

TECHNICAL AND ENVIRONMENTAL CAPACITIES OF OIL TERMINALS IN GEORGIA

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Abstract: *Transport-logistics system of the Southern Caucasus, which is used for the export of oil and gas resources from the Caspian region to global markets, includes the pipelines laid across the territory of Georgia, seaside oil terminals, tanker and ferry means of delivery and railways. The most important in technical and environmental terms, are the oil transshipment facilities in Batumi, Supsa, Poti and Kulevi.*

Currently, the development of Georgian ports, including the oil transshipment facilities is carried out within the established infrastructure and defined water zones of ports.

KEY WORDS: TRANSPORT-LOGISTICS SYSTEM, OIL TERMINAL, ENVIRONMENTAL SECURITY

1. Introduction

The creation of the seaside oil transshipment facilities is aimed to solve a whole number of technical, economic, environmental and navigational problems. One of the aspects of this process is the selection of a tonnage group of oil tankers for transportation of bulk oil cargoes. In general, however, economic considerations take precedence, although in some cases, you must take into account the navigational specific features of the regions and navigation and existing local conditions. World-wide trends in demand for the construction and purchase of oil tankers are known to everyone.

Unit costs for the transportation of 1 ton of oil by tankers with deadweight of 100-150 thousand tons are almost by 2 times smaller in comparison with tankers with deadweight of 40-65 thousand tons, so about 80% of the oil is transported by ships of such deadweight. The tankers of larger deadweight are not considered due to fact that the Turkish authorities have strengthened the control of passage through the Black Sea straits.

The use of high-capacity tankers for bulk oil transportation reduces the number of berths by about 2 times, and for the version with mooring berths, there is increasing their time of operation by meteorological factors that increases the throughput capacity of the berth.

Another aspect of the problem of creating the oil transfer complex (OTC) is to choose the type and location of the berthing facility. In recent years, generally, two types of bulk oil terminals are widely used: fixed moorings (inshore or protected areas moorings) and one-point inshore moorings. This is a multi-factor challenge, and its optimal solution depends on the location of the OTC and natural conditions, the availability of sufficient area protected harbors, volumes of overloads, planned the whole fleet. In each case, the choice is the priority requirements, conditions and source data.

Only with a view to the construction industry, this analysis makes sense, since the cost of construction of the fixed berth is approximately by 3 times higher in comparison with one-point inshore mooring, and the present costs (including the maintenance costs) – by 1,5-2 times accordingly.

In densely populated areas when selecting the location and type of berthing facility there are taking into account logically the criteria of operation safety, ensuring the required throughput capacity and construction costs.

The third aspect is an environmental one. Despite fact that the emergency oil tanker fleet losses are up to 10% of oil pollutions in the world-wide ocean, each accident with a considerable spill is considered as a serious environmental case.

Storage, transport and transfer of oil bear the risk of a negative impact on the environment:

- emissions of harmful substances from tankers, respiratory systems of tankers and tank batteries;
- oil pumping (spill);
- possible fires and explosions.

Since all sites of oil transfer are located near residential and recreation areas, the risk of their adverse effects is under the

watchful eye of the public that attaches particular importance to safety of such objects.

Oil spills associated with its transportation by sea had always taken place in the world. After the 80-ies of the last century as a result of consecutive purposeful activities of the International Maritime Organization (IMO) and adequate measures taken by seafaring countries, the oil spill accidents has declined tenfold, but of times, but all the same that probability is conserved. of remain. This is due to the complex hydrometeorological conditions; the aging of tanker fleet; miscalculations in the actions of the ship's crew; display of a human factor at all levels of the organization and performance of works on oil transportation by sea [4].

In the ports of Georgia, there has also been a downward trend in the oil spill. Special mention should be made of the creation and adoption during the last years of an entirely new of legislative-regulatory framework of Georgia in the domain of ensuring the safe operation of potentially hazardous facilities, to which the marine and oil and gas complexes are belonged largely, in particular, the marine oil transfer terminals [2].

Safety measures and equipment must be provided at all stages of the port installations (oil transfer terminals) – in the design, construction (reconstruction, modernization) and maintenance – and it must represent an integrated safety system.

