Research on the collection and distribution system of Qinhuangdao Port

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Abstract. As a big coal port, Qinhuangdao port is an important shipping hub for coastal shipping because of its superior geographical location. Nowadays, with the growth of the throughput of Qinhuangdao port, it not only puts forward higher requirements for the port infrastructure construction, but also brings greater pressure to the port collection and distribution system. Therefore, it is of practical significance to study the collection and distribution system of Qinhuangdao port to promote the further development of the port. This paper first expounds the relevant theories of the port collection and distribution system, on this theoretical basis, mainly analyzes the current situation of Qinhuangdao port collection and distribution system, and puts forward corresponding countermeasures and suggestions according to the existing problems of the collection and distribution system, so as to accelerate the development of the port and improve the competitiveness of the port.

1 Introduction

The port collection and distribution system is composed of railway, highway, urban road and corresponding junction station, which is connected with the port, The rapid development of port cargo throughput not only puts forward higher requirements for port infrastructure construction, but also brings greater pressure to port collection and distribution system. The contradiction between the collection and distribution system of many ports and the increasing cargo throughput in China is becoming increasingly fierce, and port collection and distribution is becoming the bottleneck restricting the development of ports.

2 The strategic position of Qinhuangdao prort

Qinhuangdao port is the main energy supply port in the economically developed areas of East and South China, as well as a large-scale commercial port in the two economic regions of northeast and North China. The import and export goods of the port mainly include coal, petroleum, ore, chemical fertilizer, grain, cement, feed, etc. At present, the designed annual throughput capacity of the port is 226.35 million tons and 750000 TEUs, with a specialized coal yard with a storage capacity of 10.27 million tons, a general cargo yard with a storage capacity of 2.19 million tons, 15 oil tanks with a total storage capacity of 286000 cubic meters and a container yard with a storage capacity of 23000 TEUs. The main cargo throughput and container throughput are shown in Figure 1 and Figure 2.

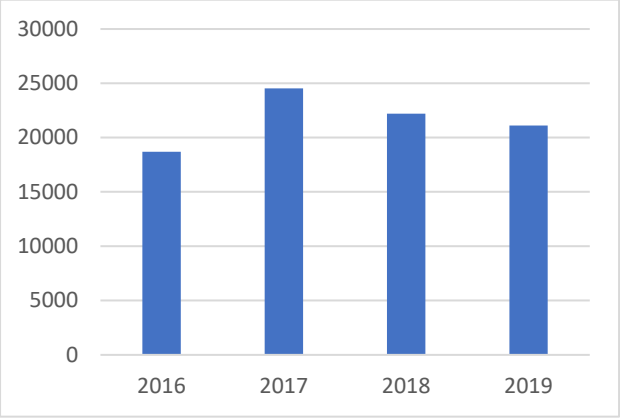

Figure 1. Cargo throughput of Qinhuangdao port from 2016 to 2019 (unit: 10000 tons)

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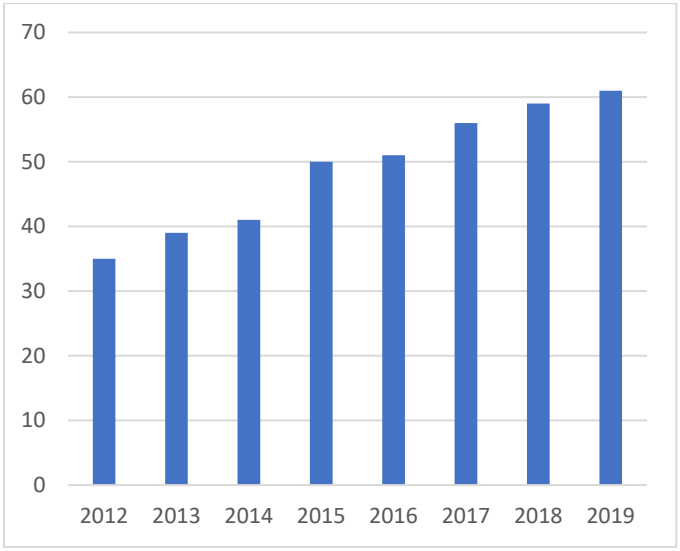

