THE CURRENT STATUS OF EAST SLOVAKIAN TRANSHIPMENT POINTS AND THE POSSIBILITIES OF THEIR FURTHER DEVELOPMENT

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Abstract: The article discusses the possibilities of East Slovakian transhipment facilities, which, despite their relatively strategic location and the possibilities they provide, are far from being used as much as their capacities allow. Growing requirements for green transport and reducing the carbon footprint create space for increasing rail transport as the most ecological option; on the other hand, the long-standing problems experienced by East Slovakian transhipment points put them in a competitive disadvantageous position compared to other countries. The opening of the Silk Road provides opportunities that East Slovakian transhipment points do not use or use very little. Therefore, the article points out the weaknesses of East Slovak transhipment centres and looks for ways to improve the current situation, it also draws attention to the possibilities of East Slovakian transhipment centres, especially Čierna nad Tisou, and makes suggestions for rationalization. The findings of the article point to the fact that Eastern Slovakian transhipment facilities have a potential that needs to be further developed, which, however, will probably not be possible without state aid.

1 Introduction

International trade is currently growing significantly, and the volumes of goods being transported are increasing. The European Union has created an appropriate legal framework for the transport sector to facilitate the free movement of people and goods within the Union [1]. Any country has a strategic document establishing a model of actions with the view to achieve a global developmental goal. To be competitive, a country must have a viable economy [2]. But the volume of goods between Europe and Asia is an important element of international trade within the EU, as one of the most important Asian partners is the People's Democratic Republic of China. The main mode of transport is sea container transport. However, in recent years, part of the flow of goods has been diverted from maritime to rail. Several measures have been taken to support rail transport in this area, such as the creation of a joint CIM / SMGS consignment note. The higher application of common consignment note CIM/SMGS in rail transit cross Slovak republic is good way how to make railway transport more efficient [3].

Improving and supporting rail transport within the Europe - Asia freight flows brings an opportunity for the development of the largest Slovak transhipment point in Čierna nad Tisou. The makespan of operations at container terminals is crucial for the lead time of cargo and consequently the reduction of transportation costs. Therefore, an efficient transhipment and short storage of containers are demanded [4]. The transhipment point thus becomes one of the most important points of the two international direct transport regimes (CIM/SMGS) in rail freight transport.

Reducing costs and increasing efficiency are very important objectives for all service providers, which is made possible by a thorough survey of demand in this area. The excessive increase in transport intensity is one of the negative impacts on the economy [5]. In the end, what will decide which mode of transport will be chosen it depends on:

- cost of transport,
- ability to create networks,
- railway safety,
- environment protection [6].

Transport of goods in intermodal transport in Slovak republic (Table 1) is increasing. During last 20 years transport is more than 10 times higher what shows huge potential for intermodal transport.

![Table 1 Transport of goods in intermodal transport of Slovakia - transport of intermodal transport units (containers) by railway](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport of goods total (gross tonnes)</td>
<td>564 228</td>
<td>1 256 000</td>
<td>2 779 126</td>
<td>4 791 633</td>
<td>5 890 000</td>
</tr>
<tr>
<td>National</td>
<td>15 892</td>
<td>28 000</td>
<td>163 024</td>
<td>482 370</td>
<td>439 000</td>
</tr>
<tr>
<td>Export</td>
<td>116 909</td>
<td>388 000</td>
<td>1 129 479</td>
<td>1 980 692</td>
<td>3 213 000</td>
</tr>
<tr>
<td>Import</td>
<td>92 924</td>
<td>445 000</td>
<td>1 162 635</td>
<td>2 068 072</td>
<td>2 147 000</td>
</tr>
<tr>
<td>Transit</td>
<td>338 503</td>
<td>395 000</td>
<td>323 988</td>
<td>260 499</td>
<td>91 000</td>
</tr>
</tbody>
</table>

It is obvious that this significantly increasing transport of goods also requires an increase and a focus on automation. The big problem is related to railway transit, where problem is in the transferring many information, e.g. waybill, technical condition of the wagon, etc. [8].