2. Preconditions and means for resolving the problem

Currently, the development of Georgian ports, including the oil transshipment facilities is carried out within the established infrastructure and defined water zones of ports.

Thus and so, particular attention in the current develop schemes of ports is is received by security problems not only for new developing units, but for all units, including the "old" ones, which were built before adopting the modern security requirements: terrorist, environmental and fire protection.

The modern oil transshipment facilities existing in Georgia generally are well-organized and technically prepared for oil spill response in the defined water zones of ports, and they quite successfully solve the problems with liquidation of cosequencies thereof. In formulating a project document on oil terminals and preparing proposals to investors regarding an integrated safety measures, the port management relies on real goods and services market, while actively participating in the creation of new technical means and technologies (ship fitters, boom-laying boats, fire-fighting equipment, and onshore activities).

Over past years, the efforts have been made in the world at different levels in order to ensure safe navigation and improve the reliability of large-tonnage tankers that resulted in both regarding the reduction of the number of incidents and minimizing the oil losses.

.More accidents occur in areas with severe hydrometeorological and navigational conditions and a high density of traffic. The Black Sea does not pertain to such zones, and therefore there was no accident with the tanker fleet, but only in recent years through the main oil terminals (Batumi, Supsa, Poti and Kulevi) were transported more than 50 million tons of oil and oil products, and the number of ship entries amounted to several thousands.

The transfer of oil and oil products in Georgia is carried out via the sea specialized terminals in the ports of Batumi, Poti and Kulevi. Kulevi. Out of the total volume of bulk-oil cargoes, the crude oil accounts for more than 70%. The main part of oil cargo turnover (about 98%) is represented by transit flows, but the main part of oil products cargo turnover is represented by export (more than 70%) and transit (29%) flows, and the share of domestic traffic is less than 1%.



Pic. 1. Scheme of loading the terminals with energy carriers

Batumi Port. Due to traffic volume grow from Kaspi region, Batumi Sea Port became a bridge spanning the Eurasian transport corridor. Oil and oil products are loaded in Batumi Port's 4 berths having an area of 8 ha and length of 755 meters. Throughput capacity of port is 15-18 million tons of oil products annually. The analogous indicator for dry cargo makes up 2.3-2.5 million tons over the year. The terminal's planned cargo turn-over of the container shipping is 47-50 thousand containers annually.

The oil terminal carries out transportation of crude oil and other oil products from Kazakhstan, Azerbaijan, Turkmenistan and Georgia. The terminal provides consumers with loading, uploading and storing services.

Oil is supplied to terminal by rail, and at the same time, it is capable of providing services for 260 rail cars. Total volume of terminal premises makes up 5700.000 tons, and is intended for 22 various sorts of oil products. Since 2008, the oil gas storages had been expanded as well, and their volume now is 5 000 cubic meters [1].

Oil in Batumi terminal is loaded in tankers from three berths by using the modern systems that allows loading of tankers with loading capacity over 130 000 tons.

At present, the throughput capacity of oil terminal is 15 million tons annually. The terminal is specialized on the processing of a crude oil and all sorts of oil products in practice, such as: diesel oil; petrol; oil slurry and so on. 5.4 million tons of oil products were transported via the oil terminal in 2011, and 6.115 million tons in 2010.

Oil in Batumi terminal is loaded in tankers from three berths by using the modern systems. The depth of berths in Batumi port is 25-30 meters that allows loading of tankers with loading capacity over 130 000 tons.

Over the last decade, cargo turnover of the Batumi Sea Port has been increased considerably. At present, about 90% of 80% total cargo turnover accounts for oil and oil products shipment. The Port actively participates in international associations, conferences and projects.

Till 2015, there is planned in the area of "Batumi Oil terminal Ltd." the construction of oil reservoir with capacity 4X20000 m³ and facilities and engineering networks forming the tank battery complex, that should considerably increase the oil terminal's throughput capacity.

