

Ministry of infrastructure of Ukraine

State enterprise «Ukrainian sea ports authority»

Study on the activity on the Danube ports in 2018



Odessa 2019

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1. Introduction

The given research was developed by the state enterprise "Ukrainian seaports authority" (hereinafter – SE "USPA") by means of statistical and analytical data, proceedings of conferences, round tables and periodical editions in the field of maritime and inland waterways transport of Ukraine, etc.

The Ukrainian Danube region is strategically important for the whole country, as it is a crossing point of the most important international routes between Europe and Asia. The way to these transport corridors will connect Eastern and Central European states will promote the development of maritime transport branches and hubs of the Odessa region.

The Ukrainian Danube region is represented by three main ports: Izmail, Reni and Ust-Dunaisk seaports, which became the respective branches of SE "USPA" with its establishment in 2013.



Fig. 1 Location of the Danube region ports on the map of Ukraine

Port name	General cargo	Bulk cargo	Liquid cargo	RO-RO
Izmail port	+	+	+	-
Reni port	+	+	+	+
Ust Dunaisk port	+	+	+	-

Table 1. General specialization of Ukrainian ports on Danube river by types of cargo

2. The Sea Port of Izmail

The Sea Port of Izmail is situated in the waters of Chilia mouth of the Danube river. From the moment of its establishment and until today, the Port of Izmail is a city forming state enterprise, with around of 2000 people working there. Functions of port administration are conducted by Izmail branch of SE “USPA”.

With respect to other ports of the Danube region of Ukraine, the port of Izmail is the most important one because of significant volumes of ore and coal transshipments.

This Port is one of the most modern and highly equipped Ukrainian ports on the Danube. Due to its favorable geographical location, this port is a European gateway of Ukraine., It’s an important transportation link, connecting countries of Central and Northern Europe with the countries in the Black and Mediterranean Seas. The 1 sea port harbor waters include also waters of Chilia arm of the Danube river from 85th to 94th kilometer, counting from the left bank to the Ukrainian state border, passing through the fairway of the river. This port is a great transport hub, in which different types of maritime, river, railway and road transport are interconnected.

The navigation of Izmail sea port is provided year-round and 24 hours per day. It is a passenger transportation center for custom services at Ukrainian state border.

The sea port of Izmail is a partially ice-free warm-water port with soft and fragmented ice- ice formations happens mostly during severe winters (usually in January-February),.

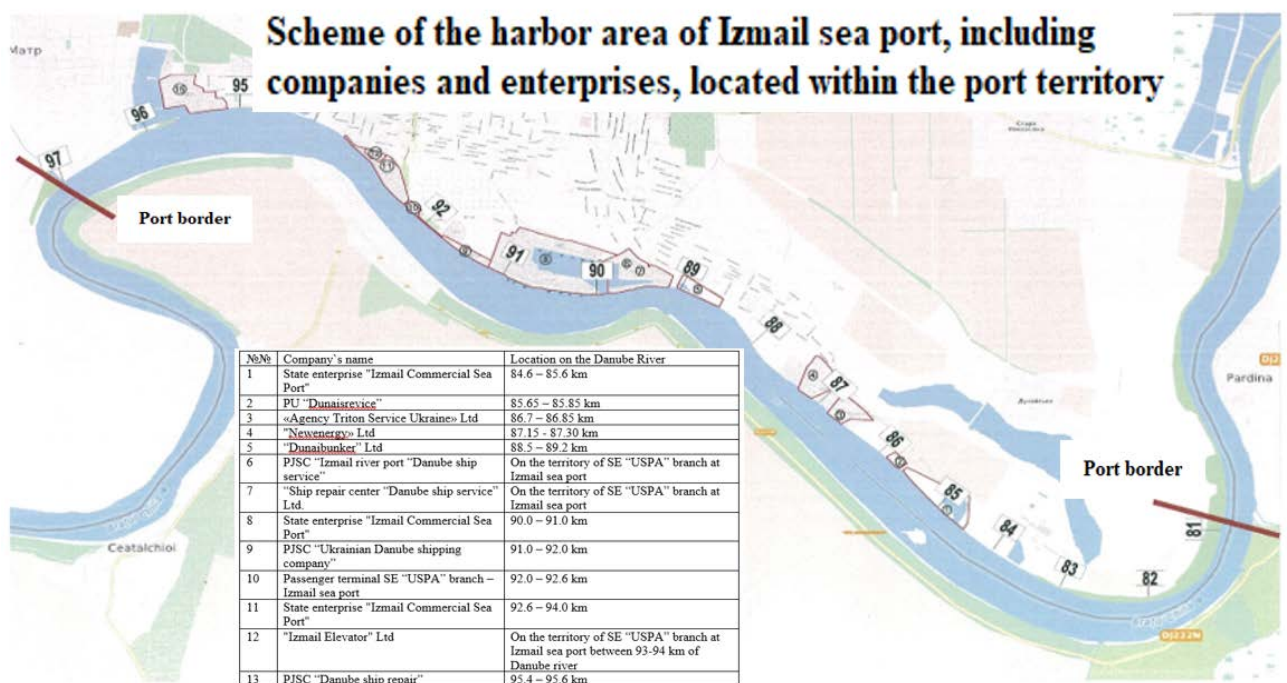


Fig. 2 Izmail sea port layout.

The Port of Izmail is located on the territory of 107.5 hectares and consists of three production and cargo handling complexes. Complex №1 (berths №№1-8) mainly handles artificial goods and cargo in bags, equipment, agricultural machinery, metals, packaged goods, grain; Complex №2 (berths №№19-22) is intended for handling bulk cargoes: ore, coal, coking coal, concentrate, ore pellets, metal products, grain; Complex number №3 (berths №№16-18, 23-26) processes bulk and general cargoes: equipment, coal, metal, ore, grain.

The Port of Izmail has 24 berths with a total length of 2618.6 m. The capacity of the berths of the port allows accepting and handling cargo operations for vessels with following parameters: draft of up to 7 meters, length of up to 150 meters, width of up to 30 meters, deadweight of up to 6000 tons.

Vessels can enter Izmail port from the Black sea through Sulina Channel or through the maritime approaching channel of the deep-water navigable route "Danube - Black Sea" on the Ukrainian part of the Danube River.

The total area of the open warehouses in this Port is 201.1 thousand square meters, covered warehouses – 19.7 thousand square meters.

Furthermore, this Sea Port is a multipurpose trade port for transportation of iron ore raw materials, coal, coking coal, ferrous and nonferrous metals, paper, cellulose, fertilizers, timber, general cargo in bags, boxes, packs, big-bags, etc. This Sea Port has a large fleet of cargo handling machinery and heavy lifting equipment: gantry cranes with a capacity of up to 40 tons, forklifts with a capacity of up to 25 tons, floating cranes with a capacity of up to 16 tons. All this equipment allows handling the entire range of goods offered by customers in a qualitative way. To perform auxiliary operations there are also tractors, bulldozers and other machinery. It has its own Port Fleet, which includes tugboats, boats, floating cranes, non-self-propelled dry cargo barges, bunker vessels, pontoons and special purpose vessels.

As it was mentioned above, this Port has three production and cargo handling complexes, with their own distinctive features, both in relation to port capacities, and to processed goods. Except for these three complexes, this Port also has passenger station and other auxiliary production centers.

Types of services provided at the Izmail sea port:

- loading and unloading and storage of goods;
- fastening and packing of special cargoes of the customer;
- freight forwarding;
- packaging works;
- marking and re-marking of goods;
- ordering railway transportations for cargo from port to other destinations;
- ensuring safety mooring for vessels;
- water supply for vessels at berths and on roadsteads;
- cleaning vessels from oil-containing waste, sewage and garbage;
- substitute crewing services;
- piloting services for barges and other vessels;

- floating crane services;
- delivery of goods within Lower and Middle Danube by the port fleet;
- ship repair of non-self-propelled fleet and other services.

Technical and operational capacity of Izmail sea port:

- Overall capacity of the port is 8.5 million tons per year;
- The port can handle a cargo volume of 23,288 tons per day;
- The actual volume of port's operations can constitute up to 40,000 tons per day;
- The maximum annual number of vessels to be handled is 6070;
- Gross amount of bulk cargo loading and unloading – 5,000 tons/day;
- The maximum daily number of processing wagons - 448 units;
- The maximum annual number of processing wagons - 163520 units;
- The maximum deadweight of vessels handled in port - up to 6000 tons.

Freight operations in the port are carried out round the clock, without weekends, all year round.

The Izmail Sea Port carries out various cargo operations, including operations with dangerous goods of classes 3, 4.3, 5.2, 7, 9 of IMO hazards, fumigation works, the embarking and disembarking of passengers, the replenishment of food and fresh water supplies, the refueling, the collection of sewage/ oil-containing waste and all categories of garbage, equipment repair and diving inspection of vessels.

2.1. General indicators of cargo turnover of the Izmail port in 2018

The main cargo flow of the port of Izmail is constituted by export and transit of bulk cargoes (coal, ore cargoes), bulk (grain and food) and liquid bulk (oil, gases).

The traditional cargo for Izmail seaport is ore coming from the Poltava region - Poltava Mining and Processing Plant - the largest Ukrainian exporter of iron ore pellets to Europe (Ferrexpo company - Poltava Mining), as well as from Kryvyi Rih and Zaporizhia.

Therefore, in 2018, iron ore exports to Austria constituted 797,269 tones, to Bulgaria – 2,614 tones, to Romania – 149,401 tones, to Serbia – 1.868,522 tones (which is 35.5% more than in 2017), to Hungary – 238,752 tons.

In 2018 Izmail port had reduced cargo turnover by 8.1% compared to 2017, which totaled to 4.683 million tons less (including 3.518 million tons of export cargo, 134,800 tons of import cargo, 1,014 million tons of transit cargo, 16,040 tons of cabotage cargo). The percentage share of Izmail port cargo handling volume with respect to the total cargo turnover of Ukrainian sea ports was 3.5% in comparison with 3.8% in 2017.



Fig. 3 Statistics of performance of SE “USPA” and Izmail sea port with indicators and diagrams.

According to the cargo chart of 2018, the major amount of transported cargoes constituted by bulk cargo was 4.239 million tons (including ore - 3.169 million tons, coal – 748,910 tons, grain cargoes – 111,390 tons). With respect to general cargoes (266,060 tons), there were prevailing ferrous metals - 177.830 tons, chemicals and mineral fertilizers – 45,320 tons), liquid bulk – 177,910 tons (including chemical cargoes – 85,510 tons, vegetable oil – 74,550 tons, oil products - 17.850 tons).

