MULTIMODAL TRANSPORTATION IN THE CORRIDOR «NORTH–SOUTH»

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ABSTRACT

The international transport route using transit possibilities of Iran within the framework of the corridor «North–South» is a project, the urgency of which is conditioned by the processes of intensification of trade and economic relations between the countries of the Eurasian continent. ITC provides delivery of cargo from India, the Persian Gulf zone, Iran to the territory of Azerbaijan, Russia and then to Northern and Western Europe. In particular, rail transportation along this route will shorten the transportation time from 45–60 to 20–25 days compared to the way from the Baltic through the Mediterranean, the Suez Canal and the Persian Gulf. Such a change in logistics reduces transportation costs by 10–15 %. The prospective volume of container traffic is estimated at 3,5 million containers in a twenty-foot equivalent.

Keywords: multimodal transportation, corridor «North–South», transport infrastructure, transport and logistics system, Caspian logistics cluster.

Background. *The agreement on creation of the international transport corridor «North–South» was signed by Iran, India and Russia in 2000 [3]. Later they were joined by Belarus, Kazakhstan, Tajikistan, Azerbaijan, Armenia and other countries of Eastern Europe, the Middle East and the Asia-Pacific region.*

The international transport corridor No. 9 (border of Finland–St. Petersburg–Moscow with branches to Astrakhan and Novorossiysk) and the corridor No. 2 (Berlin–Warsaw–Minsk–Moscow–Nizhny Novgorod–Yekaterinburg) and also the Volga-Baltic and Volga-Don canals and ports Astrakhan, Olya, Makhachkala are the constituent parts of ITC «North–South». The main route runs in the direction: Northern Europe–St. Petersburg–Moscow–Volgograd–Astrakhan–Baku–Iran (Bandar-Abbas)–India (Mumbai). The length of the route from St. Petersburg to Mumbai is 7200 km. At the same time, the delivery of goods by the Russian segment can be carried out both by rail and by inland water transport.

With the use of intermodal technologies, the corridor is able to provide high-speed transcontinental transportation with a volume of 20 to 50 million tons [2].

Objective. *The objective of the authors is to consider multimodal transportation in the corridor «North–South».*

Methods. *The authors use general scientific methods, comparative analysis, evaluation approach, graph construction.*

Results.

Terminals of the Caspian ports

The Caspian segment of the transport corridor allows four variants of the route: Trans-Caspian, Western, Eastern, Eastern new.

The trans-Caspian route involves transporting cargo across the Caspian Sea through the Russian ports of Makhachkala, Astrakhan, Olya and the Iranian port of Amirabad, which are the main centers for processing cargo flows in this direction.

The port of Olya is designed for handling general, container and rolling cargo. Favorable geographical position and non-freezing water area allow to produce year-round cargo handling and provide access to river, sea, road and railroads. Other advantages of the port are the maximum proximity to the Caspian Sea, great opportunities for future development at the most modern level.

Olya has 12 berths with a total length of 1877,4 running meters. Four berths are intended for general cargoes of open storage, two for container and cargo of the ro-ro type, one for grain, timber, packaged and palletized cargo, heavy and oversized cargo. The depth of the berths is five meters. The aggregate capacity is 4,37 million tons [11]. The capacity of the grain terminal is up to 1 million tons.

The Astrakhan commercial port is located in the estuary of the Volga River, on the right bank. It has 14 cargo terminals with total capacity of 9,93 million tons per year and 18 cargo berths with a depth of 4 to 5,2 meters. The length of the mooring berth is 4,2 km. The port specializes in transshipment of general, bulk, grain cargo and containers. It can process up to 6 million tons per year. It can process oil and oil products, but up to 98 % is really dry cargo, the bulk of which is grain and ferrous metals [11]. Astrakhan port does not have free areas for expansion of the territory, that significantly reduces its prospects [1].

