5$, $r = 0.9916$, the accuracy is one level, which can be used for prediction.

The variance ratio $C = 0.7295 < 0.80$, the accuracy is the fourth level.

Table 4 Coal prediction value table

Years	2019	2020	2021
Forecast value (10,000 tons)	27584	28116	28658

Through the forecast of the import volume of the two goods, it can be found that China's import volume of iron ore has not decreased, and it will continue to increase in the next few years. While the volume of coal imports remained relatively stable, the increase in imports of goods was small. The increase in China's main dry bulk shipping volume has provided many opportunities for the future development of COSCO Shipping bulk carrier fleet. COSCO Shipping Bulk Company can also formulate the correct operation strategy and appropriately adjust the development direction of the bulk carrier fleet by analyzing China's main dry bulk shipping market and future forecast conditions [2].

4. Characteristics of COSCO Shipping Bulk Carrier Fleet

4.1 Business purpose

The scale of dry bulk carriers of COSCO Shipping bulk carrier fleet ranks first in the world. The bulk of the cargo transportation is mainly dry bulk cargo. The route network extends in all directions, providing high-quality services to customers worldwide. On the one hand, the company implements an international strategy, actively deploys overseas outlets, and builds a global marketing network. On the other hand, the company has continuously updated its marketing concept, promoted "quasi-liner" services, concentrated its advantages, and built a brand belonging to COSCO Shipping Bulk Company [3]. At the same time, the company strives to develop customers in new regions, strengthens business cooperation with other enterprises, constantly adjusts the fleet structure, attaches importance to the introduction of new ships, and saves operating costs. Finally, the enterprise actively introduces and trains talents, reserves sufficient talents for the development of the enterprise, thereby improving the service level and promoting the development of the enterprise.

4.2 Route characteristics

Generally speaking, the source and consumption areas of bulk dry bulk cargoes are relatively concentrated, so COSCO Shipping bulk carriers fleet have formed a large and stable route concentration worldwide [4]. As can be seen from Fig.4, the main routes operated by the company include: China-Australia, China-Brazil, China-South Africa iron ore transportation routes; China-Australia, China-Southeast Asia coal transportation routes; North and South America grain import routes; small bulk short-haul shipping routes such as nickel ore and bauxite in Southeast Asia; and domestic North Coal South Transport, North Grain South Transport, and two-way ore transport routes. In short, the routes are spread all over the world, covering more than 100 countries around the world, but the large and stable routes have a concentration.

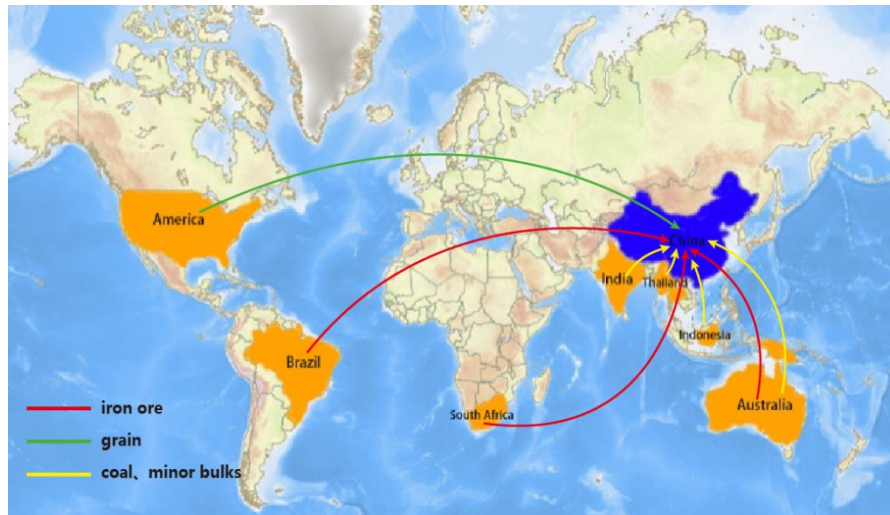


Figure. 4 Main routes of COSCO Shipping bulk carrier fleet

Source: <http://bulker.coscoshipping.com>

4.3 Capacity characteristics

According to the official website information of COSCO Shipping bulk carrier fleet, the fleet composition of Table 5 is obtained. From Table 5, it can be seen that in terms of the composition of the number of ships, there are 230 Handysize vessels, accounting for 53.6% of the total fleet, ranking first; 116 Panamax vessels, accounting for 27.1% of the total fleet; Capesize vessels and oversized ore vessels are 49 and 34, respectively. This shows that in the current COSCO Shipping bulk carrier fleet, the number of Handysize vessels is mainstream, with more than half of the share.