The cargo turnover indicators of Izmail port for the previous years were as follows: 2017 - 5,098 million tons, 2016 - 5,683 million tons, 2015 - 4,825 million tons, in 2014 - 3,093 million tons, 2013 - 2,763 million tons, 2012 - 2,937 million tons.

The chart below (Figure 4) shows the distribution of goods by type and quantity.

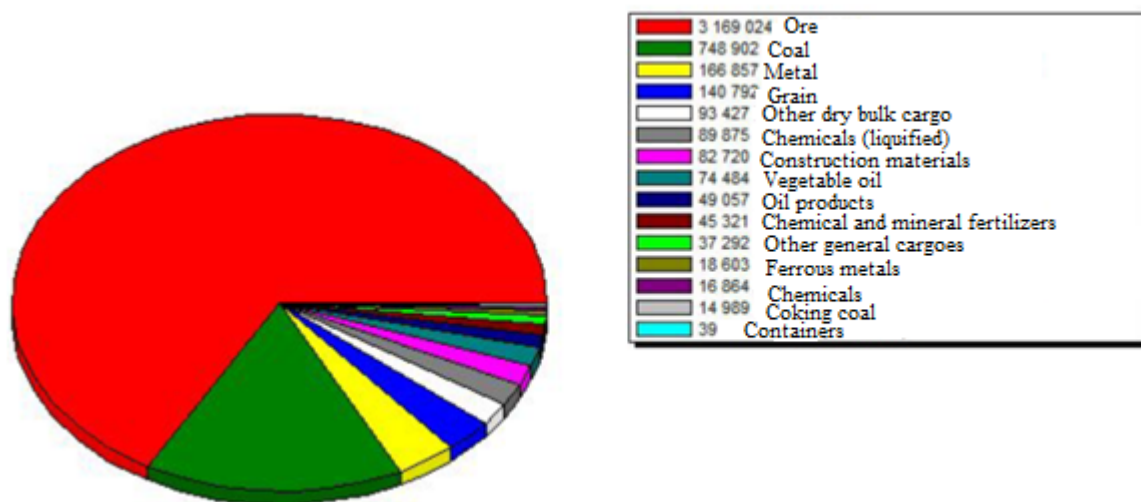


Fig. 4 Freight distribution of Izmail sea port by type of cargo in 2018.

Fig. 5 shows the distribution of cargo flows for export, import, transit and cabotage cargoes in 2018.

It should be emphasized that the largest share of imported goods in 2018 was attributed to goods received from Romania (76.9%), which were represented mostly by construction materials (82,720 tons), chemical goods and oil products (18,079 tons). Imported cargo from other countries made up a small share in 2018, with 7.7% of the

goods coming from Serbia and 6.7% from Bulgaria (chemical and mineral fertilizers, general cargoes). The remaining 8.7% of import came from Austria, Moldova, USA, Turkey and Croatia. Total import from Danube countries amounted to 95.5% of goods (128,178 tons).

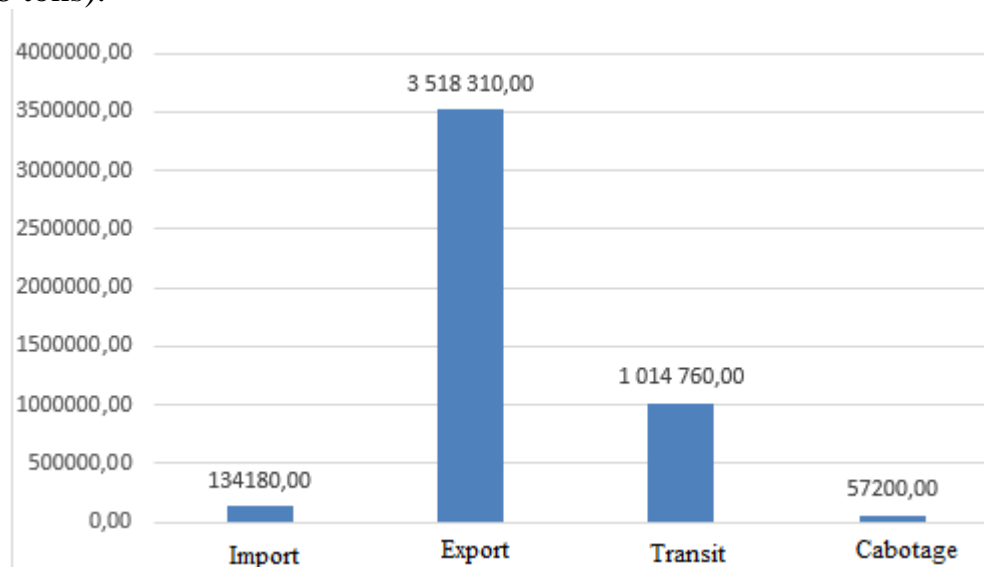


Fig. 5 Freight distribution by import, export, transit and cabotage at Izmail sea port.

The largest share of export of Izmail port in 2018 is presented by goods transported to Serbia (53.9%), which is mostly ore (1,868,522 tons) and ferrous metals (32,676 tons), with exports accounting for 8.1% to Romania (a much lower share than import indicator for Ukraine from Romania) and is represented by different types of cargoes. Total export to Danube countries amounted to 92.8% of goods (3,265,459 tons).

Transit cargoes are mainly freight from the Russian Federation to other Danube countries (Bulgaria, Serbia, Romania, Hungary and Croatia). The share of such cargoes is largest among other transit cargoes and makes up 93.4%. Chemical fertilizers, ferrous metals, coal, bulk cargoes and ore represent transit cargoes.

Sunflower oil also becomes a traditional cargo in a range of Izmail sea port cargoes. Recently, Izmail Sea Port has completed loading on the sea-going vessel “Duruca” (Flag of Turkey) 6,500 tons of vegetable oil, which was transported to the port of Barcelona (Spain). “Duruca” is the sixth sea-going vessel of 2019, with vegetable oil export from Izmail sea port to Europe.

The total volume of vegetable oil transshipments of Izmail sea port from the beginning of 2019 is 34.200 tons. Vegetable oil is exported to Spain, Turkey, Italy.

2.2. The analysis of Izmail port operators` performance in 2018

According to the register of SE “USPA”, in 2018 cargo handling of Izmail sea port was provided by the following terminal operators: state enterprise "Izmail Commercial Sea Port", "Serviceport" Ltd, "Ville Forte Ukraine" Ltd, "Izmail Elevator" Ltd, "Newenergy» Ltd and «Agency Triton Service Ukraine» Ltd.

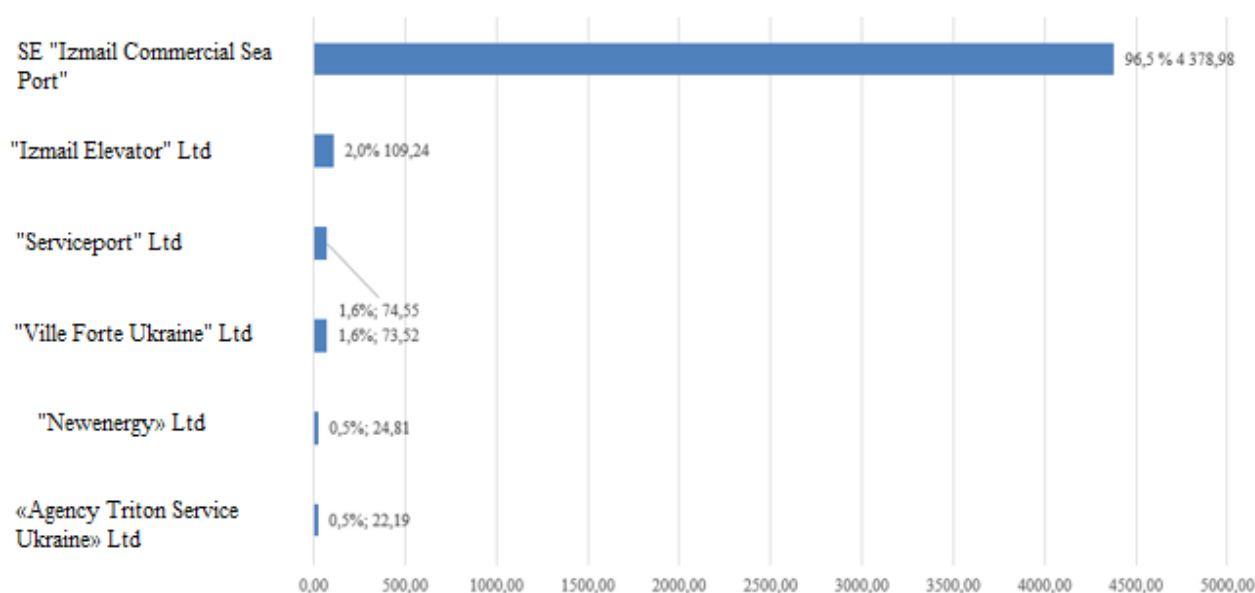


Fig. 6 Freight distribution by terminal operators at Izmail sea port in 2018.

As shown in Fig. 6, the largest share of cargo handling falls on the state enterprise "Izmail Commercial Sea Port", which is a state terminal operator and handles the largest number of cargo of Izmail port, since it has the largest capacity.

Other stevedoring companies specialize in certain types of cargo. Therefore, for example, Ltd "Serviceport" carries out the handling of liquid bulk cargoes – vegetable oil.

Ltd "Ville Forte Ukraine" processes chemical liquid bulk cargoes. "Ville Forte Ukraine" Ltd is a terminal operator for the transshipment of liquefied petroleum gas (hereinafter - LPG) in the port of Izmail. The main function and tasks of this terminal are the attraction of freight traffic from producers in CIS countries with further transshipment to Balkan states. For example, "Ville Forte Ukraine Ltd" carries out collection and transshipments of import and transit LPG by means of inland waterways, rail and road transport; storage in own tank park and subsequent shipment of LPG by small-scale batches for delivery to the customer's gas stations.