2 Historical development of East Slovakian transhipments

After the end of World War II, the Slovak Railways were among the most damaged European railways and their restoration lasted until April 1946. In May of the same year, the construction of the railway transhipment yard in Čierna nad Tisou began. Thanks to the large area, in which there are wide and normal gauge tracks, Čierna nad Tisou is said to be the largest land port. On April 15, 1947, the wide gauge line built in Slovakia merged with the wide gauge line on Soviet territory. As early as the week of April 22, 1947, the first train from the USSR arrived in Čierna na Tisou after a wide gauge, and transhipment to normal gauge wagons began. In addition to tracks and equipment, facilities for the maintenance of locomotives, wagons and mechanisms were built in Čierna nad Tisou. In the first stage, 4 tracks of normal gauge were built, to which 4 and 3 tracks of wide gauge for transport and 1 track for transhipment were later added. The transhipment consisted of 1 wide track and 1 normal gauge track, which were next to each other. At one end was a wooden ramp 50 meters long. At the same time, a definitive transhipment ramp was being built, which they called the “covered ramp”. The scope and technical level of transport and transhipment facilities were low. In 1947, an average of 3,500 tons of goods was transhipped here. In the first years of operation of the transhipment facility, it was assumed that raw materials for the heavy and textile industries would flow from the eastern side of the border. However, the most intensive was goods with grain. The composition of transported and transhipped commodities was later influenced by the construction of Východoslovenské železiarne (East Slovak Ironworks) in Košice, as the transport of iron ore increased. The launch of the “Družba” pipeline in 1963 was also significant, as millions of tons of oil a year were stopped translating in Čierna nad Tisou. [9]

The requirements for transhipment increased and so it was necessary to build additional tracks and transhipment ramps.

Already e.g. in 1947, 700,000 tons of grain were transhipped there. Gradually, ore defrosting plants, pumping stations for oil products and other ancillary facilities were built here. The construction of the wide gauge line started from Matovce to Haniska near Košice, it is 106 km long in the Slovak Republic. At present, there are approximately 160 km of tracks and 500 switches on an area of 10 km2 at the transhipment point in Čierna nad Tisou.

3 Characteristics of East Slovakian transhipments

The East Slovak transshipments include:
- transhipment complexes in Čierna nad Tisou,
- wagons from wide gauge (1 520 mm) to normal gauge (1 435 mm) and
- modern Combined Transport Terminal in Dobra.

East Slovak transhipment points are of strategic importance on a European scale, especially in east-west transport, as they are the gateway to Central Europe. The Čierna nad Tisou transhipment yard provides the following services:
- transhipment, loading and unloading of goods,
- pumping of liquid substances,
- wagon strapping,
- determination of the weight of consignments,
- palletising, packaging and strapping of goods,
- detection of damage to wagon consignments,
- distribution of unloaded consignments,
- issue of a transit declaration,
- representation of the declarant on delivery of the customs declaration,
- delivery of transport documents,
- sending consignment notes and other documents to the carrier. [10]

Table 2 Types of transhipped goods in East Slovakian transhipments

<table>
<thead>
<tr>
<th>Naming of good</th>
<th>Types of transhipped goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>soft hardwood, raw wood</td>
</tr>
<tr>
<td>Iron ore</td>
<td>agglomerated, non-agglomerated, iron ore pellets and concentrate</td>
</tr>
<tr>
<td>Iron, steel products</td>
<td>angles iron, bars, rods, rolled products</td>
</tr>
<tr>
<td>Minerals</td>
<td>stone, gravel, salt, sand, kaolin</td>
</tr>
<tr>
<td>Coal</td>
<td>black and brown coal</td>
</tr>
<tr>
<td>Coke</td>
<td>anthracite and pitch coke</td>
</tr>
<tr>
<td>Chemical products</td>
<td>methanol, ethyl alcohol, benzene, various oils</td>
</tr>
</tbody>
</table>

Various types of transhipment machines and equipment are used for loading, because (as show Table 2) various types of transhipped goods are transhipment and unloading in East Slovakian transhipment points. Machines and equipment can be as follows:
- lifting devices,
- hydraulic excavators,
- universal front loaders,
- technological translation equipment,
- pumping complexes,
- tippers [10].
Tippers are used in modern transhipment facilities for transshipment of bulk substrates. They have more power than other transhipment facilities, unloading the wagon is automated.

Tipper types:
- side tippers - the load is dumped through the side wall, the wagon can be rotated by 150° - 175° around the axis, which is parallel to the track axis;
- front tippers - the load is dumped over the folded front wall of the wagon, tilting the wagon by 45° + 65° around an axis that is perpendicular to the track axis;
- rotary tippers - the load is dumped through the side wall of the wagon, the wagon can be rotated by 150° - 175° around an axis that is parallel to the track axis;
- combined tippers - in the longitudinal and transverse direction they tilt the closed wagon with the emptying of the load by the wagon door [11].