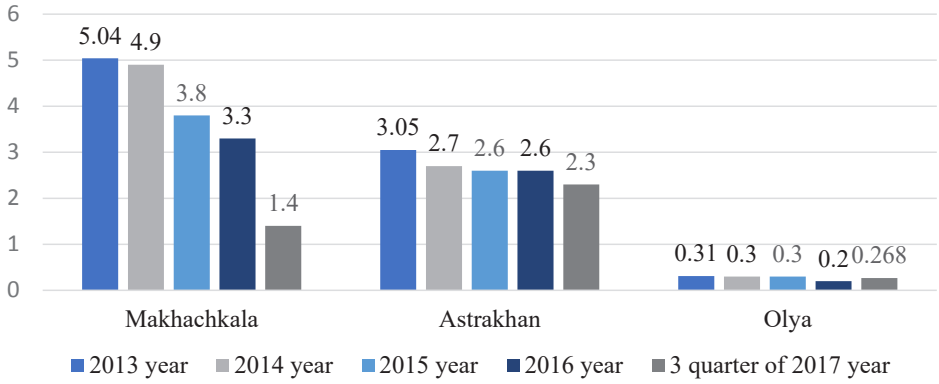
The port of Makhachkala is one of the largest transport hubs in the south of Russia, and its strategic attractiveness is due to the advantageous opportunity of sea communication with Iran, the countries of Transcaucasia and Central Asia [4].

The Makhachkala trade port is located at the western coast of the Caspian Sea. It has 20 berths, nine of which for general cargo, four oil berths, as well as auto-ferry and grain terminals. The total processing capacity is about 7 million tons per year. In general, the port is used for transshipment of oil products. It can take ships with draft up to 8 meters.

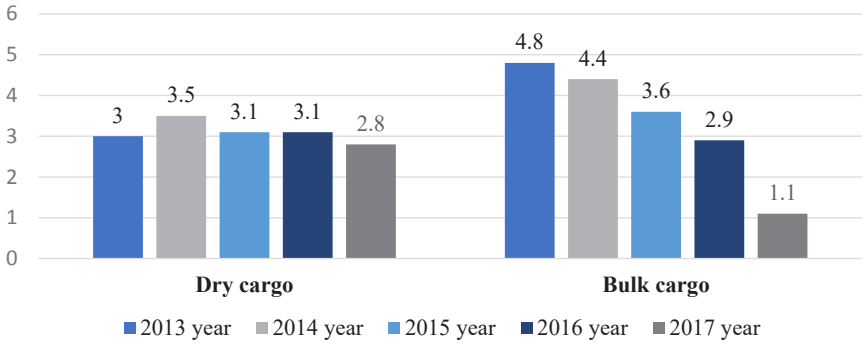
The development of the port is limited territorially, as there is a dense urban development around it, free land plots in federal ownership are absent [11].

The turnover (in millions of tons) of Russian ports in the Caspian Sea, according to the Association of Sea Trade Ports, is shown in Pic. 1 and 2 [7–11].

The port of Amirabad will take in the future a key position in the development of transit traffic in the new transportation and logistics route. Its main advantage is that it is directly connected to the Iranian railway network, while the distance to the port of Bandar Abbas on the Persian Gulf shore is 1780 km [3]. Amirabad is the only port on the Caspian coast of Iran, where there are capacities for transshipment of grain cargoes, a silo park with the capacity of 79 thousand tons, which is intended for receiving grain from water transport. In 2016,



Pic. 1. Cargo turnover of Russian ports in the Caspian (in million tons).



Pic. 2. Aggregate volumes of transshipment of goods of Russian ports on the Caspian (in million tons).

construction of a new elevator with the capacity of 28,8 thousand tons started. In addition, Amirabad has 15 universal and specialized berths up to 6,5 meters in depth, as well as a terminal for ro-ro vessels.

The Trans-Caspian route is attractive primarily for grain exports from the central regions of Russia, as our river-sea type vessels can directly enter the port of Amirabad, loaded with grain from small terminals in Saratov, Volgograd, Samara and other cities. In the future, this will reduce the burden on the North Caucasian railway and the ports of Novorossiysk and Tuapse [3].

The western route of the corridor is a direct rail link through the line Astrakhan–Makhachkala–Samur–Astara (Azerbaijan)–Rasht (Iran)–Qazvin (Iran). The construction of the final element of Rasht–Qazvin is nearing completion. The main advantage of the western route in comparison with the rest is its smallest extent.

The Eastern route is direct rail communication through the territory of Kazakhstan, Uzbekistan and Turkmenistan with access to the Iranian network via the Tejen–Serakhs border crossing.