Ltd "Izmail Elevator" carries out handling of dry bulk cargoes, namely grain. The elevator has a capacity of 27,000 tons of simultaneous storage. It is a part of a holding company "Agroinvestgroup" Ltd. The priority direction of holding's activity is plant growing: growing of cereals and oilseeds with their further selling on the domestic market of Ukraine and export. Joint ventures of this agricultural holding are located in three zones of Odessa region and have direct access to the largest seaports of Ukraine. Ltd "Izmail Elevator" operates an elevator of port type and provides bulk type of storage.

The elevator carries out grain loading with a capacity of 1,500 t/day for road transport and with a capacity of 1,000 t/day for rail. As for unloading it is 1 000 t/day for road transport and 1000 t/day for rail. The capacity of shipments for vessels is 1500 t/day.

2.3. Main factors affecting type of cargo and cargo volume in transportations of Izmil sea port

1. Transport indicators. The number of ships passing through the Ukrainian deep-water navigable route "Danube - Black Sea" have decreased significantly due to implementation of special tariffs on the Sulina Channel in 2010, because freight traffic was artificially re-oriented and seagoing vessels have been forced to use the Romanian Sulina Channel with higher charges. This is negatively affecting the number of vessels' calls to Izmil port (as well as to other Ukrainian ports on Danube).
2. Changing the situation of the commodity market. Ukrainian and foreign metallurgical plants have recently reoriented their production for imported coal and iron ore raw materials.
3. Termination of the flow of Danube transit to the Black Sea, because of a reorientation to the Romanian Danube – Black sea Channel (Cernavodă - Constanța).

2.4. Strategic plans and perspectives of 2018

Amongst the main strategic development projects of Izmil sea port, the following projects should be distinguished:

1. The modern technologies construction project "Parts of the complex with storage and handling capacities for energy resources at the territory of state enterprise" Izmil Sea Commercial Port "- on the jetty №5 of the production site of 85 km of the Danube.
2. "The construction of cargo handling terminal for bulk mineral fertilizers near the berth №26".
3. "The construction of 2 berths of a bulk cargo handling terminal with the capacity of up to 2.200.000 tons per year in the southern part of the harbor 90 km of Izmil seaport". Terminal will include two berths №№ 27, 28.
4. "The construction of new and reconstruction of existing objects of road transport and railway infrastructure".



Fig. 7 Scheme of the drawing of main strategic projects of Izmail sea port development plan.

Taking into account the volume of iron ore exported by the Izmail Seaport to Europe and the volumes of iron ore production in Ukraine, one of the directions of development plans in 2018 was a concession project for state enterprise "Izmail Commercial Sea Port". Chinese company HBIS group, one of the world's most powerful steel producers is supposed to be asponsor. Therefore, in the long run, the possibility of implementation of this concession project is being considered.

Also attractive for an investor can be the development of passenger transportation infrastructure and the efficient management of the river passenger station of the port of Izmail.

3. Reni Sea Port

The port of Reni was founded in 1816 and is located on the left bank of the Danube River, between 62.5 and 71 miles from the mouth of Sulina, in the southwestern part of Ukraine at the junction of Ukrainian, Romanian and Moldovan borders and at the intersection of 4 transport corridors: Cretan №7 and №9, Eurasian and Black Sea. Today, the Reni Sea Port is a transport hub in Ukraine, where the work of inland waterway, maritime, rail and road transport is closely intertwined, and traffic flows from the countries of the former Soviet Union, Eastern and Central Europe, as well as the Black and Mediterranean Seas cross over here.

The unique geographic location has determined the status of the port of Reni as both maritime and river port.

The area of Reni seaport includes part of the left bank of the Danube River going from 123.6 km to 128.3 km of the Danube. Navigation in the port lasts all year round, the connection with the Black Sea is carried out through the Ukrainian deep-water navigable route "Danube - Black Sea" (Bystroe arm, Ukraine) and Sulina channel (Romania). The port's depths range from 2 to 30 meters from the coast to the fairway axis.

The port of Reni accepts any vessels whose draft allows it to pass Sulina Channel (up to 7.0 m). Total berths length of the seaport is 3.6 km (30 berths) with a maximum depth of 7.5 m.

At cargo berths of the port all types of cargo are processed, including general cargoes, bulk (both dry and liquid), heavy, oversized. General information on cargo handling standards is given below in Table 2.

Type of cargo	Technological scheme (straight line, wagon/crane etc.)	Type of cargo handling operation, loading/unloading (L/U)	Cargo handling standard, ton/vessel per day
Bulk grain imported cargo	Vessel-crane-wagon	U	2000
Bulk grain cargo (wagon loading)	Wagon- crane - vessel	L	1000
Ore, bulk ore concentrate at 3 rd cargo handling complex of the port	Warehouse- crane - vessel	L/U	6000
Ore, bulk ore concentrate at 1 st and 2 nd cargo handling complexes of the port	Warehouse- crane - vessel	L/U	3000
Coal at 3 rd cargo handling complex of the port	Warehouse- crane - vessel	L/U	4000
Other dry bulk cargoes	Warehouse- crane - vessel	L/U	1800
Canned foods	Wagon- crane - vessel	U	500

Refrigerated cargo in a sealed package	Wagon- crane - vessel	U	500
Refrigerated cargo in a package	Wagon- crane - vessel	U	300
Cargo in bags	Wagon- crane - vessel Warehouse- crane - vessel	U	600
General cargo in boxes, barrels, without package etc.	Warehouse- crane - vessel	L/U	600
Packaged mettall	Warehouse- crane - vessel	L/U	1500
Rolled in metal	Warehouse- crane - vessel	L/U	1200
Bulk cast iron	Warehouse- crane - vessel	L	1000
Timber	Warehouse- crane - vessel	L	500
Scrap metal	Warehouse- crane - vessel	L/U	800
Coking coal	Warehouse- crane - vessel	L	1500
Goods in packages and big-bags	Warehouse- crane - vessel	U	700
Paper, cellulose	Warehouse- crane - vessel	L	500
Bulk fertilizers (wagon unloading)	Wagon- crane - vessel	L	800

Table 2. Standards for cargo handling of State Enterprise "Reni Commercial Sea Port".

It should be emphasized, that in cases of shallow water and closure of navigation during the ship handling services provision these standards go down by 30%.

The port of Reni`s specialization, depending on the cargo area of the port, is as follows:
The 1st cargo handling area processes metal, scrap metal, general cargo, bulk cargoes (ore pellets), chemical cargoes;

The 2nd cargo handling area processes metal, scrap metal, grain, timber, oil, general cargoes, bulk (coking coal, ore pellets, coal), phosphates, chemical goods;

The 3rd cargo handling area processes bulk cargoes (coking coal, ore pellets, coal, ore, iron ore concentrate);

Oil terminal transports crude oil and oil products (gasoline, diesel fuel, vacuum gas oil, etc.).

The Reni Port is the only Port amongst Ukrainian ports on the Danube river, which can serve Ro-Ro vessels going in the river direction.

At auxiliary berths, there is a temporary mooring area for vessels, which provides all the corresponding support services.

The Reni Sea Port is equipped with an extensive network of railways, with a large amount of loading/unloading machinery and lifting devices (with the capacity of up to 250 tons). The total length of the access railway tracks located on the territory of the port is 21.4 km, adjacent to and serviced by Reni railway station - regional branch of "Odessa Railways" of state administration of railway transport of Ukraine "Ukrzaliznytsia".

Non-self-propelled barges are provided with towing and maneuvering services. Launch boats provide transportations to/from the roadsteads for registration of border, customs and other types of control.

The main characteristics of the Port of Reni:

- port territory constitutes 94.36 hectares;
- harbor area is 40.28 hectares;
- railway tracks length - 13.6 km;
- highways length - 6,1 km;
- port fleet vessels - 5 units (fire and rescue boat, launch boat, a floating crane, waste collection vessels);
- push convoys - 6 units (the owner - state enterprise "Reni Commercial Sea Port");
- auxiliary vessels - 4 units.

On March 23, 2000, the Law of Ukraine "On Reni Special Economic Zone" came into force. The SEZ "Reni" was created for a period of 30 years in Reni sea port. The total area of SEZ "Reni" is 94.36 hectares.

The purpose of creating the SEZ "Reni" was:

- increasing of the investment attractiveness for the development of the port's production and infrastructure;
- introduction of modern technologies;
- development of international economic relations and entrepreneurial activities;
- creation of new job titles;
- creation of new freight traffic.

On the territory of SEZ "Reni" all types of business activity, which are not prohibited by the legislation of Ukraine, may be carried out.

Five out of ten terminal operators of Reni sea port, are providing their cargo handling activities at SEZ "Reni". Reni sea port turnaround of 2018, was mostly represented by private terminal operators and constituted to 82.3%.

3.1. General indicators of cargo turnover of Reni sea port in 2018

The cargo turnover of Reni sea port in 2018 amounted to 1.3 million tons. At the same time, the capacity of the terminals of Reni sea port is 8.0 million tons/year.

Reni sea port in 2018 increased cargo turnover by 18.5% compared to 2017 to 1.332 million tons. The percentage share of Izmail port cargo handling volume in the total cargo turnover of Ukrainian sea ports was 0.9% in comparison with 0.8% in 2017.



Fig. 8 Statistics of performance of SE “USPA” and Reni sea port with indicators and diagrams.

Transshipment of transit cargo increased by 16% - up to 1.267 million tons, import of cargo - by 3.5 times, up to 38.47 thousand tons, export goods - by 31.2%, to 26.82 thousand tons.

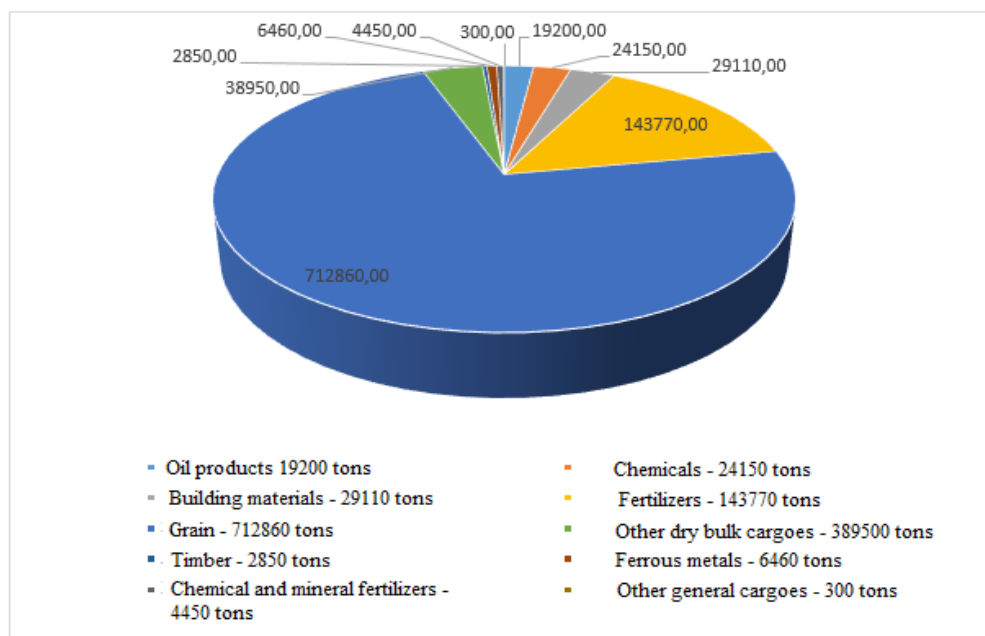


Fig. 9 Freight distribution of Reni sea port by type of cargo in 2018.