Figure 2. Container throughput of Qinhuangdao from 2012 to 2019 (unit: 10000 TEU)

Qinhuangdao Port mainly carries out service business through 23 coal berths, and almost all the coal handled is used for outbound transportation. Qinhuangdao port is located in the east of Daqin line, which is the main transportation artery of China's domestic coal trade from west to East. Qinhuangdao port plays the role of "coal price stabilizer" and "reservoir of coal transportation from north to South". It is expected that Qinhuangdao Port will not shake its position as the main hub of coal transportation in a long time in the future, and will play a more important role in the two projects of coal transportation from West to East and coal transportation from north to south.

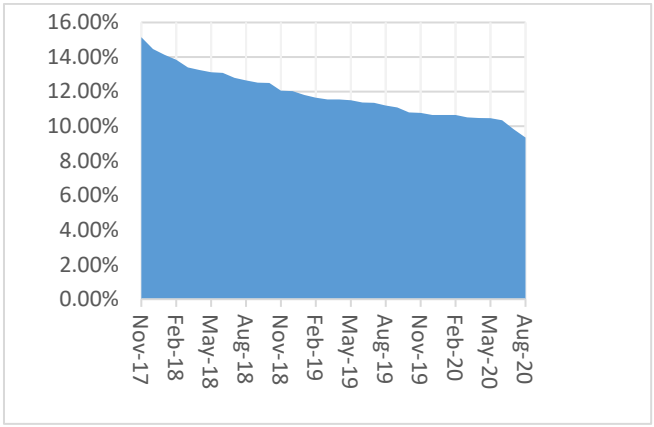

Figure 3. Proportion of Qinhuangdao coal throughput in total coastal coal

3 Current situation of collection and distribution system in Qinhuangdao Port

Qinhuangdao port is bounded by Xinkai River, which is mainly divided into East and West ports. Donggang District mainly exports energy, while Xigang District mainly imports and exports groceries. At present, Qinhuangdao port is the largest energy export port in the world, with the largest automated coal handling terminal in China.

The domestic transfer coal of Qinhuangdao port flows to Shanghai, Zhejiang, Jiangsu, Fujian, Shandong, Guangdong, Guangxi, Hainan, Liaoning and other 9 provinces and cities, accounting for about 77% of the port's coal throughput; the foreign trade coal export flows to Japan, Hong Kong, Southeast Asia, Europe and other countries and regions, accounting for about 23% of the port's coal throughput.

According to its composition, Qinhuangdao Port coal logistics collection and distribution system can be divided into three key links: railway, water transportation and storage yard. At present, Qinhuangdao port has 100000 ton waterway, 5 coal liner routes, four railway lines leading to the hinterland, namely, Jingshan, Shenshan, Jingqin and Daqin, directly leading to the port. There are more than 170 kilometers of self owned railways built in the port, as well as domestic advanced locomotives and marshalling yards. Five overpasses have been built, the port highway has been reconstructed and expanded. Beijing Shenyang Expressway, national highway 102, 205 and Qincheng highway are connected with Shugang Road, forming a reasonable port collection and distribution network of railway, highway and ship.

In terms of road transportation, the Shugang road in Qinhuangdao port is connected with Beijing Shenyang Expressway, national highways 102 and 205, and Qincheng highway, but the coal collected by the road accounts for less than 10% of the port's coal throughput.

In terms of railway transportation, at present, the railway transportation of Qinhuangdao port is mainly composed of three parts: hinterland - Qinhuangdao Port Railway Hub - Qinhuangdao port. Qinhuangdao port is located at the intersection of Jingshan, Jingqin, Daqin and Qinshen (Shenshan) lines. Four railway trunk lines connect the port. Among them, Jingshan, Jingqin and Daqin railways are the main channels for coal transportation in northern China.

