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THE EURASIA CANAL AS A FACTOR OF ECONOMIC PROSPERITY FOR THE CASPIAN REGION

ABSTRACT. The Eurasia Canal is a proposed direct water transport connection between the Caspian Sea and the Azov and Black Sea basin. The completion of construction of the Eurasia Canal will significantly increase non-oil and gas export, and it will lead to the emergence of more than 200 thousand jobs in the South of Russia, Kazakhstan and other countries of the Caspian region. A significant part of the cargo traffic between China and the countries of the European Union, which have ports on the Mediterranean Sea, will be transported via this new trans-Eurasian route that includes the Eurasia Canal.

KEY WORDS: Eurasia Canal, Caspian Region, Russia, Kazakhstan, China, The Belt and Road Initiative.

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INTRODUCTION

The Caspian Sea is the largest enclosed body of water on our planet, rich in hydrocarbons and other resources; however, due to the geographical features, this region, which has huge economic potential, does not have convenient transportation access to the world market. Moreover, the analysis of the potential freight base of Caspian countries suggests the need to increase the capacity of the unilateral transport system by more than 75 million tons, linking the Caspian and Black Sea region.

Accordingly, the President of Kazakhstan, Nursultan Nazarbayev, in 2007 made a proposal to create a direct water transport connection between the Caspian Sea and the Azov-Black Sea basin, a shipping canal which became known as the Eurasia Canal [Nazarbayev: the Eurasia Canal... 2007].

According to Russian President Vladimir Putin, a new water transport connection between the Caspian Sea and the Azov-Black Sea basins "would not simply give Caspian Sea countries access to the Black Sea and the Mediterranean, that is to the World Ocean, but this qualitatively changes their geopolitical status and allows them to become maritime powers" [Annual Address of the President of Russia... 2007].

In September 2013, in Kazakhstan, Chinese President Xi Jinping suggested the joint creation of the Silk Road Economic Belt, forming the strategic concept of the "One Belt and One Road". The concept of the Silk Road Economic Belt is a strategy for developing economic cooperation, especially in the construction of transport and other infrastructure, and implementing investment projects of Chinese companies and enterprises from Central and West Asia, the Mediterranean basin and Europe, as well as Russia and Kazakhstan. The Eurasia Canal construction project is consistent with the spirit of the One Belt and One Road initiative, as the route "Western China – Kazakhstan – Caspian Sea – Eurasia Canal – the Black Sea" will be the shortest between China and the European Union [Bolaev, 2016a].

SOURCES OF CARGO

Some of the most important types of goods that need to be transported from the Caspian region to the Black Sea region are oil and oil products. There have been more than 20 oil and gas fields proved and identified more than 250 promising oil fields on the Caspian shelf. The oil reserves were estimated at approximately 24–26 billion tons, which is 6–10 % of the world's oil resources (270 to 400 billion tons). Potential natural gas reserves have been estimated at approximately 8.3 trillion cubic meters in the Caspian [Volkov, 2010].

A comparative analysis of oil reserves and oil production's volume in the Caspian region and the forecast of expansion of transport systems indicate that in the next few decades, in the absence of implementation of new major projects for the transportation of oil and oil products, there will be a lack of freight transit capacity of the system for the transportation of oil and oil products in excess of 50 million tons per year. Thus, for example, such companies as "Lukoil" and "KazMunaiGaz", which own refineries in the Black Sea basin with a total processing capacity of 20–25 million tons of oil a year, could be interested in creating a water transport connection between the Caspian Sea and the Azov-Black Sea basin even at the present time [Volkov, 2010].

The annual existing cargo traffic, representing the trade between Kazakhstan and the other countries of Central Asia and the countries of Europe and the Mediterranean basin not associated with the export of hydrocarbons, has been estimated at 20–25 million tons [Alekhova, 2009].

In contrast to pipelines, water transport can carry all kinds of goods, including hydrocarbon processing products which cannot be transported by existing pipeline systems. Efficient water transport connection between the Caspian Sea and the Azov and Black Seas basins, and the included port infrastructure (involving the quay system along the navigable route, which can be constructed within the framework of the project) would significantly increase non-oil related exports from the South of Russia (Republics of Kalmykia and Dagestan, Stavropol and Krasnodar Territories, Rostov and Astrakhan Regions), Kazakhstan and other countries of the Caspian region. This includes ferrous and nonferrous metals, grain and other agricultural products, construction materials, coal and other local products. For example, the freight cost of wheat between the cities of Aktau (Kazakhstan) and Izmir (Turkey) through the existing transportation system is more than double the estimated cost by waterway transportation through the Eurasia Canal [Bolaev, 2015].