Liquid bulk cargo handling increased by 2% - up to 43.35 thousand tons. In particular, the processing of oil products increased by 18.3% - up to 19.2 thousand tons, processing of chemical goods decreased by 8.1% - to 24.15 thousand tons.

Transshipment of dry bulk cargo increased by 20.3% - to 1,275 thousand tons. In particular, grain processing increased by 29% - to 712.86 thousand tons. Transshipment of chemical goods and mineral fertilizers decreased by 14.7% - to 143.77 thousand tons. The transfer of construction materials amounted to 29,11 thousand tons. Processing of other dry bulk cargoes increased by 15.2% - up to 389.5 thousand tons.

The processing of general cargo decreased by 36.2% - to 14.06 thousand tons. In particular, the handling of steel was 6.46 thousand tons, chemical cargoes and mineral fertilizers - 4.45 thousand tons, timber cargoes - 2.85 thousand tons. The processing of other general goods amounted to 0.3 thousand tons.

Reni sea port in 2017 increased cargo turnover by 15.7% compared to 2016, which amounted to up to 1.124 million tons. The percentage share of Izmail port cargo handling volume in the total cargo turnover of Ukrainian sea ports was 0.8% in comparison with 0.7% in 2016.

Fig. 10 shows the distribution of cargo flows by export, import, cabotage and transit in 2018.

It should be emphasized that the largest share belongs to the transit cargo, which makes up 95.1% of the total cargo volume of the port's turnover in 2018. A significant part of transit cargoes is cargo (mostly represented by grain and other dry bulk cargoes) from Moldova - 86.6% to the Black Sea and Mediterranean basins countries, the Danube countries (Bulgaria, Romania, Serbia), North Africa (Tunisia, Morocco, Libya) and the east.

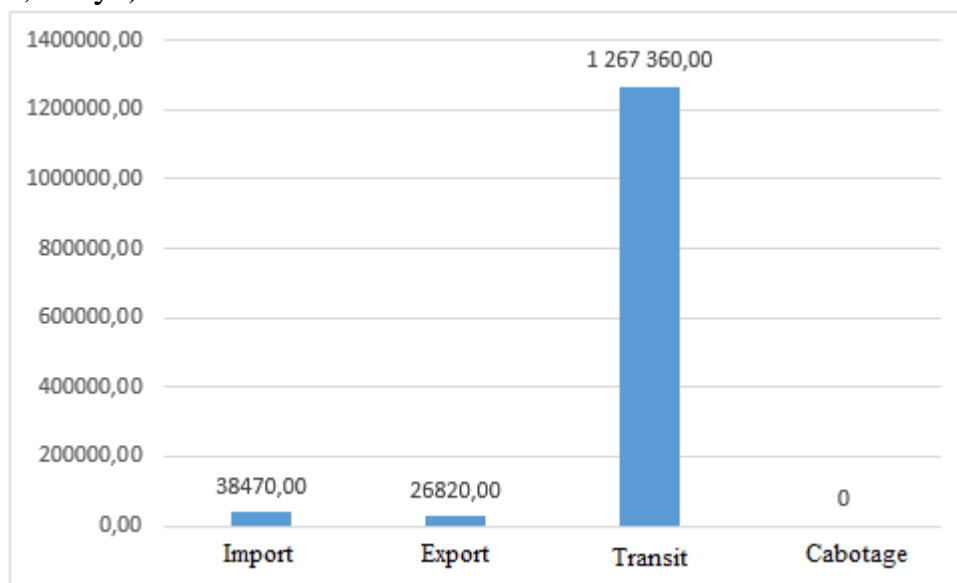


Fig. 10 Freight distribution by import, export, transit and cabotage at Reni sea port.

At the present moment, the main cargo traffic in the port is represented by grain cargo from Moldova to Middle East, which are imported by road. Some North African countries have disappeared from this list in 2018 due to a reorientation of cargo traffic because of military operations in these countries.

In addition, among transit cargo of 2018, 12.5% of transport is attributed to chemical and mineral fertilizers that are shipped from the Russian Federation and the Republic of Belarus to the Danube countries (Bulgaria, Romania, Serbia, Croatia, Hungary and Moldova).

The share of imported goods in 2018 is negligible - about 3.0% of the goods received from Egypt and the Danube countries, and were represented mostly by construction cargoes (26500 tons), chemical goods and oil products (6400 tons).

3.2. The analysis of Reni port operators` performance in 2018

According SE "USPA" statistics in 2018, cargo handling at Reni sea port was carried out by following companies: "Danube Transservice" Ltd, "Laguna-Reni" Ltd, "Reni-Terminal" Ltd, "Imex Vitnei Investment Company" Ltd, "DSL Ukraine" Ltd, Private company "Larus Shipping", "Terminal Dugai" Ltd, "SC Accord" Ltd, Private company "Reni-Lis", "Reni-Line" Ltd, SE "Reni Commercial Sea Port", "Reni Elevator" Ltd and "AGRO RENI" Ltd.

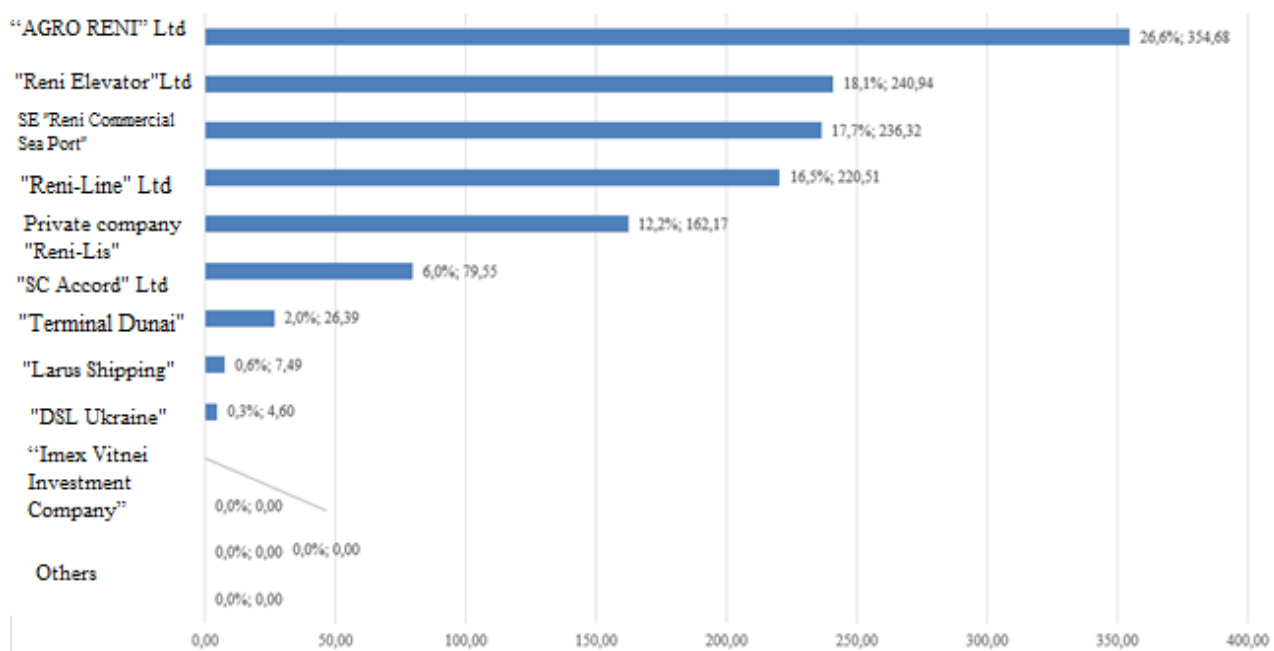


Fig. 11 Freight distribution by terminal operators at Reni sea port in 2018.

As it is shown in Fig. 11, the largest share of cargo processing falls on "AGRO RENI" Ltd, which provides loading and unloading of grain cargoes. In 2018, "AGRO RENI" Ltd had processed 354.7 thousand tons of grain, exceeding the similar indicator in 2017 by 12.5%. Grain Terminal "AGRO RENI" Ltd is located on the territory of the Reni Seaport. The terminal provides simultaneous processing of various dry bulk cargoes: grain, oilseeds, legumes and general cargoes. It can provide simultaneous storage of 15 thousand tons of grain. The terminal provides services of collection, storage, and shipment of grain both for export and for import.

"Reni Elevator" Ltd provides services for the collection, loading/unloading, storage for grain and other agricultural cargo, and also provides storage in warehouses with a total capacity of about 40,000 tons, with the possibility of grain processing by drying and cleaning to the necessary conditions. According to the results of 2018, the share of goods processed by "Reni Elevator" Ltd amounted to 18.1% in the total volume of cargo turnover of Reni seaport. Amongst the goods processed by "Reni Elevator" Ltd 52.8% was grain, the rest was represented by other bulk cargoes.

State Enterprise "Reni Commercial Sea Port" is a state-owned terminal operator, which has one cargo terminal and specializes in cargo handling operations for handling dry bulk, general cargo and liquid bulk. The ultimate cargo handling capacity of SE "Reni Commercial Sea Port", taking into account oil, is about 12 million tons per year. The share of cargo processed by SE "Reni Commercial Sea Port" at Reni sea port is considerably small (17.7%) due to the need of modernization of the existing equipment and port facilities.