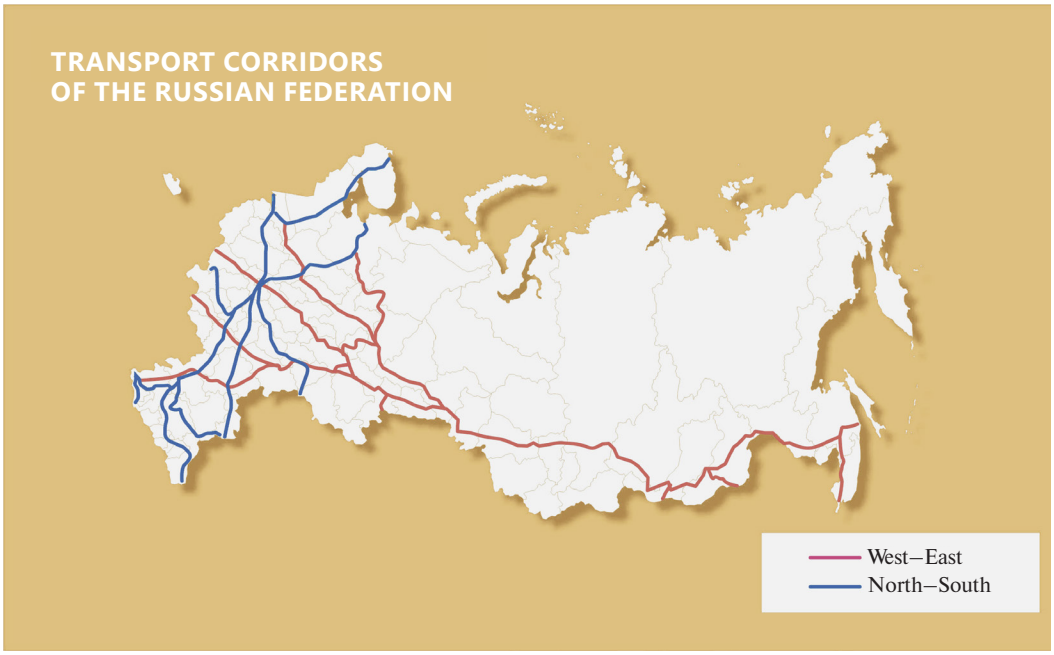
The new eastern route adds the line Uzen (Kazakhstan)–Gyzylgaya–Bereket–Ertek (Turkmenistan)–Goran (Iran) to the current scheme.

A strategically important segment of the new route within the North–South transport corridor should be the transit section of the north of Iran–the port of Bandar-Abbas, because through it almost all cargo flow will go to India and the countries of the Asia-Pacific region from Europe by road and rail transport.

The port of Bandar-Abbas is the most modern Iranian port in the Persian Gulf. 22 international shipping lines pass through it, which connect it with 90 ports of the world. It processes general, bulk and liquid cargoes, as well as 90 % of containers coming to Iran. In addition, Bandar-Abbas is the only port in Iran that can handle container ships from 8000 TEU or more [3].

The port has two terminals at its disposal: «Shahid Bahonar» and «Shahid Rajai». The first specializes in handling bulk cargo and has six berths for this. In addition, there are two berths for oil cargo and one for ore transfer. The terminal is equipped with a bunker system for loading and unloading of grain, and two dozen port cranes with a load capacity of up to 60 tons and is capable of simultaneously processing up to six vessels of no more than 170 meters.

The terminal «Shahid Rajai» is the largest container terminal in Iran, where it is also possible to process general, bulk and liquid cargo. Transshipment of containers is carried out at eight berths with a total length of 2 thousand meters. The area of the terminal is about 25 hectares, the processing capacity is 3 million TEU per year. The



unloading of a container carrier takes, as a rule, 10 to 12 hours. In the roadstead, up to 50 ships can be at the same time. The terminal is connected to the railway network by tracks, the total length of which is 504 km [3].

Another key element of the Iranian segment of the ITC is the port of Chabahar, located on the shores of the Gulf of Oman, equipped and commercialized by the Indian company Indian Ports Global Limited. At the beginning of December 2017, the first reconstructed facilities of the port were put into operation, and at the moment it can handle 8,5 million tons of cargo a year and take ships with a carrying capacity of 100000 tons. Further plans provide for expansion of the annual transshipment capacity to 82 million tons per year [17], the prospect of becoming the main port for export-import shipments to Mumbai.

Despite the developed port infrastructure, transit opportunities of the Iranian ports in the Persian Gulf are used, however, only for 30–50 %. The estimated cargo turnover is 25 million tons of cargo per year with a calculated capacity of more than 40 million, which in the case of optimization of logistics technologies, can be increased by about 20 %.

