

ANALYSIS OF LAND BRIDGE TRANSPORTATION

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ABSTRACT: Land bridge transportation means transportation from one seaport to another by railway across continents instead of by ocean ship. At present, there are two common routes for using land bridge transportation in the world. One is Asia—America—Europe land bridge, the other is Europe—Asia land bridge.

Eurasia land bridge has obvious advantages over Asia—America—Europe land bridge due to its shorter distance, shorter transportation time and special freight rate. China started Eurasia land bridge transportation business in 1980. It mainly used the mode of railway—railway combined transportation. The comparison between using Eurasia land bridge and using shipping transportation from China to Northern and Western Europe shows that Eurasia land bridge transportation can save time and get foreign exchange in time, and commodity turnover will be speeded up. According to the port layout and railway network structure, China's land bridge transportation projects are proposed. They are Suifenhe project, Dalian project, Tianjin project and Lianyungang project. The comparison of the four projects reveals that regarding to the total distance, Tianjin project is the shortest, but the distance covering China is shorter, and the transportation capacity of Beijing—Tianjin section is low. Lianyungang project has better geographical position and large attractive scope. The distance within China is the longest, but now there is 463 km of railway which have not been completed, and the transportation capacity is limited by Lanzhou—Xinjiang and Lianyungang—Lanzhou railway lines. From a long-term point of view, this project has a bright future.

KEY WORDS: land bridge transportation, Eurasia land bridge, Suifenhe project, Dalian project, Tianjin project, Lianyungang project.

I. THE STATUS OF THE INTERNATIONAL LAND BRIDGE TRANSPORTATION

Land bridge transportation means transportation from one seaport to another by railway across continents instead of by ocean ship.

At present, there are two common routes for using land bridge transportation in the world. One is Asia—America—Europe land bridge; the other is Europe—Asia land bridge.

The Asia—America—Europe land bridge connects two shipping lines of Japan—America and America—Europe. The shipping cargo from Japan to Europe is shipped to the west coast of America, then carried to the east coast by railway across American continent, and then shipped to Western and Northern Europe. For example, shipping of the cargo from Japan to Rotterdam covers 33,000 km, in more than 80 days through Cape of Good Hope and 21,000 km, in 45 days through Suez Canal. If by Asia—America—Europe land bridge, the distance is 18,800 km with transportation time of 45 days. So it's 14,200 km shorter than through Cape of Good Hope, and saves 35 days; it's 2,200 km shorter than through Suez canal, but transportation time is same.

The other one is Eurasia land bridge. It was initiated by Japan and USSR. The cargo which is carried from Japan to USSR or Western and Northern Europe, is loaded in one port of Japan, and shipped to the eastern big port of USSR—Nakhodka. After going ashore, the cargo was transferred by Sibirsk Railway. Through Omsk, Novosibirsk and Moscow the cargo arrives at the western border station Brest (bound for Western Europe) and Leningrad (bound for the Northern Europe). Then, the cargo arrives at the destination by railway or ship. The other example is to Rotterdam, Holland, the total distance from Tokyo, Japan, to the port of Rotterdam is 13,700 km, and it's 7,300 km shorter than through Suez Canal and saving 10 days.

With a shorter distance the Eurasia land bridge takes an advantage of shorter time. In order to collect the transit goods transportation fee USSR make a careful calculation of transportation rate. USSR made varied freight rates for different areas and countries so as to gain source of goods and extend attractive scope. There are the following 4 kinds of freight rate:

1. The lowest freight rate are designed for Hong Kong, Southeast Asia, Malaysia etc. For Hong Kong (for all goods) the freight is 1185 R for each standard container (from Hong Kong to the western border station Brest USSR).

2. The lower freight rate is provided for Japan. The freight rate of cargo which from any Japan port to the western border station of USSR, is 1385 R (for class 1 goods).

3. For China, the medium freight rate is made. From Manzhouli to the western border station of USSR, the freight for each standard container is 1300 R.

4. For European countries, the high freight rate is served. They made higher freight policy. From the western border station of USSR to Rotterdam, the freight of mid class is

942 R. The freight for per container per km is 0.45 R, that is one time more than that of other countries (for other countries is 0.17–0.20 R / km per container).

Besides, they will repay 20–30% of total freight to the cargo owner, according to the number of container and size of shipment.