3.3. Main factors affecting type of cargo and cargo volume in transportations of Reni sea port

It should be emphasized that the performance of Reni sea port during the last 5 years remains unchanged. Volumes of cargo in comparison with the indicators of cargo handling of the last century are considerably reduced. This happened primarily due to two main factors: the reorientation of cargo flow of Russian oil, chemicals and mineral fertilizers to European ports and high rail transportation tariffs to/from Reni sea port due to an absence of railroad access from the port to the rest of Ukrainian territory. Thus, goods are transported through the territories of Transnistria and the Republic of Moldova, which increases the rail tariff on average of \$ 5 per ton.

The railway station of the first category «Reni-Nalivna» and the station of the second category «Reni-Main» of Odessa railway service Reni Sea Port terminal operators, including SE «Reni Commercial Sea Port». At present time, there is no direct connection of the Reni station with the railway stations of the rest of Ukraine. All rail transportation are carried out through Moldavian stations of State Enterprise "Railways of Moldova", such as Novosavitcaia - Etulia, by crossings of the borders of Kuchurgan (Ukraine) - Novosavitcaia (Moldova), and Etulia (Moldova) - Frykatsei (Ukraine), as well as through unrecognized state - Transnistria. Through the border crossing of Giurgiulesti (Moldova) - Reni (Ukraine), connections are provided by Moldavian and Romanian rail. This has a significant negative impact on the tariff rates of transportation and negatively affects the volume of cargo handling in the port of Reni, namely because bad logistical connection with Ukraine. As shown in Fig. 12, the decrease in freight turnover began in the period of USSR disestablishment and during the last 30 years it has decreased by almost 90%.

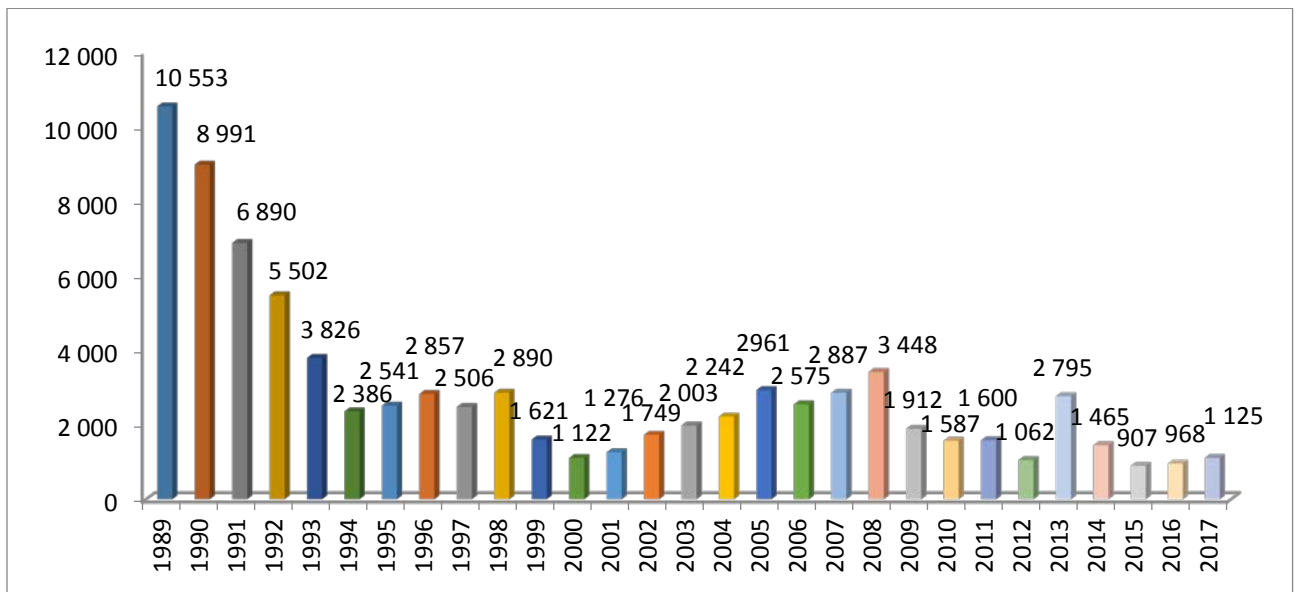


Fig. 12 Turnover of Reni sea port for the period of 1989 – 2017

In order to restore the sustainable freight operation of Reni Sea Port, SE "USPA" together with the Ministry of Infrastructure of Ukraine develops and implements a new strategy for the development of seaports until 2038. It is proposed to create in the special economic zone of the Port of Reni an industrial zone with processing enterprises, which will attract new types of cargo. Together with this, different perspectives for privatization of the port are considered. It is envisaged to increase the efficiency of the use of existing transshipment capacities and to carry out shore-protection works on the left bank of the Danube river basin from the Ukrainian-Moldovan border to the port territory.

3.4. Strategic plans and perspectives of 2018

Major investment projects for Reni sea port are following:

1. Development of the cargo-handling complex at the berths №№ 34, 35, 36, 37 of the seaport of Reni;
2. Development of production facilities at repair workshops (auxiliary berths №№ 1B, 29B) in the seaport of Reni;
3. Development of the cargo-handling complex in the "Maintenance service center" of the seaport of Reni;
4. LNG terminal for the accumulation, storage and bunkering of vessels on the territory "Maintenance service center" of the seaport of Reni.

SE "USPA" is considering the possibility investors attraction for the implementation of a public-private partnership project to create a terminal for collection, accumulation, storage and vessels bunkering with liquefied natural gas at the seaport of Reni.

The project envisages the construction of a LNG terminal and a floating-point for bunkering of vessels at the territory of "Maintenance service center" of the seaport of Reni.

The location at the special economic zone "Reni" (Figure 13), the proximity of the Odessa-Bucharest international route, along with the possibility of efficient use of existing assets and related infrastructure, makes the LNG terminal project promising and beneficial both for the state and for a potential private investor.

Among the benefits of the project for a private investor is the possibility of obtaining international and European funds, to participate at international programs for the construction of LNG terminals to reduce the environmental pollution, as well as the inclusion of the Danube ports of Ukraine in the European Transport Network (TEN-T).

It is expected that the implementation of the investment project will contribute to the increment of the number of vessels to port of Reni, and thus to increment of revenues from port dues and other services for SE "USPA", as well as revenues to the budgets of different levels (payment of taxes, concession payment) for the state.



Fig. 13 Site location of the strategic project of LNG terminal construction at the territory of Reni sea port.

In addition, the project will have a significant positive impact on the economic, social and environmental situation in the region by creating new jobs, modernizing the infrastructure and reducing harmful emissions on inland waterways of Ukraine, in particular, on the Danube river.

It should also be emphasized that the urgency of the creation of a LNG terminal, among other things, is due to the necessity of equipping stations of vessels' bunkering with LNG in Ukrainian seaports. By 2025, sufficient LNG terminals must be installed in seaports in accordance with Directive 2014/94/EU. Many European countries use liquefied natural gas as fuel for ships for more than ten years. This has had a positive impact on both the economic efficiency of maritime transport and the environment.

There are still very few vessels working on liquefied natural gas on inland waterways, but their number is constantly increasing.

Project implementation is scheduled for 2020-2025.

4. Ust-Dunaisk Sea Port The port of Ust-Dunaisk was established on June 20, 1980, for its intended purpose - maintenance of main and feeder lighter (unpowered) barges, as well as for the reloading cargo from large vessels with a capacity of up to 100 thousand tons to smaller barges. Primarily for the transshipments of iron ore from Brazil and Australia for the Danube metal processing plants. This system began to operate due to the establishment in 1978 of the International Commercial Navigation Company "Interlichter", which included Bulgaria, Hungary, Czechoslovakia and the USSR. The technological scheme of the work was as follows: the lighter barge was loaded at different Danube ports, after which it was towed in the seaport of Ust-Dunaisk for loading on lighter carriers. The "Interlichter" barges operated on two lines: the Danube - India and the Danube-Mekong. Due to the financial difficulties that arose with the disestablishment of the USSR, this line ceased to function.

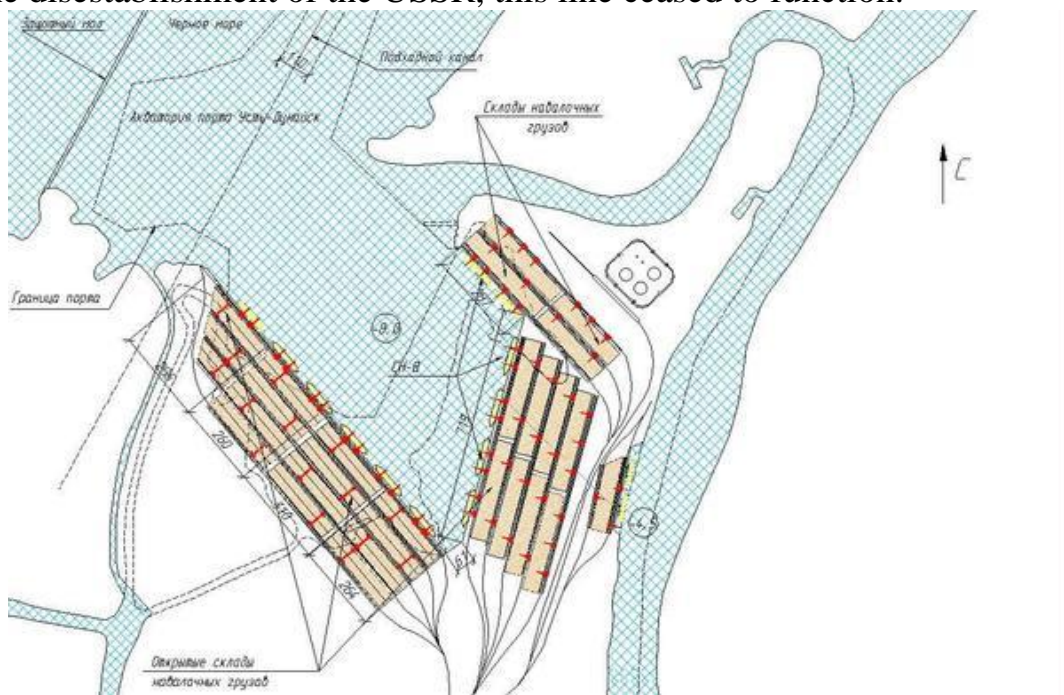


Fig. 14 The layout of warehouses location at Ust-Dunaisk sea port.