The main way of coal transportation in Qinhuangdao port is waterway transportation, and the proportion of coal transportation is absolutely dominant. On the one hand, due to the increase of coal throughput in Qinhuangdao Port year by year, the amount of coal transportation undertaken by waterway transportation increases rapidly; on the other hand, the increase of water to water transportation can not be underestimated. By 2020, Qinhuangdao port has 12 quasi liner routes for coal transportation.

4 Existing problems

4.1 Port collection and distribution and urban traffic need to be further coordinated

In the early stage of port development, it led to regional economic development and urban scale expansion. In the process of development, the contradiction between the port and the city is gradually prominent, the urban development limits the expansion of the port area, and the interference of the port development, especially the port collection and distribution, is becoming increasingly serious. Qinhuangdao West port area is surrounded by the city, and many collection and distribution railways pass through the city, which seriously divides the city. Xishugang road has been cut off by urban buildings. There is only one east Shugang Road on jishugang Road, and the rest need to use urban roads.

4.2 The connection of collection and distribution channels of MTR combined transport needs to be further strengthened

The port area of Gangshan customs in Qinhuangdao is short of branch railway connecting with trunk railway. The lag of railway construction and the development of Qinhuangdao Port container terminal are not synchronous and matching, resulting in the short barge fee, which leads to the total cost higher than the surrounding ports. The railway department and other departments are in the state of separate management, with poor coordination and low awareness of market and service. The separation of railway and wharf in Qinhuangdao Port objectively results in the increase of import and export cost of sea rail intermodal container in Qinhuangdao port and weakens the competitive advantage with other ports.

5 Development Countermeasures

5.1 Strengthen the overall connection between port planning and urban planning

Strengthen the overall connection between port planning and port city planning, improve port collection and distribution channels according to the concept of passenger and freight separation, realize port collection and distribution and urban traffic separation operation in areas with conditions, and realize Lane separation operation in areas with limited conditions. Qinhuangdao Port focuses on adjusting the functional orientation of the West Port Area, gradually shutting down the coal terminal berths in the West Port Area, transforming it into an urban living coastline, and focusing on the development of international cruise ships and yachts. Focus on strengthening the connection between the port planning and the port new town planning, and realize the coordinated development of the port collection and distribution freight transportation and the port new town passenger transportation.

5.2 Optimize and perfect the comprehensive transportation channel of collection and distribution

With the core of improving the comprehensive service capacity and level of port collection and distribution system, the layout of inland dry port is planned as a whole, the two-way logistics channel between land and sea is improved, the connection of external backbone road network of port area is unblocked, and the comprehensive transportation channel between port and inland hinterland is improved. Qinhuangdao Port accelerates the construction of Beijing Qinhuangdao Expressway and actively plans Chengqin railway.

5.3 Improve the connection between the port and the rear collection and distribution channel

We will speed up the construction of branch railways, special railway lines and roads for entering and leaving the port, and realize the effective connection between the port and the rear collection and distribution channels. Qinhuangdao Port plans to build Shanhaiguan port railway branch line, connect with the existing Jinshan railway, smooth the connection between Shanhaiguan port and trunk railway, meet the demand of container and general cargo transportation in hinterland, accelerate the construction of South Shugang road to the East, plan to build middle Shugang road and North Shugang Road, and strengthen the connection with rear trunk highway.

6 Conclusion

An unimpeded coal logistics collection and distribution system is the key to control the efficiency and benefit of port coal logistics service. It has a very important meaning and role in the development of port coal throughput, the

improvement of terminal handling speed, the strengthening of vehicle and ship turnover and the shortening of coal circulation time. Therefore, how to optimize the port coal logistics collection and distribution system and promote the coordinated development of various collection and distribution modes has become a hot issue in the development of port logistics economy. This paper focuses on the empirical study of the collection and distribution system of Qinhuangdao port, analyses the problems existing in the system, and puts forward suggestions for improvement.

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