Regional cargo geography

Pakistan is ready to become a promising participant in transport and logistics projects. The country began in 2017 the supply of fruits and vegetables via Iran and Kazakhstan to Russia. At the same time, the key transit points are the Pakistani city of Quetta, in which the export cargo is consolidated, the Iranian Zahedan, which connected to Quetta via the 650-km-long railway line, which provides transportation within 33 hours, and the Kazakh port of Aktau, where cargoes come from Zahedan through rail and road transport, and from there by water transport are transported to Russia. In turn, Iran intends to use the railway to transit cargo of the port of Chabahar to Central Asia and Europe, the route could potentially become a new transit corridor linking the East and the West [17].

Integration of the Pakistan ports of Karachi and Gwadar located on the coast of the Indian Ocean into the transport corridor «North–South» is not excluded.

The project can be joined by Myanmar and that would create a new route from Europe to China and South-East Asia. At the same time, the growth of cargo flows will open up a large transit perspective for the country.

The factor attracting investors is the unique geographical location of Myanmar. In the Asia-Pacific region, it occupies an important strategic position between two giants – India and China. Significant continental territories and access to the Indian Ocean, which provides an opportunity for development of port infrastructure, dramatically increase its geopolitical chances as a continental bridge between three regions – Southeast, South and East Asia [16].

Realizing the importance of this vector of development of the economy of the country, the Government of Myanmar aims to support three special economic zones, with special attention being paid to the ports of Tilava, Dawei and Kyaukpyu [16].

The Dawei Port is a deep sea port, which is a special zone of economic development, which is expected to begin to function fully by 2020. In the port, one berth has been constructed so far, which, after dredging, will be used to process feeder vessels. In the near future, the railway is planned to be laid and the port is planned to be connected to the transport route Yangon–Mandalay–Muse, and later to the railway system of the People's Republic of China [16].

Port of Kyaukpyu is built on the island of Maday. It has sufficient land resources and labor force for expansion and industrial development. Depths at dry cargo berths are up to 10 meters, which makes it possible to handle ships with a carrying capacity of up to 20 thousand tons. In addition, there is a deep-sea oil terminal, which is designed for tankers of deadweight up to 300 thousand tons.

However, for the further development of the port, it is necessary to bring the railway to the terminals, and also to construct and reconstruct the hydraulic structures, taking into account modern requirements. The expected annual capacity of the seaport can reach up to 7,8 million tons of bulk cargo and 4,9 million TEU [16].

The port of Tilava is located on the right side of the Yangon River, 25 kilometers from the city of the same name. With the port there is a communication on the road, rail and inland waterways. It is available for receiving ships of up to 200 meters in length, up to 9,5 meters in draft and with a carrying capacity of up to 20000 tons. It is possible to handle sea-container ships with a capacity of up to 2000 TEU. The main processed goods are: containers, general cargo, metals, automobiles, wheeled machinery, equipment, coal, cement, fertilizers, rice, oil products, palm oil.

The depths of the port of Tilava do not allow to handle large-tonnage ocean vessels, and therefore there is no possibility to expect a serious increase in cargo turnover. However, due to the availability of road and rail infrastructure, a convenient geographical location, the port can be considered as a pilot project for establishing a stable cargo flow between China, India, Iran and Russia [16].

The defining role of the TLC

In order for ITC «North–South» to function fully, it is necessary to create an interconnected transport and logistics system from separate existing elements, which, in turn, will require a transport and terminal-logistics infrastructure of a higher level and modernization of existing port and terminal complexes, transport main lines.

In particular, to ensure the prospective volume of cargo transportation in the Volga, Caspian and North-Caucasian segments of the transport corridor, it is necessary to increase the throughput and carrying capacity of the railways – to build the second track, to reconstruct and to electrify the section of the Privolzhskaya Railway Trubnaya–Verkhniy Baskunchak–Aksaraiskaya, to electrify the section Volgograd–Astrakhan, to reconstruct the Volgograd and Makhachkala railway junctions, bridge crossing the Akhtuba River [1], to modernize and to redirect the port capacities of the Caspian region, to develop automobile and railway approaches to them.