Analysis of the impact of the project on the social development of the South of Russia, Kazakhstan and the Caspian Sea region as a whole, suggests that completion of construction of the Eurasia Canal will created about 32 thousand new jobs, mostly highly paid, in the manufacturing sector. It means creation of about 200 thousand jobs in service industries and will significantly contribute to economic growth and improve the tax base in the region [Bolaev, 2015]. This contribution, in terms of the additional volume of nominal

GDP of the Russian economy in 2015, according to the IMF assessment, can be estimated at approximately US $ 3.9 billion. Besides, it is necessary to consider the positive effects brought to the economies of Russia, Kazakhstan and other countries of the Caspian region by increasing export potential of almost all industry sectors, benefiting agriculture and increasing significantly revenues for the transit of Chinese goods and the related tax revenues [Bolaev, 2016b].

The cargo traffic transported by Kazakhstan railways from 2008 to 2010 can be estimated at 17.2–23.6 million tons [Alekhova, 2009]. As a rule, waterway transport is far more advantageous than the standard railroad transport. Thus, the sender and the recipient countries have a convenient outlet to the sea and better timing of cargo shipping via Eurasia Canal, which is far more competitive compared to railroad and automobile transportation. Therefore, it is assumed that cargo, which is transported, for example, from Kazakhstan to Italy or Tunisia, or in the reverse direction, most probably would be transported via Eurasia Canal. Respectively, goods transported from Kazakhstan to the Baltic States, Poland, Germany, etc., are more likely to be transported via land routes.

Also, undoubtedly an important factor for the potential additional cargo for the transportation via direct water transport connection between the Caspian Sea and the Black Sea regions is the development of port infrastructure along the Caspian Sea coast. For example, the port of Aktau is currently focused primarily on operations of transport corridor "TRACECA" [The Seaport of Aktau, 2014], but surely it would be able to become the most important cargo port, servicing new transport corridor via the Eurasia Canal.

An important part of the potential cargo of the Eurasia Canal is the production of goods from the South of Russia, primarily in the regions of the Russian Federation, located in the vicinity of the intended route of the waterway. For example, in the Stavropol region in 2014, about 8.7 million tons of wheat were harvested [Vladimirov... 2015]. Approximately 4.5 million tons from this amount was exported [The Stavropol... 2015] (as a rule, the main importer was Egypt [Cherezo, 2014]). Goods from the Stavropol region, as well as from other regions of the Russian Federation, may be transported through the Eurasia Canal if the quay walls system along the route of the shipping canal is constructed as part of the project.

Thus, after the completion of the Eurasia Canal, cargo traffic not directly related to the already-existing transport of hydrocarbon products from the Republic of Kazakhstan by pipelines, may exceed 45 million tons via the direct water connection between the Caspian Sea and the Azov-Black Sea basins, and the direction of movement would be be mainly from east to west. Current oil and oil product cargo can be estimated at 25–50 million tons per year. This volume would increase with the growing share of hydrocarbons processed (and not exported as raw material) in the South of Russia, Kazakhstan, Azerbaijan and other countries of the Caspian region. The direction of movement of this type of cargo is also primarily from east to west.

Another interesting component of our study is the data on the structure of cargo transit through Ukrainian ports from other countries; for example, in 2011, 71.8 % of the total amount of cargo transit was from Russia (34.2 million tons), 20.2 % from Kazakhstan (9.6 million tons), 5.7 % from Belarus (2.7 million tons) and 2.3 % from other countries (1.1 million tons) [Il'nitskii, 2012]. There is a very high probability that the goods from the Republic of Kazakhstan, which were transported through the ports of Ukraine, would be loaded on vessels in the port of Aktau after construction of the Eurasia Canal.

However, we did not take into account that the construction of the Eurasia Canal itself would be a significant factor of the emergence of new industrial facilities and additional cargo sources in the region.

An oil pipeline with a throughput capacity of 60 million tons of oil per year, in addition to several railroads, may represent an alternative to the Eurasia Canal; however, the cost of construction, lack of advantages over the water transport (primarily, the price of transportation) and, in this case, the increase in the land area affected (because the route should go around the Caspian Sea) allow us to consider the Eurasia Canal as a vital project for the Caspian region.

At the same time, there is a high probability that a significant part of the cargo traffic between China and the countries of the European Union, which have ports on the Mediterranean Sea will be transported via the new trans-Eurasian route that includes the Eurasia Canal. It should be noted that at present time almost all trade between China and Europe is carried out by maritime transport. The vessels have to go around the entire Eurasian continent, and sometimes even around Africa. Meanwhile China is the third country in the world by the size of land area and a significant part of the cost of goods in Sino-European trade is railway transportation costs, which reflects the distance from Chinese cities to the coast. The distances from the central and western provinces of China to the Caspian Sea coast are comparable with the distances from them to Chinese ports [Bolaev, 2009].