3.1 Workplaces in East Slovakian transhipment facilities in Čierna nad Tisou

The transhipment section is used to perform transshipment activities and manage transhipment according to customer requirements. It is important that customer service is performed in a quality and timely manner, adhering to all technological and safety procedures. The transhipment section consists of the following circuits:
- ore;
- heavy machinery;
- light mechanization;
- overdrafts.

The above-mentioned districts provide transhipment, unloading and loading of goods such as wood, coils of steel sheets, loose lumber, rails, coke, anthracite and other goods. There is also a transfer from wide gauge to normal gauge and from normal gauge to wide. Transhipment ramps, on which bridge and gantry cranes are located, are used to fulfil and perform the required services and works. The employee is responsible for the activities of individual districts and work on transhipment ramps is organized by warehouse masters and warehouse supervisors. Transhipment ramps allow you to work in continuous operation.

Within these districts, there are individual workplaces where transhipment activities are carried out. The first district is the Ore District, which is divided into the following individual ramps:
- general ramp,
- high ramp I. - III.,
- sub-high ramps I. - IV.,
- Eastern South / North Ramp,
- II. ore ramp.

General ramp – use for transshipment of bulk substrates such as agglomerated iron ore, non-agglomerated iron ore, pellets and other bulk substrates. Transhipment is performed using hydraulic crawler excavators, which are equipped with a hydraulic grab. The maximum capacity of this ramp is 6,500 tons in 24 hours.

High ramp I. - III. - is intended for storage of bulk substrates for unloading pellets and iron ore. There is a rotating tipper on the high ramp III.

Sub-high ramps I. - IV. - perform iron ore loading and freight adjustment in NR (normal gauge) wagons when weighing them on a rail scale.

Eastern ramp - southern is used for transhipment of logs and stem-wood. Transhipment is performed using 2 hydraulic belts of excavators type DH 411 and Liebherr 934. The maximum capacity on this ramp is 1800 tons in 24 hours.

Eastern Ramp - north is used for transhipment of ferrous metals, iron ore and other ores. Transhipment is carried out using 2 hydraulic excavators type DH 411 and Liebherr R 932. The maximum capacity on the north east ramp is 4,300 tons in 24 hours.

II. ore ramp - used for transhipment of pellets, ferroalloys, titanium ore, coal, coke and other granular goods. Transhipment is performed using 2 pieces of hydraulic belts of type DH 28.1. Maximum capacity for II. ore ramp is 4,300 tons in 24 hours.

The second circuit is the Heavy Mechanization Circuit, which is divided into the following ramps:
- new meat ramp,
- I. ore ramp,
- old container ramp,
- portal ramps,
- container ramp.

New meat ramp - use for transhipment of pellets and coke. Transhipment is performed using 3 gantry cranes. The maximum capacity on the New Meat Ramp is 2,000 tons in 24 hours.

The ore ramp is used for transhipment of steel scrap, ferrous metals, ilmenite, pellets, logs and wood. Transhipment is carried out using 4 bridge cranes with a capacity of 12.5 tons. The maximum capacity on the I. Ore Ramp is 2,400 tons in 24 hours.

Old container ramp - use for transhipment of bulk substrates and loading of iron ore on heaps. Transhipment is performed using one hydraulic excavator.

Portal ramps - are used for transhipment of metallurgical products, machinery, ferrous metals, iron scrap, bar steel, pig iron, sheet steel, transformers, crates, marble, logs, etc. The portal ramps form 2 crane tracks. Transhipment is carried out using bridge cranes with a load capacity of 80,000 / 12,500 kg and 25,000 / 8,000 kg. The maximum capacity is 2,000 tons in 24 hours.

Container ramp - is used for reloading, loading and unloading of sheet steel, bar steel, big-bag bags. It is used for loading goods on road vehicles from the storage area or from the railway wagon. There is also a customs warehouse, which has a 600m2 storage area. The
maximum capacity of the Container Ramp is 900 tons in 24 hours.

Technological equipment of the Heavy Mechanization Circuit:
- new meat ramp - 3 gantry cranes, 2,000 tons / 24 hours,
- ore ramp - 4 bridge cranes, carrying capacity 12.5 t, 2,400 t / 24 hours,
- portal ramps - 6 bridge cranes, carrying capacity 25 and 80 t, 2,000 t / 24 hours,
- container ramp / portal ramps, KPS cranes, load capacity 36 t, 900 t / 24 hours.