The Caspian ports of Russia, when integrated into international transport hubs and corridors, can play a decisive role in building the country's trade potential [4], but the share of transshipment of transit cargo in them is still only 0,8 %. The implementation of the strategy for development of seaports, meanwhile, provides by 2030, to increase grain exports to 7 million tons, and the volume of cargo flow for other dry cargo should also increase to 7 million tons.

In connection with the prospect of increasing the flow of goods, an investment project for the second cargo area of the port of Olya was developed, which includes the expansion of facilities for receiving and processing containerized cargo, general cargoes of open and closed storage, grain, timber materials, bulk and liquid cargo. The project involves the construction of three terminals with a total capacity of 26 million tons. At the same time, the cargo area will have 46 berths with a length of 7700 meters [2]. As a result, it will be possible to direct a part of the freight traffic from Europe to South Asia through the territory of Russia.

The implementation of the tasks facing the ITC «North–South» requires, first of all, improvement of the transport management structure and the terminal-logistics complex through creation of a single operator, with the help of a long-term flexible tariff policy, reducing the total transport costs for transportation for each segment of the route [14, 15], simplification of customs and border control, unification of the regulatory framework of participating states, as well as further integration of elements of Eurasian transport systems, participating in the corridor [1].

The result of these organizational and technological measures should be a significant and multifold increase in the volume of cargo transportation in both directions. Moreover, the corridor «North–South» can also simultaneously become a competitor not only for the sea route through the Suez Canal, which is extremely in demand [18], but also for the ITC «Europe–Caucasus-Asia».

Chinese, Kazakh, Turkmen cargoes go to Europe, including through the countries of Transcaucasia. The route goes through Azerbaijan and Georgia. The relief features, the passage of borders and the absence of uniform rules hamper the possibilities of this promising direction. With the agreed development of key cargo processing centers in the region – the ports of Makhachkala, Olya and Astrakhan and the subsequent integration of a new deep sea port with the capacity of 91,4 mln tons into the ITC «North–South», the construction of which is carried out on the Taman Peninsula, a transit corridor will be built that could attract a large part of the flow of goods from Central Asia to Europe.

This branch of the corridor «North–South» should be developed through creation of regional terminal and logistics complexes in Dagestan, the Chechen Republic, Krasnodar, Stavropol, Astrakhan regions. A complex multi-level logistics cluster is being formed. In it, Chechnya and Stavropol region can take on a regulatory role, consolidating domestic Russian goods and sorting transit cargo in their multi purpose logistics centers, the appearance of which is possible in Gudermes, Georgievsk, Kropotkin. At the same time, the transit flow will be significantly supplemented by Russian grain exports and other agricultural goods [5].

Dagestan, Astrakhan region and Krasnodar region, coordinating the capacity of port facilities in Astrakhan, Makhachkala and Taman, will provide the proper level of service in the processing of transit cargo of the trans-Caspian direction. All participants in the Caspian cluster will receive tangible incomes to the budgets of their regions, and the growth of employment will have a beneficial effect on the social atmosphere in the region.

Conclusions.

Analysis of the state, problems and prospects of ITC «North–South» allows us to make the following generalizations:

– transport corridor is an ambitious project, but only the Caspian segment is functioning in a more or less stable manner;

– for integration of individual segments into a single route, it is necessary to create a new and modernize the existing transport and logistics infrastructure;

– to attract stable cargo traffic to the route, it is necessary to implement a complex of organizational and technological measures, including the development of a single logistics operator, to develop a flexible tariff policy, and to resolve a wide range of regulatory and legal issues.

Key participants to this project can together consider existing problems. For example, JSC Russian Railways could act as an initiator of creation of a single logistics operator and, in conjunction with transport and logistics, railways, maritime companies of Iran and India, realize this idea by analogy with JSC OTLK (which is a joint project of JSC Russian Railways, Belarusian and Kazakhstani railways).

The Russian Ministry of Transport, with participation of colleagues from Azerbaijan, Iran, Kazakhstan and other interested parties, could take on the development of proposals on solution of legal and customs issues, in particular, to determine the legal status of the Caspian Sea.

The issue of investments in transport and logistics infrastructure remains open. The construction and modernization of the infrastructure can be carried out both at the expense of private investors, and through financing from the budget sources of the participating countries within the project.

Another promising option expected is the creation on PPP basis of institutions, whose tasks will be development of trade and transportation of domestic goods to Iran, India and the Persian Gulf countries through Russian ports.

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