In the composition of the tonnage capacity, the number of advantages for its Handysize vessels, to achieve the highest capacity, reaching 11.79 million dwt, of the total tonnage of 29.1%. The Capesize and super-large ore ships account for 1/4 of the total number of ships in the fleet, but their capacity is close to half of the total tonnage, which is 8.9 million deadweight tons and 10.69 million deadweight tons, accounting for 21.9% and 26.4%.

Table 5 Fleet composition (as of the first half of 2019)

Ship type	Number of ships	Proportion of total vessels	Deadweight tonnage (10,000 tons)	Proportion of Deadweight
VLOC	34	7.9%	1069	26.4%
Capesize	49	11.4%	890	21.9%
Panamax	116	27.1%	916	22.6%
Handysize	230	53.6%	1179	29.1%
Total	429	100%	4054	100%

Source: <http://bulker.coscoshipping.com>

4.4 Ship characteristics

At the beginning of the establishment of the COSCO Shipping bulk carrier fleet, it only had three types of vessels: Handysize, Panamax and Cape of Good Hope. However, after four years of development, the company's bulk carrier fleet currently has a total of 7 main ship types, namely, Handysize, Handymax, Panama, Cape of Good Hope, 230,000 tons VLOC, 300,000 tons VLOC, 400,000 tons VLOC ship type [5]. According to the information of COSCO Shipping bulk carrier fleet, from Fig.5, it can be seen that the number of Handysize ships is the largest and the number of super-large ore ships is the smallest. However, the proportion of deadweight tonnage of super-large ore ships is very high. According to the development history of the ship type and the composition of the fleet, it is found that the dry bulk carrier of the fleet has a trend of large-scale development.

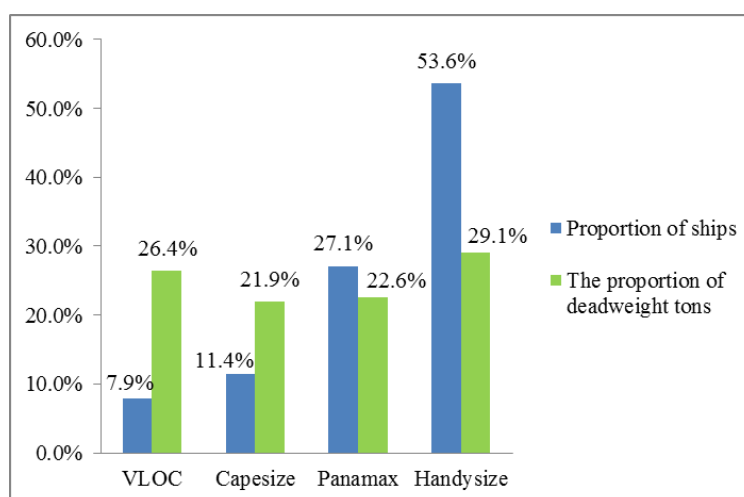


Figure. 5 Proportion of each dry bulk carrier type

Source: <http://bulker.coscoshipping.com>

5. Development Trend Analysis of COSCO Shipping Bulk Carrier

5.1 Scale up

In recent years, with the gradual recovery of the international dry bulk market and the rebound of the BDI freight index, the scale of COSCO Shipping bulk carrier fleet has been expanding. Since 2016, the company has owned and controlled various types of bulk carriers. The number of vessels in the fleet has increased by 5.3% from more than 380 to more than 400 now. From the initial 34 million dwt to the current 40 million dwt, the capacity scale is also expanding, and the growth rate reached 17.6%. The fleet size of the fleet is obvious. The company purchased multiple 400,000-ton ore ships, and the average tonnage increased from 78,000 deadweight tons to at least 91,000 deadweight tons, which is more in line with the development trend of the fleet. Overall, the fleet scale is expanding. At the same time, this has also brought some operating pressure to the company [6].

5.2 Ship shape refinement

From the perspective of transporting goods, on the one hand, the rising demand for low- and medium-grade iron ore in the Chinese market will be beneficial to the maritime demand for iron ore. The recovery of global steel demand and the rapid growth of steel demand in emerging countries such as Southeast Asia will also drive iron Volume of ore trade. In order to broaden the market at home and abroad, COSCO Shipping bulk carrier fleet also signed a long-term COA transportation contract with Brazil's Vale, and newly built a number of ultra-large ore ships. This approach will clarify the development of very large vessels, reduce transportation costs, increase cargo transportation capacity, and increase economies of scale. On the other hand, due to the impact of China's capacity reduction policy and coal import regulation, coal imports will remain relatively stable, and due to the instability of Sino-US trade relations, the demand for grain shipments will be relatively reduced. These factors will have a certain adverse impact on the development of the Panamax vessels of the fleet. At the same time, with the continuous development of China's economy, the increase in demand for small dry bulk cargoes such as timber, bauxite, and nickel ore, as well as the continuous growth of dry bulk cargoes along China's coasts, will be beneficial to the development of fleet Handysize vessels. Finally, the COSCO Shipping bulk carrier fleet can also be tailor-made for customers with long-term cooperation, and develop some unique, environmentally friendly and economical emerging ship types.