Starting from 1994, the port began to specialize on handling of export and import grain cargoes. The bulk ore cargo volumes consisted of bauxite and magnesite originating from Guinea on vessels of the foreign bulk carrier fleet type Panamax with a carrying capacity of 55-80 thousand tons. Ust-Dunaisk sea port was processing the other cargo such as metal.

At the present time, Ust-Dunaïsk sea port has been engaged in the majority of cargo transshipment from seagoing vessels for further transportation to the countries of the Danube and in the opposite direction, as well as servicing passenger ships.

The main activities of the port are:

- loading-unloading of vessels;
- transshipments of cargo from river-going vessels to the sea-going vessels and vice versa;
- passenger services;
- freight forwarding and warehousing operations;
- servicing of unpowered fleet;
- navigation safety at the water area of the port, informational support;
- international activities;
- ensuring safety of mooring;
- agency and other administrative services, towing operations.

Ust-Dunaïsk seaport is located in the southern part of the Zhebryans`kyi Bay of the Black Sea. The water area of the port includes the area of the port harbor, the approach channel, three anchorage areas, the water area of the connecting channel of 1.5 kilometers within the shores, the water area of the mouth of Prorva, the water area of the roadstead for unpowered fleet, the water area of the Bazarchuk. The port includes Chilia harbor station and Vylkove harbor terminal.



Fig. 15 Passenger terminal of Ust-Dunaïsk sea port (Vylkove harbor terminal)

Chilia harbor terminal is located 47 km from the Danube River. The water area of Chilia harbor terminal is the water area of the Chilia mouth of the Danube River from 42 km to 54 km, counting from the left bank to the conditional line of the state border, which passes along the fairway. Chilia harbor terminal has a berth, which provides round-the-clock processing of cargo handling facilities.

The port facility has road connection, the nearest train station Dzynilor is 42 km away. A cargo berth (the only cargo berth of the seaport of Ust-Dunaïsk) has a length of 150 m. The berth specializes in handling of bulk and general cargoes. It can serve vessels with carrying capacity up to 5 thousand tons. The depth at the berth is 2,5 - 3,5 m. Cargo storage is provided at a warehouse with an area of 960 m² and at open-air storage areas of 10.8 thousand square meters.

4.1. General indicators of cargo turnover of Ust-Dunaïsk sea port in 2018

In 2018 Ust Dunaïsk sea port reduced cargo turnover by 5.7% compared to 2017, which amounted to 51.1 thousand tons. In particular, the transshipment of oil products (cabotage) grew by 26.7% - to 21.8 thousand tons. Grain processing (exports) decreased by 11.2% to 29.3 thousand tons. In total, in 2018, 73 vessels were served at the port.

According to the cargo specifications in turnaround of 2018 dry bulk cargo prevailed - 29,3 thousand tons (total volume was grain). Liquid bulk cargo transported - 21.8 thousand tons (the entire volume - oil products).

Indicators of cargo turnover of Ust-Dunaïsk sea port for previous years: 2017 - 54 thousand tons, 2016 - 25.4 thousand tons, 2015 - 22.5 thousand tons, 2014 - 61.6 thousand tons, 2013 - 39.1 thousand tons, 2012 - 35,3 thousand tons.

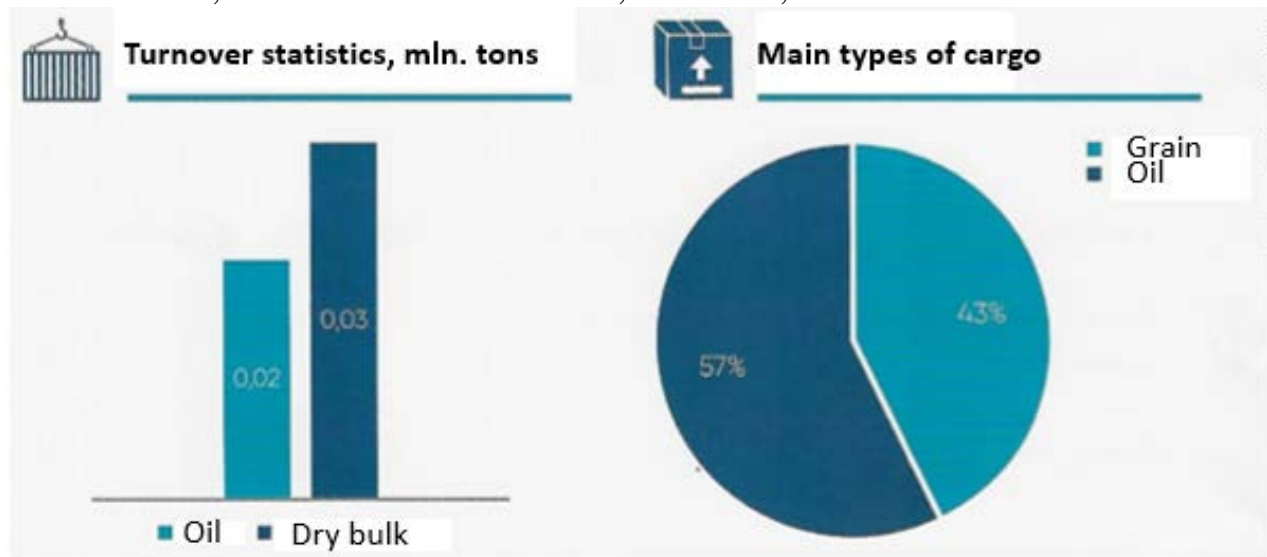




Fig. 16 Statistics of performance of SE “USPA” and Ust-Dunaisk sea port with indicators and diagrams.

In 2017, Ust-Dunaisk sea port increased its turnover by 2.1 times compared to 2016 - to 54.2 thousand tons.

Oil products (43%) and grain cargoes (57%) represent the main cargo of the port.

According to the distribution of traffic of Ust-Dunaisk sea port (import, export, transit, cabotage), it should be noted that during 2018 the port had been exporting goods mostly to Egypt, and there was also a small proportion of freight going to Spain and Philippines. Type of export cargo was 100% grain. Cabotage transportation accounted for 42.7% of the total volume of Ust-Dunaisk sea port cargo transshipments. Cabotage transportations were provided in 2018 by river tankers from other sea ports of Ukraine like Kherson, Skadovsk and Izmail.

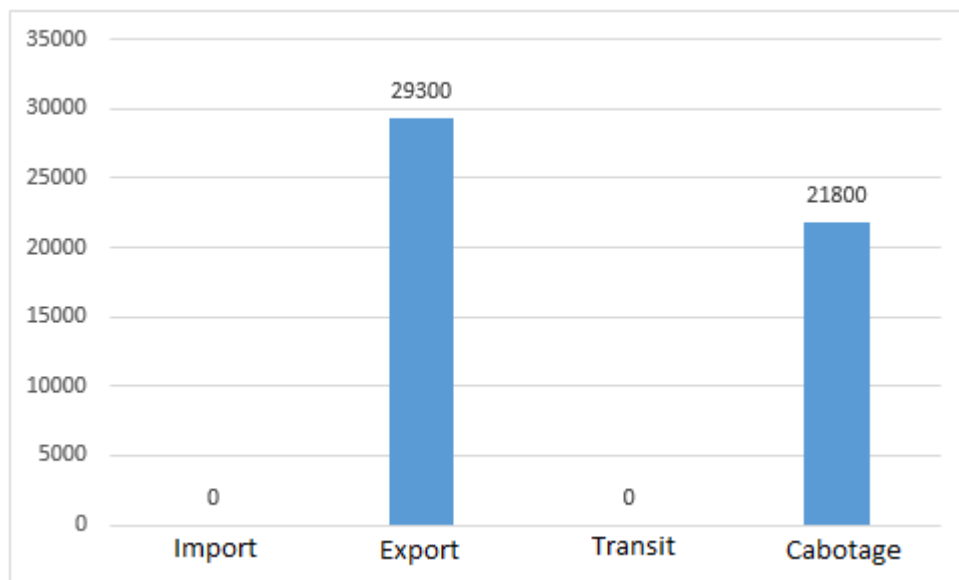


Fig. 17 Freight distribution by import, export, transit and cabotage at Ust-Dunaisk sea port.

By type of cabotage cargo in 2018 prevailing were petroleum products (100% of cabotage cargoes), which were transported to the oil collection station of the port from vessels. As shown in Fig. 17, import and transit cargoes did not pass through the Ust-

Dunaïsk sea port in 2018. However, in 2019 there is a share of import goods (chemical fertilizers), which came from Bulgaria.

4.2. The analysis of Ust-Dunaïsk port operators` performance in 2018

Cargo handling operations at Ust-Dunaïsk sea port are carried out by the state enterprise "Ust-Dunaïsk Commercial Sea Port" and "Kranship" Ltd.

State enterprise "Ust-Dunaïsk Commercial Sea Port" is a state-owned terminal operator providing various logistic services for handling grain, including the organization of import, export and transit grain transportations by means of maritime, inland waterways and road transport throughout the territory of Ukraine, Moldova, EU countries. The port fleet of SE "Ust-Dunaïsk Commercial Sea Port" consists of four floating cranes, a floating grapple truck and a tugboat-pusher, different tugboats. Part of the fleet is leased. After the decision to close the works in the water area of the port of Ust-Dunaïsk in Zhebryyans`kyi Bay, loading and unloading works are carried out only at Chilia harbor terminal. Chilia harbor terminal can process all kinds of dry bulk cargo. Cargo storage is provided at warehouse area of 960 square meters and at open-air storages with a total area - 1415 square meters.