Poti Port. Poti Port is located at the area of 49 ha and operates round-year. At present, the property that the Port owns is the cargo transportation complex, which comprises 14 berths and has length 2650 meters. 11 berths are equipped with portable elevator intended for 6-40 tons. The conditions required for shipping are fitted to transportation of any type of loads and liquid products. The

infrastructure of Poti Port is designed so as to enable it to treat 10 000 tons of cargo. However, railway is no longer able to transport these loads, since there is only one rail-track on Poti-Senaki railway line that places a serious obstacle against railroad train turnover. It is necessary to construct one additional railroad on Poti-Senaki railway line in order that ingoing and outgoing trains in order that they might not interfere one to another.

At this time, Poti Port treats only 1,5 million tons of oil annually. Soon, the construction of a new oil terminal will be completed. This operation includes the construction of oil terminal with modern design in Poti port from the Caspian Sea towards the Black Sea for the purpose of opening the privileged export routethat in turn should strengthen the Georgian economy through expanding the railway traffic and increasing the oil transportation competitiveness, and actually, it should contribute to growing the volume of oil and oil products transportation in the region. This project is implemented under financial support of Black Sea bank (BSTDB).

ThePoti Port partially is connected with Ilychevsk Port (Ukraine), Varna (Bulgaria) and some Caucasian ports (Russia) by means of the direct ferry-boat-railway line, and with Novosibirsk (Russia), Burgas (Bulgaria) and Rize (Turkey) by means of the direct ferry-boat-automobile passages.

Supsa Terminal.Supsa Oil Terminal is located on the left bank of Supsa River, and it was put into operation in April 1999. Annual throughput capacity of Baku-Supsa pipeline is 7 million tons. Overall volume of Terminal's storage tanks is 160 000 cubic meters. All four tanks have identical size. After the tanks are filled the oil transportation through the pipeline is carried out by means of tankers distanced from the coast [3].

In 2012, 3 922 306 tons of oil were transported through the Supsa Terminal that exceeds the data of 2011 by 2,8%. In 2011, the Socar Oil Company had transported .562 million tons of oil through the Supsa Terminal.

Kulevi Port.Kulevi Terminal is one of the most modern terminals among all Black Sea terminals. It is equipped with up-to-the-minute technology, as well as possesses the highest-level vast oil storage tank facilities located at the area of 320 thousand square meters. The terminal comprises two berths with capability of providing services for 100-ton ships. Kulevi Terminal is capable to receive high-tonnage ships, but the berth inlet area needs to be deepening down.

The Terminal possesses its own railroad line as well. The production control at the Terminal is carried out on the basis of modern SCM systems. Design capacity of Terminal is 10 million tons annually. At this time, it is only at 40%.

About 4 thousand tons of chemical products daily (50 thousand tons per year approximately) is transported through the Kulevi Oil Terminal. This could be accomplished due to a new complex for transportation of propylene existing in the Kulevi Terminal.

Kulevi Oil Terminal had successfully adopted the following standards: ISO 9001 (Quality Management Systems); ISO 14001 (Environmental Management Systems) and OHSAS 18001(Occupational Health and safety Management Systems). Since 2007, the Kulevi Oil Terminal is a property of Socar Oil Company. The Terminal has started its functioning on may 16, 2008.

3. *Conclusion*

TRACECA is considered as a priority European project and in practice, it lays the European transportation service lines until the Caspian Sea, and then to Asia. Europe-Caucasus-Asia transport corridor or "New Silk Road" (TRACECA) begins from Ukraine, Bulgaria and Romania. Then crossing the Black Sea it is connected to Georgia, towards Batumi, Poti and Kulevi terminals. By involving the transportation networks of South Caucasus countries, the route is directed to the Caspian Sea, and then passing through the ferry-boat passages (Baku-Turkmenbashi and Baku-Aktau) TRACECA has access to the railway network of Central Asia countries - Turkmenistan and Kazakhstan, whose transportation networks are connected to the directions of Uzbekistan, Kyrgyzstan and Tajikistan, and then they reach the borders of China and Afghanistan.

Loading of terminals largely depends on transit oil cargoes, attraction of which is envisaged at the account of providing the services to an appropriate level, "adjusting" their nature to the market needs, improving the oil terminals infrastructure, which provides an appropriate volume of services to customers.

4. *Literature*

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