In general, according to the demand of the cargo market, the ship types of COSCO Shipping bulk carrier fleet should be developed accurately. Table 6 shows the shipping cargo types corresponding to each ship type, and Fig.6 shows the shipping status of the main dry bulk cargo types.

Table 6 Cargo types by ship type

Ship type	Transportation goods
VLOC	Iron ore
Capesize	Coal and iron ore
Panamax	Grain, coal, iron ore
Handysize	Grain, coal, small bulk

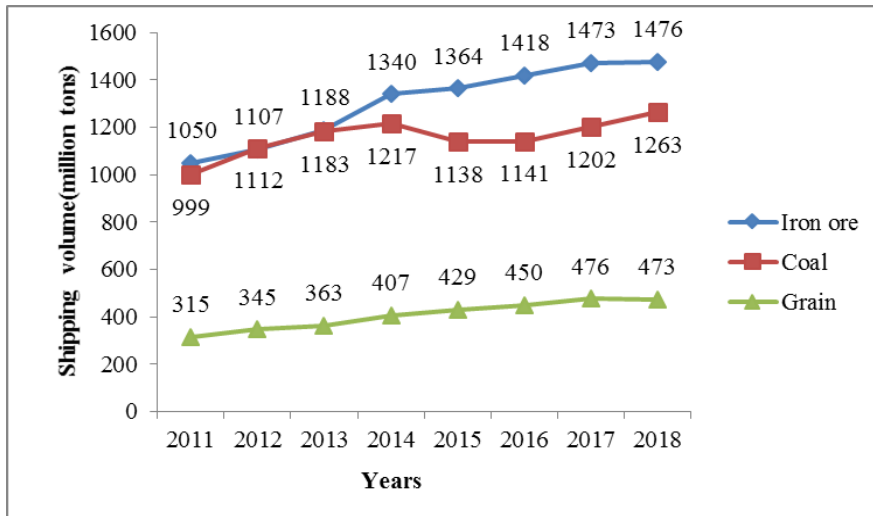


Figure. 6 Shipping situation of the world's major dry bulk cargoes

Source: Clarksons

5.3 Shrinking ship age

Due to economic growth, technological progress, environmental protection requirements, and intangible losses, the age of the world fleet should be getting lower and lower. It can be seen from Fig.7 and Fig.8 that there are more bulk carriers in the current 0 to 4 years and 5 to 9 years, reaching 2474 and 5152 ships, respectively, accounting for 21% and 43% of the fleet. The average ship age in the world is 10 years, which is lower than the average age of 13 years in 2010 and is at a medium level. With the active promotion of supply-side structural reforms, COSCO Shipping bulk carrier fleet has also achieved a younger age. The average age of ships has dropped from 12 to 8 years. The age of ships is shrinking, which is in line with the industry's development trend.

On the one hand, in theory, the older the ship, the higher the loss rate and scrap rate of the ship. Therefore, from a safety perspective, efforts should be made to

reduce the average age of the fleet. On the other hand, in order to respond to market demand, ship replacement, company development strategies, reduce navigation costs, and better participate in international market competition, the age of ships must also be reduced.