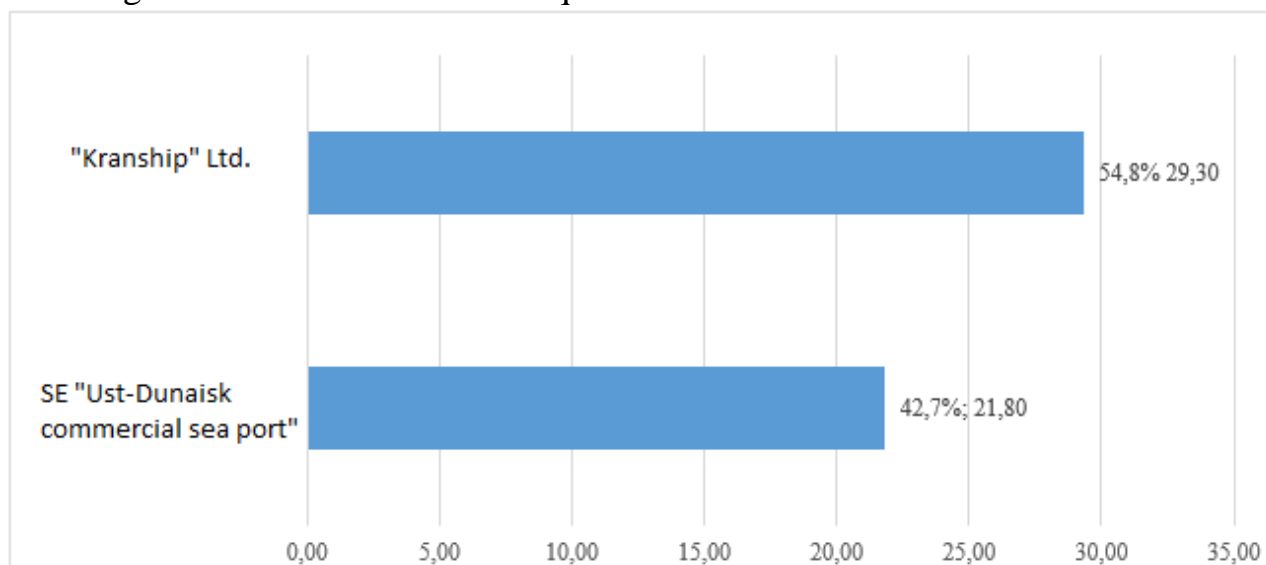


Fig. 18 Freight distribution by terminal operators at Ust-Dunaïsk sea port in 2018.

In 2018, state enterprise "Ust-Dunaïsk Commercial Sea Port" had transshipped 21.8 thousand tons of bulk cargo at the seaport of Ust-Dunaïsk, which amounted to 42.7% of the total cargo handling capacity of the port.

"Kranship" Ltd. is the main port operator of Ust-Dunaïsk sea port and in 2018 the amount of processed grain reached 29.3 thousand tons, which amounted to 54.8% of the total volume of cargo handling of the port. "Kranship" Ltd. belongs to the holding company "Transship" group. "Transship" group for more than 10 years has been a leader in the grain-handling sector of Azov-Black Sea basin. In July 2017 "Transship" group became a member of the Ukrainian Grain Association.

According to the range of goods being transshipped, "Kranship" Ltd. carries out handling such cargoes as coal, grain, coking coal, fertilizers, ore etc. Among the technical facilities of "Kranship" Ltd. are modern floating cranes, oil tanks and other cargo handling complexes, which can provide simultaneous storage of cargo on the roadsteads for 100 thousand tons.

4.3. Main factors affecting type of cargo and cargo volume in transportations of Ust-Dunaisk sea port

The port has experience in transshipment of transit grains from Hungary to the Mediterranean countries and East Asia, transit metal and mineral fertilizers from Russia to Western Europe, import bauxite from Africa. Despite aforementioned, Ust-Dunaisk sea port has strong competitors, such Ukrainian ports as Izmail and Reni, as well as the Romanian port of Constanta.

The Romanian port of Constanta, as well as the port of Ust-Dunaisk sea port, is located at the river mouth, which connects the Danube with international sea transportation routes. The Danube River connects these ports with countries of Central and Eastern Europe - Austria, Bulgaria, Hungary, Moldova, Slovenia, Germany, the Czech Republic, Serbia and Croatia.

In addition, the lack of railways and highways has a negative impact on the competitiveness of the Ust-Dunaisk sea port.

4.4. Strategic plans and perspectives of 2018

Main development scenarios for Ust-Dunaisk sea port are focused on the development of free port territories, enhancement of the touristic services, reconstruction of existing berths in order to broaden port auxiliary territories and to ensure their further development, rearrangement of storage facilities of SE "Ust-Dunaisk Commercial Sea Port".

In the future, the possibility of privatization of SE "Ust-Dunaisk Commercial Sea Port", which is currently engaged in stevedoring activity, is being considered.

According to the Law of Ukraine "On the Sea Ports of Ukraine" and the plan for the development of Ust-Dunaisk sea port for short (up to 2018), medium (till 2023) and long-term (until 2038) perspective, adopted from January 29, 2014, the port needs are described as following:

- construction of new terminals at the Chilia harbor terminal for cargo handling;
- construction of cargo handling complexes and reconstruction of existing berths and other structures;
- construction of new and reconstruction of existing road transport infrastructure;
- reconstruction of the project depths at the port water area, which will allow to call vessels for handling up to 50 thousand tons and above with a draft of 13.5 m;
- development of touristic services.

All the aforementioned activities require significant capital investments (for around 222.7 million \$).

5. Passenger transportations of Ukrainian ports on Danube in 2018

Creation of the most favorable conditions for the development of tourism in the Danube region is one of the priority tasks of SE “USPA”. Ukrainian Danube region is currently rather promising, but is not often used in its recreational and tourist aspect concerning passenger transportations market. The region has significant resources for ethnic and ecological tourism due to the multinational population, preservation of national traditions, and unique natural reserve areas.

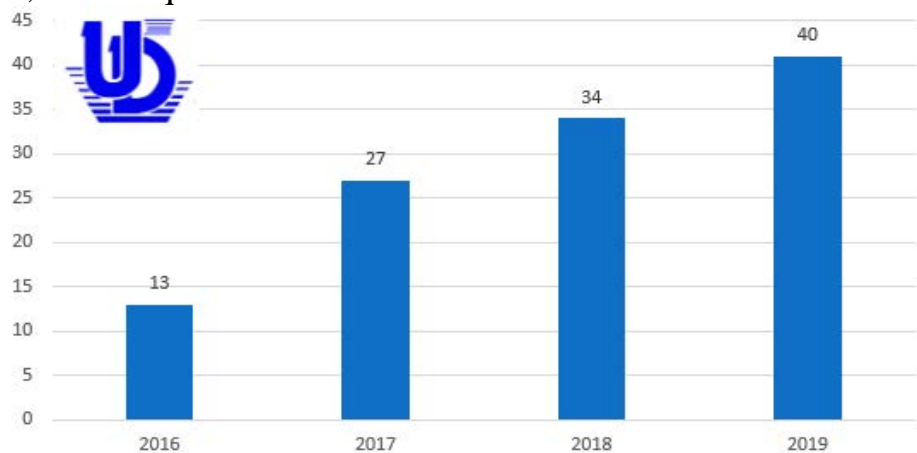


Fig. 19 Number of passenger ships' calls at Ust-Dunaisk sea port

Recently, Ukrainian ports of Lower Danube becoming more and more attractive for the touristic business. Therefore, as shown in Fig. 19, Ust-Dunaisk sea port became the leader in 2018 among other Ukrainian seaports by the number of passenger ships' calls, which was 34 in 2018, and by the number of passengers - 5338.

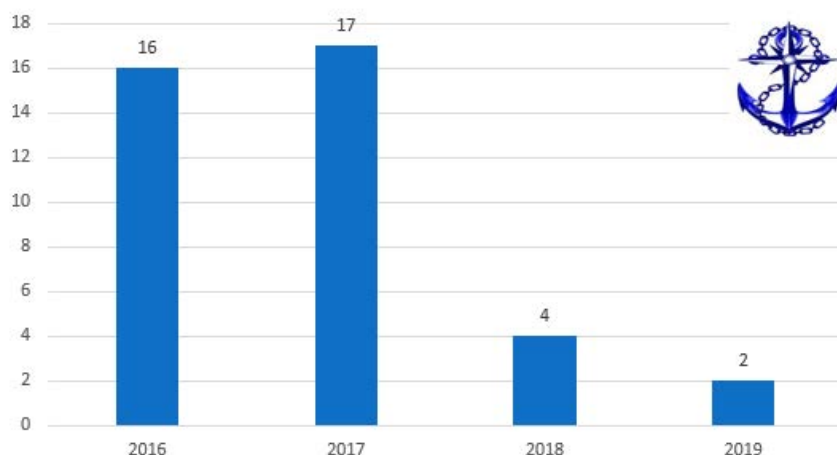
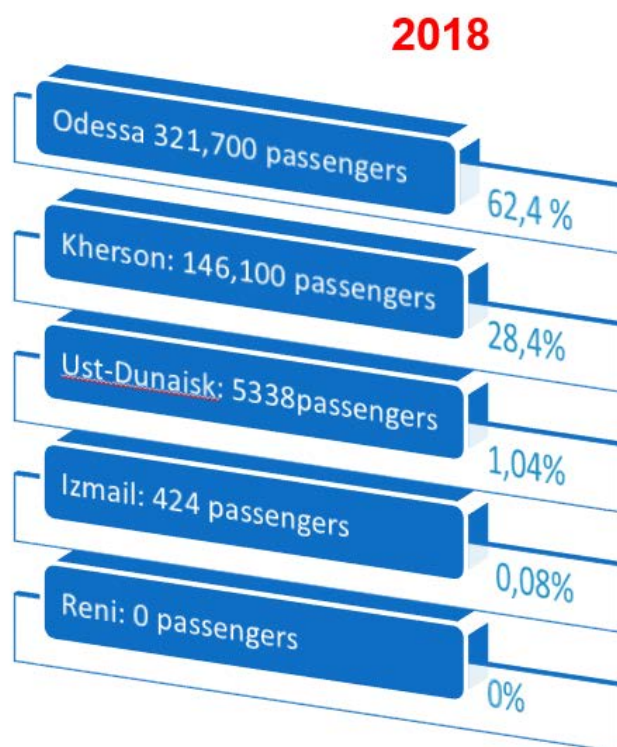


Fig. 20 Number of passenger ships' calls at Izmail sea port

Passenger navigation in 2018 began on the Danube on April 1, at Vylkove harbor terminal of Ust-Dunaisk sea port, which had served passenger ship "JOY" (Swiss flag) with 124 tourists on board. In total, from April to September 2018, 24 similar vessels had been served at the port.



Total of 2018: 515 593 passengers

Fig. 21 Statistics of passenger ships` calls at maritime ports of Ukraine in 2018

It has to be mentioned, that tourists visit Ukrainian part of Danube delta through a local tour-agent "Chervona Ruta" on a passenger ship "Dnieper Princess". In 2018, there were 10 similar passenger vessels` calls at Vylkove harbor terminal and four calls to the port of Izmail.