According to recent data, Chinese ports annually handle more than 7 billion tons of cargo. According to expert assessment, the annual trade between China and the European countries of the Mediterranean (Italy, France, Greece and other countries) exceeds 45 million tons. Therefore, a significant part of this cargo volume can be transported via territories of Russia and Kazakhstan after construction of the Eurasia Canal [Bolaev, 2015]. The proposed route of the Eurasia Canal is located on the shortest way between China and the European Union. After the construction of the Eurasia Canal, one half of this way will be by water. This way will be considerably shorter and faster than the ocean route; besides, it will be comparable in cost due to the use of water transportation. The construction of the Eurasia Canal will allow increase export to the countries of the European Union from the Western and Central regions of China.

The issue of the Eurasia Canal construction draws attention of many Chinese experts. In particular, the results of the research on this issue by the Chinese Sinohydro Corporation show that after the opening of the Eurasia Canal, Chinese export cargo traffic through Russia and Kazakhstan would increase significantly. Thus, according to the research of the Sinohydro Corporation, the Eurasia Canal would be an important factor in diverting Chinese transit traffic from the ocean route to the territories of Russia and Kazakhstan. With the opening of the Eurasia Canal, the annual traffic mentioned above would be 24–30 million tons by 2030 and 43–51 million tons by 2050. The experts of Sinohydro Corporation conclude that in long-term the Trans-Eurasian transport corridor through the Eurasia Canal would be a comfortable, safe and highly effective route from China to Europe, and it would create favorable conditions for the development and opening of the China's western regions and for the development of trade logistics of the central regions of China. It would also have a positive impact on international multimodal transportation in Sino-European trade and would play a catalytic role in the development of regional economy in China [Wang, 2016].

Considering long-term costs of rail freight through the territory of Kazakhstan, the cost of transport of a standard container from Alashankou to Aktau would be about US $ 2,700 assuming that one container holds 14 tons of cargo, on average. By transporting 25 million tons of Chinese export goods annually by rail, the Kazakhstan economy would receive approximately US $ 4.822 billion export revenue annually.

PARAMETERS OF THE CANAL AND ENVIRONMENTAL IMPACT

The estimated volume of cargo traffic, which can be transported by the Eurasia Canal, and geographical features of the region allow us to assess the main parameters of the Eurasia Canal.

The plans of construction of the Eurasia Canal mean creating a direct waterway between the Caspian Sea and the Azov and Black Seas basins. The watershed between the Azov and Caspian Seas with a height of about 27 meters on the western slope and 54 meters on the eastern slope represents a barrier, but it can be overcome through the construction of three shipping locks of low pressure on the western slope and a combination of three medium-pressure or six low-pressure shipping locks on the eastern slope. The water feeding from the area of stable fresh water in the delta of the Volga-river (fresh river water already flows into the Caspian Sea, but it remains fresh for tens of kilometers from the confluence of the Volga to the Caspian Sea) can be considered as the primary option for the Eurasia Canal's water supply [Bolaev, 2008]. The volume of fresh water needed for sluicing process on the Eurasia Canal can be minimal if the latest world technologies of shipping locks construction are used.

In general, the length of the Eurasia Canal without sea sections is estimated at 650–700 kilometers (including sea sections, up to 750–800 km, depending on the selected depth of the canal [Bekturganov et al, 2009]). The Eurasia Canal can be linked with the Caspian Sea on its coast near the town of Lagan in Kalmykia. Then the route of the canal ascends to the watershed in the area of the Chogray Reservoir (this reservoir may accumulate water resources during floods and supply locking process in dry seasons).

On the western slope of the watershed Chogray Reservoir, the entire way to the Sea of Azov is already covered by several bodies of water, including the Manych River (another name is the West Manych, a left tributary of the Don) and man-made lakes and reservoirs, created during the construction of the Manych Waterway in the Rostov oblast, Stavropol krai and Republic of Kalmykia. In geomorphological terms, the route of the Eurasia Canal is located in the Kuma-Manych Depression, mostly represented by the Manych valley. The current state of relief and geomorphology of the valley of the West Manych River is the result of the hydrological characteristics of the ancient Manych Strait, which connected the Caspian Sea and the Azov and Black Seas basins thousands of years ago, forming the morphological structure features of the Kumo-Manych Depression [Paleohydrological Reconstruction... 2011].