The Eurasia land bridge has obvious advantages over Asia–America–Europe land bridge due to the shorter distance, shorter transportation time and also special freight rate. Therefore, the transportation of container increases rapidly. In 1971, it only fulfilled 1645 TEU. In 1981, it reached 100 thousand TEU, increasing 50 times. By the end of 1985, the total figure reached 1.038 million TEU. For the period of 14 years, it had made 74 thousand TEU by an average year.

II. THE DEVELOPMENT OF EXPLOITATION OF EURASIA LAND BRIDGE IN CHINA AND ECONOMIC ANALYSIS

1. Developing Status

China started Eurasia land bridge transportation business in 1980. It mainly used the mode of railway–railway combined transportation. The transportation route is: from China border station Manzhouli, through Borzya, and Tarsk Station in Siberia, and then into Novosibirsk and Moscow and the border station Brest, USSR then onto Northern and Western Europe. In recent years, China uses the mode of railway–shipping for transportation, that is, the cargo is carried to the western border station by railway and then transferred by ship to the coastal country and regions along the Baltic Sea, and the Mediterranean. In 1981, China sent 1500 TEU to Western and Northern Europe. On the basis of the route to Iran, the route is also extended to Germany, Finland and Austria. At present, there are 17 provinces and autonomous regions which transport clothing, textile, light industry products, chemical products, local special products by Eurasia land bridge. The containers for foreign trade grow up year by year. In 1980, the container volume was 268 TEU. In 1981, the volume was 1669 TEU. In 1985, the volume was 10,704 TEU. In 1986, the volume reached 10,183 TEU.

China has a bright future in developing container transportation with USSR, Western and Northern European countries. USSR would like to cooperate with our country. During China Port Observation Group visited USSR and Europe in 1982 the authorities of USSR suggested to collaborate on developing business of Eurasia land bridge with us. In 1983, China International Trade Corporation made an agreement with USSR Transportation Corporation about transporting 30,000 TEU that year. As a result, by the end of that year, only 7693 TEU was fulfilled, less than one third of the figure on the agreement.

2. The Possibility of China Joining Eurasia Land Bridge Transportation and the Economic

Analysis

The transportation practice of many years shows that the major part of cargo transported through Eurasia land bridge belongs to Japan, USSR, Western and Northern Europe and secondly to Hong Kong, South Korea and Southeast Asia. The cargo of our country is at low percentage.

The comparison of actual routes reveals that the route from Nakhodka Port, through Suifenhe, Harbin and Manzhouli, China, to Sibiria Railway, is the shortest. As a matter of fact, the route from Nakhodka Port, through USSR Far East railway, to Chita, is 3233 km. But through Harbin and Manzhouli of China the route is 2289 km, 944 km shorter than the former route. The latter route has two transfers (broad gauge change to standard gauge track).

With reference to freight rate, from Manzhouli to the western border station of USSR, the freight rate for per container is 1300 R. From Japan to border station of USSR, the freight rate is 1385 R. When through Suifenhe to Manzhouli, China the distance is 1485 km, collect foreign exchange 85 R, converting to 510 yuan (RMB). By means of the same capacity of transportation to handle other cargo, the freight rate will be 864 yuan, and the charge of two transshipments is added, the total charge is up to 1000 yuan. That means that the transportation of one transit container not only takes railway transportation capacity, but also decreases 494 yuan of income. That is a disadvantage, especially at present, the transportation capacity for Harbin—Manzhouli Railway line, Harbin—Suifenhe Railway line are very low, coal over-stock can not be carried out, which will be more disadvantageous to it.

3. Comparison between Using Eurasia Land Bridge and Using Shipping Transportation from Our Country to Northern and Western Europe

According to data provided by China Ocean Shipping Corporation, there are regular cargo ships to four ports—London, Antwerp, Rotterdam, Hamburg. The transportation speed is fast, and freight rate cheap. For example, from Shanghai to Rotterdam 10-class cargo the freight rate per container is US \$ 1500—1700, converting to 5600—6300 yuan (RMB). If it is transported by Eurasia land bridge, from Shanghai to Dalian by sea the freight is 680 yuan, and transshipment charge is 120 yuan/ container. The distance from Dalian to Manzhouli is 1879 km, and the freight is 1200 yuan/ container. The total freight is 2080 yuan. From Manzhouli to Brest the freight is 1000 R (class 4 goods); the distance between Brest and Rotterdam is 2080 km, and the charge is US \$ 1480. The total charge per container is up to 13,325 yuan, 7000—8000 yuan more than that by sea. Moreover, more than 90% of freight will be collected by foreign countries. That is a disadvantage for our country.