In 2019, Ust-Dunaisk sea port has been already received 40 calls for river cruise ships at and Izmail sea port has got two 2 calls for ships, which fly under the Ukrainian flag, as well as under foreign ones, with foreign tourists aboard, in the majority of which are Romanians (Fetesti) and from Germans (Passau).

Annually, the number of river cruise ships with foreign passengers aboard, visiting Ust-Dunaisk sea port, is increasing (as shown on the graph of Figure 20).

However, each year the number of ship calls to Izmail Sea Port is decreasing. Earlier, in 2017, 17 vessels were introduced to Izmail Sea Port by river cruise ships. This problem requires additional discussion with cruise companies operating cruises on the Danube River.

6. Infrastructure development and innovations at Danube region

Today, one of the priority directions in the implementation of new technologies in the infrastructure development of the Danube region is in creation of artificial territories by means of dredged soil. The annual amount of sediments of the maritime approach channel Ukrainian deep-water navigable route "Danube - Black Sea" is over 0.5 million cubic meters per year. The amount of sediments from all the Danube ports is rather large as well. Taking into account the total amount of sediments in Danube delta, the creation of artificial territories will allow not only to reduce the harmful effect of dredging, but also to reduce the cost of dredging itself. This can be achieved by reducing the distance of soil transportation to dumping sites and reducing the sedimentation of channels and other water areas. Together with this creation of artificial territories can improve the ecological conditions of the region by means of creating natural reserves, parks, islands and coastal areas. In a long run, it will also lead to increment of Ukrainian territory by means of reclamation of the banks of the Danube River etc.

At the present time, there are several Ukrainian and foreign patented inventions, which allow to design lightweight mobile coastal protecting (fencing) structures, which can be used for dredging dumping sites. For example, it was developed in the 1970s in the USSR and patented by the Institute of Hydromechanics of the Academy of Sciences of Ukraine, an analogue of Geotube – coastal protective structure, called Greenstick, see. Fig. 22. Greenstick innovative structure had also passed laboratory tests.

In this case, by means of Greenstick`s utilization both underwater dumping sites and the ones, located above water surface, can be fenced and protected.

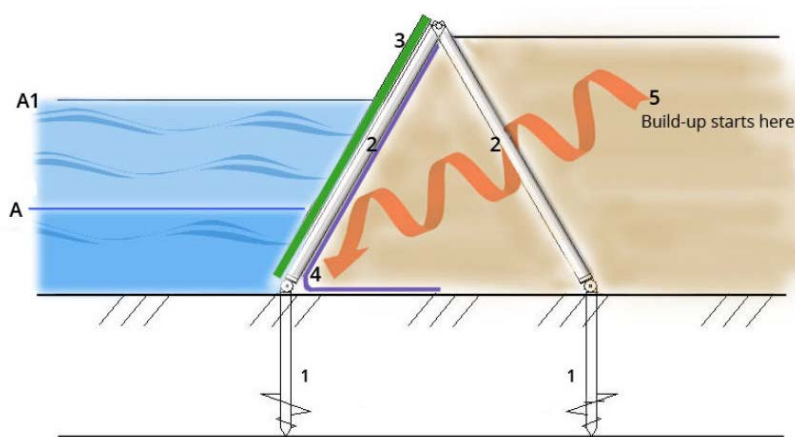


Fig. 22. Greenstick structure: 1 – screw pile Greenstick; 2 – inclined part of pile; 3 – composite panel; 4 – membrane; 5 – dredging soil or sand filling; A, A1 – water levels.

Such structures can also be used for:

- fencing of dumping sites for the purpose of reliable storage of dredging soils without the threat of their washing by a current along a large area of the river with the washing of harmful substances into water;
- protection of channels and port waters from silting;

- creation of artificial territories for natural reserves and parks, wetlands, agricultural lands, land for construction, coast protection from erosion.

In addition, a new invention for the design of berthing facilities is shown, which can be used for both sea and river Danube ports was elaborated and represented at PhD dissertation of an author Virzhiniia Oganessian “The enhancement of bearing capacity of water transport sheet-pile walls” (Figure 23).

The main idea of this development was in a creation of a more cost-efficient type of anchor bearers for quay walls that will be at the same time meeting the technical requirements applicable to structures of this type.

The proposed structure can provide a higher bearing capacity (with the same material composition as at the existing technical solutions), which improves the operational performance of the berthing facility. The proposed solution can also reduce the cost of installation works and construction materials.

The laboratory of the Odessa national maritime university conducted pilot studies related to the implementation of a new anchorage device of various configurations, in order to confirm the effectiveness of their innovative structure.

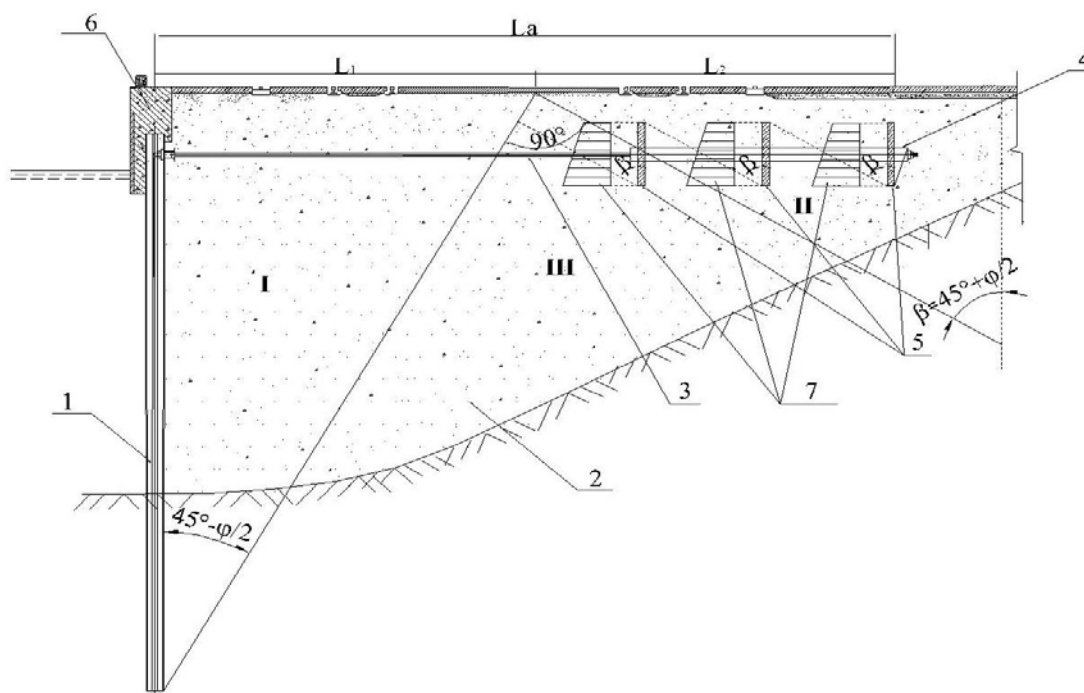


Fig. 23. Sheet pile quay wall with anchor bearers of a “comb” type: 1 – sheet piling; 2 – sand filling behind the wall; 3 – tie-rod; 4 – metal core; 5 – anchor plates; 6 – concrete superstructure; 7 – diagrams of soil pressure.

Laboratory tests had confirmed that the proposed design of the anchor bearers allows a significant material's consumption reduction together with achievement of the required bearing capacity, and on the other hand there is a possibility of a significant increase in the bearing capacity for deep-water quay walls design.

7. Conclusions

The Danube and its navigable tributaries have significant potential for growth in freight and passenger flows. A promising sector of inland waterway transport contributes to the development of a more sustainable transport system and reasonable economic growth of the region. In addition to improving the conditions of the fairway, modernization of the Ukrainian fleet on Danube is required, comprehensive investments in the development of shipping routes and seaports of the Ukrainian Danube region. The investment needs are mostly related to infrastructure, as well as rail and road connections with inland ports.

There is necessary to implement smart combination of multimodal and intermodal transport systems, taking into account the development of inland waterways, better integration of transport infrastructure into regional development plans, strengthening and development of cooperation between public and private partners, foreign investors and government.

Currently, Ukraine is undergoing an intensive search for the most effective use of the transit potential of the state, in particular its maritime regions. The territory of Ukraine and its transport routes appear in numerous international projects and, undoubtedly, in the transport system of Ukraine, the Danube has a huge potential for increasing cargo flows.

Within the framework of the development program of Danube ports, the question of sustainable operation of deep-water navigable route "Danube - Black Sea" remains one of the strategic objectives of Ukraine. Nevertheless, in order to increase the efficiency of the operation of Ukrainian ports on the Danube, it is necessary to develop a comprehensive plan of measures. This plan has to envisage an implementation of such projects as the development of the SEZ of Reni port, rail connection of Reni sea port with the rest of Ukrainian territory, creation and development of industrial parks on the Danube ports territories, construction of bases for reception of small-scale fleet, creation of tourist infrastructure, etc.

Deep-water navigable route "Danube - Black Sea" reconstruction project is highly important for the development of the Ukrainian Danube region and is corresponding to strategic targets of the European Union. The main task of this project is navigational renewal in the Chilia mouth of Danube River. The project also aims for improvement of the socio-economic state of the regressive parts of the Odessa region by means of cooperation with the European Union on transport issues. This will lead to the establishment of collaboration with the EU countries in the field of inland water transport. Moreover, it will prevent the creation of a monopoly of Romania on

transportations at VII International Transport Corridor etc. The project is aimed at supporting the reasonable and stable integration of the Danube into the international transport chains of the transport corridors "European Union - Central and Eastern Europe".

8. Reference list

1. <https://mtu.gov.ua/>
2. <http://www.uspa.gov.ua/>
3. <http://www.izmport.com.ua/>
4. <http://ville-forte.com.ua/uk/about-us/>
5. <https://agroxy.com/elevators/odesskaya-obl/izmayilskii-elevator>
6. <http://www.portreni.com.ua/index.php>
7. <http://www.portreni.com.ua>
8. <http://agro-reni.com>
9. <https://ustdunaisk.github.io/>
10. <https://ports.com.ua/>
11. <https://patents.google.com/patent/GB2500322A/en?q=Mooring+device;Gennadiy+Meltsov;+David+West+GB+2500322>
12. Doubrovsky M., Oganessian V. (2014), Quay wall, Publication of patent of Ukraine №105067, State service of intellectual property, Kiev, Ukraine.