The third circuit is the Light Mechanization Circuit, which is divided into the following ramps:
- loading platform Nr. I and II.,
- customs ramp,
- transporter ramps,
- loading platform Nr. III.

Loading platforms I. and II. - loading platforms is used for transhipment of aluminium, zinc, non-ferrous metals, nickel sheets, cellulose boxes, cotton, rubber, fibbers, chemicals in barrels, raw hides, rolls of paper and loose substrates such as ferroalloys and magnetite. Forklifts and front loaders are used for transhipment. The maximum capacity of the Loading platforms is 1,400 tons / 24 hours.

Customs ramp - on this ramp there are 2 customs warehouses, which are used for storage of goods. The customs warehouse consists of 2 steel halls, one of which is prefabricated and have dimensions of 20 m + 7.85 m. The capacity of customs ramps depends on the area in the halls. The maximum capacity of the Customs Ramp is 250 tons / 24 hours.

Transporter ramps - NT-6 is used for transhipment of bulk feed, salt and cereals in covered wagons with wide gauge to normal gauge wagons. Belt transporters and mechanical shovels are used for transhipment. The maximum capacity of the Transporter Ramp is 750 tons / 24 hours.

Loading platform Nr. III. - is used for the transhipment of bulk substrate such as salt. A mechanical shovel, winders, conveyors (screw, belt, bucket) are used for reloading. Maximum capacity of the Loading platform Nr. III. is 750 tons / 24 hours.

The fourth circuit is the Pumping Circuit, which is divided into the following:
- old complex 6/8,
- new complex 8/8, x
- complex 12/12 and
- EDC pumping complex.

The old complex 6/8 is used for pumping kerosene, petrol, diesel, gas oil, fuel and heating oil. HUNA 611 DF centrifugal pumps are used for pumping. The maximum capacity of this complex is 360 tons in 24 hours.

The new 8/8 complex is used for pumping technical oils, alcohol derivatives, fuels, various liquids and acetates.

In the complex, the units are divided as follows: pumping points, pumping station, operating building and dispatching. The new complex consists of normal and wide gauge tracks, between which there is technology that is used in the pumping station. It allows pumping 8 wagons, and the total output is 3,600 tons in 24 hours. Management and control of the pumping system is from the dispatching building. Control and management are performed using a control system; part of this process is the weighing of rail tankers at the entrance and exit to the complex.

Complex 12/12 is used for pumping fuel, kerosene, gas oil from wide gauge wagons to normal gauge wagons and vice versa, "bottom through drain valves or top using RPP 150 gear pump."

The EDC pumping complex is used for pumping hazardous substances of crude benzene and oil into normal gauge wagons from wide gauge wagons and vice versa by means of discharge valves. The maximum capacity of this complex is 1,100 tons in 24 hours.

3.2 Three subsidiaries of ZSSK CARGO and their missions

The railway company Cargo Slovakia, a.s. was established as one of the two newly established successor companies on January 1, 2005 by the division of the former passenger and freight transport operator - Železničná spoločnosť, a.s. Its activities follow the 180-year history of railways in Slovakia. The owner, founder and 100% shareholder of the Railway Company Cargo Slovakia, a.s. is the Slovak Republic. The Ministry of Transport and Construction of the Slovak Republic acts on behalf of the government. From a business point of view, the main product of the Railway Company Cargo Slovakia, a.s. (hereinafter ZSSK CARGO) is the performance of commercial and transport activities on the railways and the focus on the implementation of transport and transportation services in freight transport. The second main product is services related to the rental of rolling stock and their repairs and maintenance. The decisive activity for the company is the transport of goods such as iron ore, coal, wood, etc. The company's product portfolio includes the following services:
- carriage of wagon consignments,
- automotive,
- intermodal transport,
- services in East Slovakian transhipment,
- support services.

3.2.1 Bulk Transhipment Slovakia, a.s. (BTS)

The company is the operator of the fully automated technology of the transhipment complex in Čierna nad Tisou. The unique technology of transhipment of bulk substrates - rotary tipper - supports, in addition to direct transhipment, also indirect transhipment with the possibility of storage under a high ramp along its entire length. The complex has a defrosting hall. The transfer of
bulk substrates from wide gauge wagons to normal gauge wagons is ensured by two fully automated workplaces:
- West transhipment complex
- East transhipment complex.

The annual transhipment performance in continuous operation is 4.8 mil. tons [12].