Ocean shipping needs small investment, but has big transportation capacity and can save land as well. And the freight will be collected by our country, so, carrying our country's container to Western Europe by the domestic ships, is appropriate. But, though the shipping freight is cheap, it is limited by climate and natural conditions. The arrival time will not be on schedule, and transportation time is longer (it's 10 days longer than by Eurasia land bridge). For the expensive value of goods, or the goods which are urgent to enter international markets, and require strict arrival time, or the cargo bound for Northern Europe, though the freight is a bit expensive, in view of macroscopic benefit of our country, it will save time and get foreign exchange in time, and commodity turnover will be speeded up. It is feasible to transport goods through Eurasia land bridge.

III. THE LAND BRIDGE DESIGN FOR CHINA

China has a vast land, with coastal line of more than 18,000 km. After liberation in 1949, China has carried out construction for more than 30 years and readjusted industrial distribution, there have been some unbalanced problems. The main industry still concentrates in coastal areas. Although the transportation network of the east coastal area is developed, it cannot meet the needs of transportation development. Now, the transportation capacity is low. The development of land bridge transportation can make a full use of available facilities, and make a comprehensive use of transportation capacity of different modes and can save freight and shorten transportation distance. According to the port layout and railway network structure, we have made land bridge transportation projects as follows(Fig.1):

1. Suifenhe Project

Domestic cargo or transit cargo from Japan, and Hong Kong, first ship to Nakhodka Port, transfer to Suifenhe by railway, pass through Harbin and Manzhouli, then to Zabaikalisk-Tarsk Railway, USSR, connect with Sibiria Railway, through Chita, Ulan Ude, Omsk, Moscow to the western border station Brest. The total distance is 9511 km, of which the distance in USSR is 8028 km, and in China is 1483 km. In this project, the railway in China across over the northernmost part of northeast, through Heilongjiang Province and Xingan and Hulun Buir leagues in the Inner Mongolia Autonomous Regions. There are rich resources and developed industry along this route. For example Daqing oil field, forests in the Da and Xiao Hinggan Mountains, coal mines in Jixi, Shuangyashan, Qitaihe, Hegang and Yiminhe and the commodity grain base "Beidachang". And this route passes through several large and medium-sized cities such as Mudanjiang, Harbin, Qiqihar, Manzhouli where there are developed industries of machine building, oil extraction and refining, generating electricity by coal and wood processing. As railway transportation