Subsequently, the existence of the Manych Strait in the relatively recent past and the presence of the Kumo-Manych Depression make the valley of the Manych very suitable for construction of the western section of the Eurasia Canal. However, there are still two options: the route of the canal can pass through the existing man-made lakes and reservoirs (by deepening them), or the waterway can be constructed at a some distance from existing water bodies (for example, to avoid impact on the ecosystems and making possible reducing the mineralization level of these reservoirs if necessary).

A completely separate constructive project would seem to be a much more opportunistic venture, completely unrelated to the mouth of the Don River. It would be a separate canal flowing into the Azov Sea and not related to the Don River. The alternative is the confluence of the Eurasia Canal to the lower reaches of the Don River (but as already mentioned, the Don River does not have sufficient depth for the vessels passing through the Eurasia Canal).

During the design stage of the Eurasia Canal, it is very important to conduct appropriate studies on the issue of the environmental impact, including the impact of waterway transport connecting the Caspian Sea to the Azov and Black Seas basins. According

Table 1. Possible design parameters of the Eurasia Canal

Parameters	Type of vessel 1	Type of vessel 2
Length of vessel, m	164	226.0
Width of the vessel, m	18.4	24.0
Vessel draft, m	5.0	7.15
Deadweight of vessels capable of using the waterway, thousand metric tons	10	20–26
The length of the waterway	750	750
Quantity of shipping locks	8	8
The time of vessel passing the canal, days	2.5–3	2.5–3
The duration of the navigation, days per year (if no using of icebreakers)	280–330	280–330
The depth of the fairway	6.5	9.3
The width of the canal at the level of the depth of the fairway	48	63
Cargo throughput, million tons per year for each direction (if duration of the navigation is 280 days per year)	90	153
Estimated construction cost (the prices of 2016, including 18 % VAT), billion US dollars	10–11	26.5–27.5
Annual operating costs (the prices of 2016, including 18 % VAT), million US dollars	125–136	345–374

to the opinion of the scientific secretary of the Southern Scientific Center of the Russian Academy of Sciences Dr. Sergei Berdnikov, the Eurasia Canal project is "probably the first infrastructure project in the Southern Federal District, when the opinion of ecologists is taken into account" [Volkov, 2010].

When determining the possible design parameters of the Eurasia Canal the scientific community, as a rule, proposes the use of "river-sea class" vessels with deadweight of about 10 thousand tons or more [Bekturganov et al, 2009]. The analysis of possible technical parameters of the shipping canal was primarily focused on using already the existing in Russia types of "river-sea class" vessels. Thus, for example, the draft of the proposed vessels was about 5 meters. In this regard, the question is if it is possible to use vessels designed especially for the new waterway.

For example, the vessels that can be used on the St. Lawrence Sea Way can reach a length of about 227 m, their draft can be about 8 m and deadweight can be over 28 thousand tons (the St. Lawrence Sea Way is the system of locks and canals, allowing ocean ships to sail from the Atlantic Ocean to the Great Lakes in North America; the length is about 2.5 thousand km, the number of shipping locks is 15, including 7 shipping locks on the

St. Lawrence River and 8 shipping locks on the Welland canal) [Seawaymax 2011, Taylor et al 2007, The Great Lakes... 2014]. Increasing the design parameters of the Eurasia Canal (including the dimensions of shipping locks and the shipping route) will allow using much larger vessels than currently used in the Caspian Sea. That could seriously affect the efficiency of water transport in the entire Caspian region.

CONCLUSIONS

The Eurasia Canal will be one of the most important factors of the industrialization of the Caspian Region. In contrast to pipelines, water transport can carry all kinds of goods, including hydrocarbon-processing products that cannot be transported by existing system of pipelines. Construction of the Eurasia Canal and port infrastructure, including the quay system along the navigable route, which can be constructed as part of the project, will significantly increase non-oil and gas export from the South of Russia, Kazakhstan and other countries of the Caspian region. This applies to ferrous and nonferrous metals, grain, other agricultural products, construction materials, coal and other local products.

A significant part of the cargo between China and the countries of the European Union, which have ports on the Mediterranean Sea, will be transported via the new trans-Eurasian route that includes the Eurasia Canal. The proposed route of the Eurasia Canal is located on the shortest way between China and the European Union. After the completion of the Eurasia Canal, one half of this way will be using water transportation. This way will be considerably shorter and faster than the ocean route; besides, it will be comparable in cost due to the use of water transportation. Also, the Eurasia Canal will become an important factor of economic development of Western and Central regions of China and an important project within the China's concept of the Belt and Road Initiative. ■

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