The complexes provide transhipment of pellets, iron ore, concentrate, coal and coke. The main technological elements of both workplaces are rotary tippers. Unloading of goods with a rotary dump truck significantly reduces damage to the SR of wagons and speeds up the transhipment process (as show Fig.1). During loading, the normal gauge wagon is placed on a static rail scale ensuring official weighing of the wagon tare, the net weight of the substrate and the final gross weight of the wagon. In cooperation with the mobile conveyer, it also ensures an even distribution of the goods in the wagon. The direct transhipment system is an automated process controlled from the operations centre - control room, by two operators.

The complex is equipped with water curtain technology and air conditioning for the greening of the operation. Another advantage of transhipment is the possibility of technological wetting of substrates to temporarily limit the freezing of the substrate in the winter, whereby the end customer significantly shortens the thawing in its defrosting halls and the stay of wagons at unloading. The West transhipment complex also has a customs warehouse on an area of 5,418 m². It allows the storage of bulk substrates under customs supervision in quantities of up to 50,000 tons.

The transhipment yard is used for bulk substrates with the main focus on ore, intended for steel production. Even today, some types of goods are unloaded using excavators, but the transhipment facility handles it much faster. Thanks to the tippers, this process takes about 5 minutes, which means that one wide-gauge wagon is transferred to normal-gauge wagons in 5 minutes. In 2.5 to 3 hours, a complete set of normal gauge is loaded or unloaded.

The whole transhipment process begins with the arrival of the wide-gauge set up the ramp to the dump truck building. In it, the loaded wagon is disconnected from the towing equipment set and moved to the rotary tipper.

The wagon is fixed and rotated 175 degrees, so it is turned up by the wheels. It takes 120 seconds and 69-70 tons of goods are unloaded into stock bins.

Handling of piece goods is carried out at the workplace: East ramp - Portal.

The gantry double-girder crane creates conditions for direct transhipment from wide gauge wagons to normal gauge wagons and vice versa, as well as indirect transhipment with restocking, or transhipment from / to road motor vehicles. The telescopic traverse with four electromagnets enables the transfer of ingots up to 35 tons, coils and also sheet metal sheeting. If necessary, it is possible to use one of the four types of grabs for reloading wood or bulk substrates.

The gantry crane offers an expansion of the company's commodity offer of transhipment services with the possibility of reloading goods in a customs regime. The crane handles the goods on a 600m long track. The load capacity on the main lift is 50t and the auxiliary lift has a load capacity of 12.5t. From the south side, it has a side unloading of 8 m, which allows unloading of goods on a new paved panel area with an area of 5,000 m². Another usable area for reloading goods is the ramp area with an area of 7,200 m².

By establishing and operating a customs warehouse, the company is able to ensure the storage of goods under customs supervision without being subject to customs duties and other charges payable on the importation of goods into the territory of the European Union.

### 3.2.2 Cargo Wagon, a.s.

The main activity of the company is the management of the freight wagon fleet. The company provides rental of wagons to ZSSK CARGO and to the external environment.

### 3.2.3 ZSSK Cargo Intermodal, a.s.

Back in 2015, there was an effort for a qualified investor to join the subsidiary ZSSK CARGO Intermodal, a.s., focused on the implementation of intermodal transport. Although four companies took part in the tender, only one complete tender and three notices of decision not to submit a tender were finally received by the deadline. However, the only offer submitted by the investor EP Cargo did not meet the expectations of ZSSK CARGO. Three companies - the Russian company TransContainer, the Chinese company Bondex Logistics and the Slovak company Railtrans International - took part in the competition, but did not submit a bid. Therefore, in the end, the selection of a qualified investor was not made and the company's management was advised to consider further options for the development of intermodal transport and system solutions through support activities within the parent company.
4 Possibilities of East Slovakian transhipment points

As of March 1, 2022, the selected transhipment activity and part of the transport service were separated from the East Slovak transhipment sections. They will be provided through a subsidiary of BTS. The trial operation of the new model of transhipment organization was introduced in Čierna nad Tisou on 1 December 2021. This means that on the first of December, there were changes in the East Slovakian transhipment section concerning transhipment activities not only in work organization, but also in the personnel area [13].