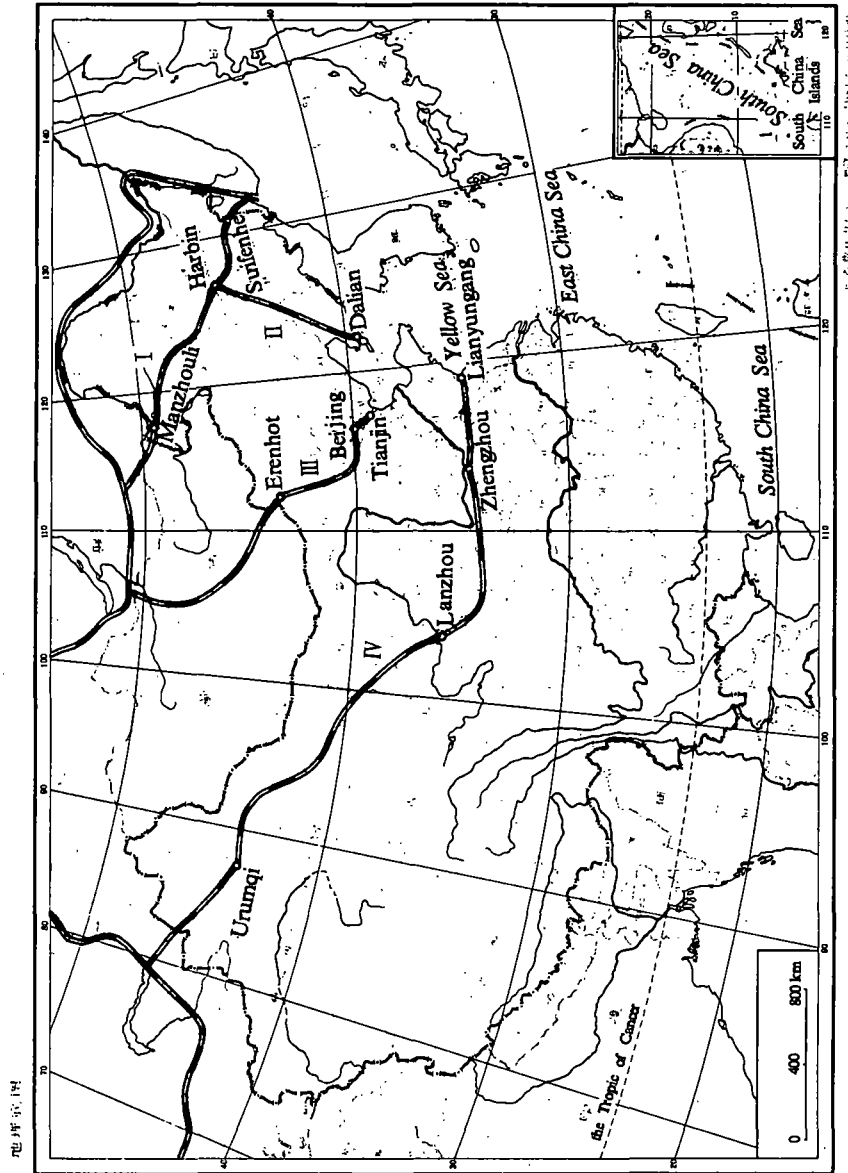


Fig.1 China's land bridge transportation projects

capacity is low the double-line reform is being carried out. It is expected that during the Eighth Five-Year Plan period, Harbin—Manzhouli and Harbin—Suifenhe railways can be constructed into double-line railways. And Suifenhe Station is transformed technologically. The transportation capacity can greatly increase, which will help to develop international through-transportation. But the distance through China is shorter, and the present freight rate is unfavorable for China.

2. Dalian Project

The cargo from mainland of our country, Hong Kong, Japan, Southeast Asia for USSR and Northern and Western Europe, ship to Dalian, through Harbin—Dalian and Harbin—Manzhouli railways, to Manzhouli then along Siberia Railway to Moscow, and finally arrive in the western border station Brest. The total distance is 9564 km, of which there are 1879 km in China, and 7685 km in USSR.

The railway of this project runs through Liaoning, Jilin, Heilongjiang provinces, and the northern part of Inner Mongolia, through large cities such as Shenyang, Harbin, Dalian, and several medium- and small-sized cities. Along this route there are smooth topography, rich resources and developed industry. There are Daqing oil field, forest in the Da and Xiao Hinggan Mountains, coal mines to east and west of Harbin and large area of land resources as well as iron ores resources in Heilongjiang Province. There are old industry bases of Shenyang and Harbin, and iron and steel enterprises of Anshan, Benxi, Fushun, Dalian. Besides, machinery processing industry is comparatively developed. There are biggest domestic diesel locomotive factory in Dalian, and some big oil refineries, chemical plants, oil pipelines and other industry and transportation companies. Jilin Province and Heilongjiang Province are abundant in corn and soybean, fruit and seafoods in Dalian and Jinzhou are well-known throughout China and the world.

For this project there is a longer railway distance both in China and USSR. During the Seventh Five-Year Plan period, the reform of electrified Harbin—Dalian Railway line will be completed and transportation capacity will meet the requirement of this project, which can help to develop Eurasia land bridge transportation.

3. Tianjin Project

This project means that the containers are shipped to Xingang Port, through Tianjin, Beijing, Datong, Erlian and Mongolia, then enter USSR. The containers transfer to Siberia Railway in Ulan Ude, through Irkutsk, Novosibirsk, Moscow, and arrive in the western border station Brest. The total distance is 9100km, in which there is 1071 km in China, 1110 km in Mongolia, and 6920 km in USSR. In this project the railway passes through the North China Plain, Tianjin, Beijing, Hebei, and Shanxi provinces and the Inner Mongolia Autonomous Region. In these region, there are developed industry, agriculture and animal

husbandry as well as rich coal resources and the energy base of our country, and coal mine bases—Shenfu, Zunggar, are all in these attracting regions. The total distance of this project is the shortest. Also the distances both in China and USSR are the shortest. The railway transportation capacity between Beijing and Tianjin is very low, so it's difficult to increase transportation volume. More freight charge will be paid to Mongolia, which is disadvantageous to China and USSR, so at present it is less exploited.