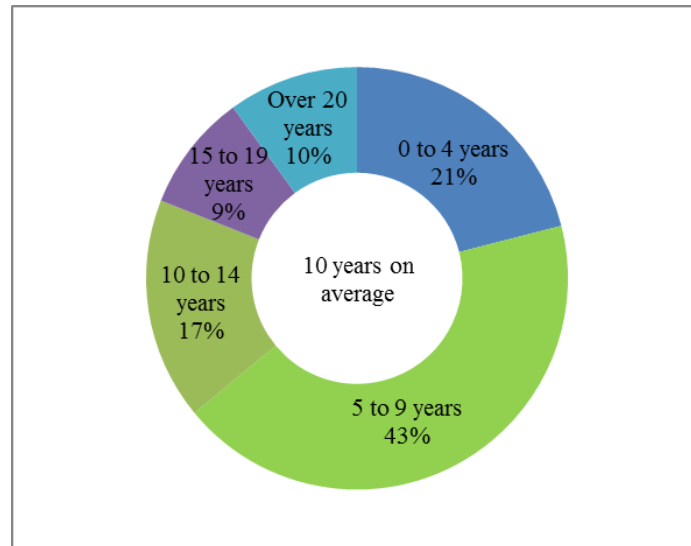


Figure. 7 Age composition of the world's bulk carrier fleet

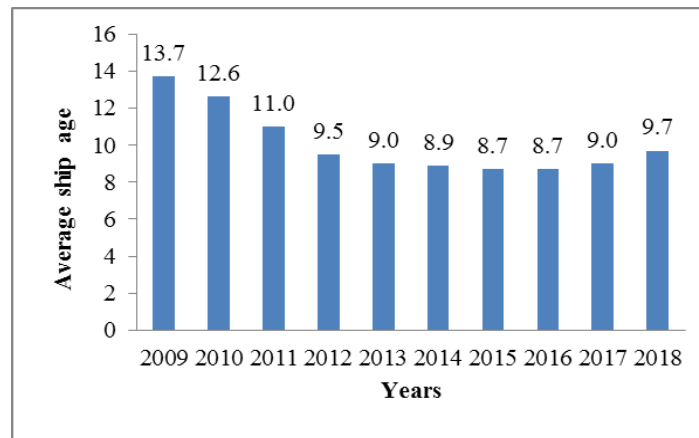


Figure. 8 Changes in the average age of the world bulk carrier fleet

Source: Clarksons

5.4 Environmental protection

In order to prevent air pollution caused by the exhaust of fuel oil from ships, more and more countries in the world have increased their awareness of environmental protection and formulated environmental protection regulations in their own seas. Fig.9 shows the changes in the sulfur content of fuel oil. By 2020, the sulfur content of fuel oil used by ships transporting goods in the ECA region will not exceed 0.1%. The "sulfur limit order" issued by the International Maritime Organization will increase the sulfur content of fuel oil from 3.5 % dropped to 0.5%. In order to cope with relevant regulations, COSCO Shipping bulk carrier fleet may choose to install desulfurization towers on ships or use low-sulfur fuel oil to reduce sulfur oxide emissions from fleet ships and reduce air pollution. At the same time, under the conditions of future carbon emission restrictions, the fleet must consider the use of clean energy or new types of ships to develop a green economy as early as possible, meet relevant international regulations, protect the environment, and make the fleet develop towards environmental protection.

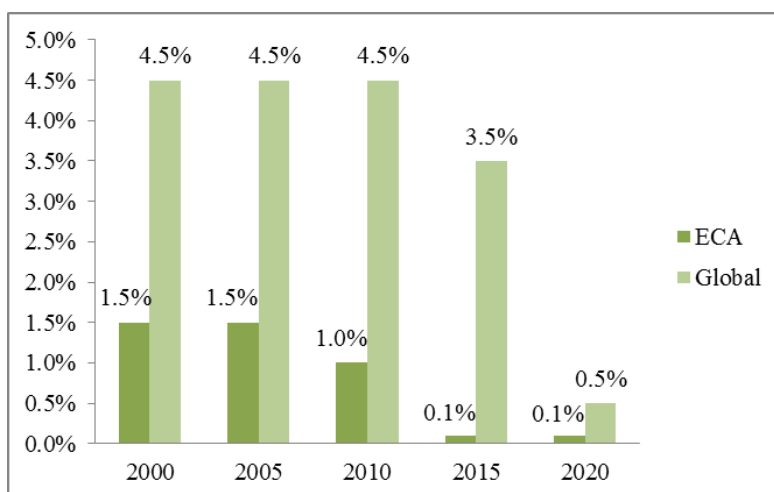


Figure. 9 Changes in fuel sulfur content

5.5 Globalization

Since the establishment of COSCO Shipping Bulk Cargo Transportation Co., Ltd., it has continuously implemented reforms and reorganizations, promoted the "internationalization" strategy, accelerated the pace of "going global", and increased the proportion of cargo transportation in third countries. Guided by the "globalization" strategy, actively expanding foreign markets, diversifying business methods, and serving global customers. Under the influence of the "Belt and Road" policy, the company seized the opportunity and signed international cooperation agreements with a number of countries along the route, which greatly increased the

total volume of foreign trade freight and changed the structure of cargo sources. In addition, by establishing good cooperative relations with major cargo owners around the world, we have accelerated the internationalization of the enterprise and established a good brand image.

6. Conclusion

COSCO Shipping bulk carrier fleet should adjust the fleet scale, transportation structure, development direction, and formulate a reasonable business strategy based on the prospects of the dry bulk market and its own fleet characteristics. Through the integration and reorganization of the fleet, the company can prevent market risks, reduce operating costs, and continue to maintain the sound development of the enterprise. At the same time, the company focuses on scientific and technological innovation, precise positioning, strengthen cooperation between enterprises, expand service methods, move towards internationalization, identify future development trends and promote better development of enterprises.

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