4. Lianyungang Project

The total distance of this project is 9871 km. The distance in China is 4134 km, and in USSR is 5737 km. The geographical position of this project is moderate and the topography is flat except the Wuqiao Mountain north of Lanzhou, most areas belong to plains and hills. This route crosses the middle part of China, and passes through Jiangsu, Anhui, Henan, Shanxi, Gansu provinces, and the Xinjiang Uygur Autonomous Region. Along this route, there are developed industry and agriculture, not only coal, petroleum, light textile, machinery and petrochemical industries, but also abundant grain. The favorable conditions of this project are: the railway distance in China is longer, up to 4100 km, so more transit freight can be collected, but the distance in USSR is the shortest. It's 2291 km shorter than Suifenhe project, 1173 km shorter than Tianjin project, and 1948 km shorter than Dalian project. Compared with other projects the total distance in this project is the longest. In this project, the railway from Urumqi—Wusu section is under construction and the section from Wusu to the border station connecting USSR, will be completed in the Eighth Five-Year Plan period. At present the Lanzhou—Xinjiang Railway is a single-line with great amount of oil transportation, severe short of water and big pressure on capacity of transportation. Baoji—Tianshui section of Lianyungang—Lanzhou Railway is also a single-line, with low transportation capacity, and landslide often occurs to stop transportation, so it is the only way to enter and go out of northwest China. For this project, if USSR makes limitation for freight rate it will be difficult to develop this land bridge for transportation.

5. Conclusion

According to the above analysis, regarding to the total distance, Tianjin project is the shortest, but the distances covering China and USSR are shorter and the transportation capacity of Beijing to Tianjin section is low.

Lianyungang project has better geographical position and large attractive scope. The distance within China is the longest, but now there is 463 km which have not been completed, and the transportation capacity is limited by Lanzhou—Xinjiang and Lianyungang—Lanzhou railway lines. The distance in USSR is the shortest, and the freight rate is controlled by USSR. From a long-term point of view, this project has a bright future.

From the point of view of present conditions if China and USSR have the desire for the cooperation of international container transportation, they can, adhering to the principle of equality and mutual benefit, adjust freight rate, namely China lower properly the tranship charge, and raise the foreign exchange income of transit expenses. Both sides don't have loss in freight rate, the desire for transportation through this route will be probably realized.

China is a country with vast territory and many international railway trunk lines. Each trunk line has a large passenger and freight volumes but the transportation capacity is limited, so China should develop transportation first easy one then difficult one. At first China should develop Suifenhe project, improve transfer equipment of Suifenhe Station to build it into a container transfer station, attracting cargo from Japan, Taiwan, South Korea and Democratic People's Republic of Korea and Hong Kong, to USSR and Northern and Western Europe. Secondly, China should develop Dalian project (after the year of 1990, Harbin—Dalian Railway line electrified, Dalian Port container berth, Dalian railway hub should be completed, attracting cargoes from the southern part of Japan and South Korea, Hong Kong, Taiwan and China's mainland to USSR, Northern and Western Europe.

At the same time, in order to extend transportation scope, improve comprehensive efficiency, China should make good condition to create Lianyungang—Alashankou corridor.

To create international transit container transportation business, China should shorten transportation time and adjust the freight rate to make the price equal to or lower than that of USSR so that China can attain more sources of goods. The following measures should be taken.

1. Strengthen organization leadership. Under the leadership of the State Planning Commission, the Ministry of Railway, the Ministry of Communications and the Ministry of Economy and Trade should organize a transit transportation corporation to coordinate transportation equipment among different departments, freight rate, to attract the source of goods, to make foreign exchange for the country.

2. Adjust freight rate. In order to get more cargo, the total freight through our country should be equal to the freight through USSR. The measures are as follows:

- 1) For shipping freight, it is suggested that China Ocean Shipping Corporation give a preferential freight rate to the transit container transportation.

- 2) The transfer charge for international container transportation by railway should lower properly.

- 3) 10—20% discount on port charge should be given to port user.

- 4) The commission collected by the external transportation company of the Ministry of Economy and Trade should decrease from present US \$ 50 / container to US \$ 30 / container.

3. Transportation speed should be quickened. Both buyer and seller consider the cargo arrival time, in order to speed up container transportation, the following measures should

be taken:

1) The number of regular cargo ships for container ought to be increased so that the goods can arrive and depart freely.

2) The number and destination of containers should be predicted accurately between port and ship. The loading and unloading bridge should be set up in order to shorten the duration of cargo berthing at port.

3) The Wagons special for carrying container need to be provided in time, and the class of special container wagon should be raised and take them as express train, so as to make container train pass each station without marshalling processes, and the transfer station should provide loading and unloading equipment with large power capacity, and set up container storage with proper size.

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