The changes, which had been prepared for a long time, were mainly due to a reduction in transported volumes and more efficient transhipment. The historically high volumes, which in Čierna nad Tisou decades ago reached the limit of 12 million tons, are now halved. In recent years, shipments have been at the level of 6-7 million tons per year. The transhipment facility in Čierna nad Tisou provides transhipment services for several types of commodities, but the highest share, almost 90 percent of the total volume belongs to iron ore and the remaining percent is divided between coal, metals, building materials, chemistry, wood and intermodal transport in 2021 belonged only 0.32 percent. Since the start of operation of both rotary dumpers, approximately 70% of the goods have been transferred using modern technology, and only a small part has been handled at ZSSK CARGO, which meant high fixed costs.

In the area of transhipment of bulk materials, the main goal is to maximize the use of modern automated transhipment complexes, which can carry out this activity with lower operating costs compared to transhipment by excavators. Transhipment on automated dump trucks is at a high quality level and without damaging the wagons. New technologies thus replace the work of excavators and excavators as much as possible.

4.1 Proposals for the rationalization of the Čierna nad Tisou transhipment point

The use of individual ramps varies, but none is used to 100% of its capacity. For a long time, the most used are the Municipal ramp, where mainly iron ore and ferrous metals are transferred, then II. Ore ramp where ferrous metals and iron ore are also handled. The used ramps also include the Eastern ramp, the I. Ore ramp and the Meat ramp. Of course, the most used ones also include Rotary tipper and Pumping complexes. It is important to realize that 100% use of the Rotary tipper is not possible, as downtime may occur during the transhipment of goods due to the technical capabilities of the tipper as well as the arrival of wagons by the transhipment operator.

The use of rail transport can also be increased by introducing a combined transport system. The development of combined transport has created space for the construction of intermodal transport terminals in the Slovak Republic, while currently there are 9 of them. TKD Dobrá is located in close proximity to the Čierna nad Tisou transhipment station, so when it started its operation, an agreement was made that there would be no transhipment facilities in the Čierna nad Tisou stacked intermodal transport units. This means that the Container ramp, which was designed for the transhipment of intermodal transport units in Čierna nad Tisou, remained unused. At the same time, this ramp it has one gantry-bridge crane of high capacity. Therefore, the transhipment capacity of this ramp is used for transhipment of metals. It is not only impractical, but also dangerous to handle long sections of metal semi-finished products with one crane. When loading longer and heavier steel ingots, the technology of synchronous transhipment with two gantry cranes on gantry ramps is used, which cannot be done with one crane. Therefore, only shorter steel ingots can be transhipped at the Container ramp, which significantly disadvantages the competitiveness of this transhipment area.

4.2 Advantages and disadvantages of East Slovakian transhipment points

East Slovakian transhipment points have several advantages:
- experienced and professional workers,
- the transhipment point is the gateway to Central Europe,
- transhipment of goods is in one place,
- the largest transhipment center that offers a wide range of services between the Slovak Republic and the Republic of Poland,
- a popular and recognized transport company on the railway transport market.

Among disadvantages are:
- military-political situation in Ukraine,
- high rate of wear and tear of the machine park,
- insufficient and uneven use of transhipment capacity,
- unbuilt border crossings,
- indebtedness of the company.

These disadvantages give possibilities for the development of the transhipment point. The main areas suitable for development are:
- modernization of information technologies,
- modernization of transhipment technology,
- development of business and operational activities,
- reducing negative impacts on the environment.

5 Result and discussion

The border crossing station Čierna nad Tisou, which is located on a large area, has several workplaces. At the same time, it has a lot of mechanization equipment. It has a new pumping complex in operation, which is intended for
pumping liquid commodities and also a rotary wagon tipper, which is intended for transhipment of ore.

The East Slovak transhipment points are not only characterized by a change in gauge, but also by a change in the transport mode, thanks to which the East Slovakian transhipment points are also equipped to perform and provide transport and procurement services. Different legislation regarding transport documentation acts as a limiting factor. Increasing performance also requires fast processing of trains, which is possible thanks to a suitable information system. However, it must be fully compatible with the advanced information systems of neighbouring countries.

Another challenge facing Eastern Slovakian transhipment points is the fact that today around 12,000 trains are transported from the Far East and back via Belarus and Poland, but only a few dozen go through the Slovak terminal in Dobra. Neighbouring states support this segment mainly through subsidies per container in various modes of division.

6 Conclusions

The Slovak Republic is interested in achieving growth in rail transport. This is also the goal of the transport policy of the European Commission. Within the EU, the transition of a significant part of goods flows, especially over longer distances, from road to rail. Especially in the interest of the sustainability of freight transport and ecology. However, this will not be possible without the respective measures of individual member states. Several European countries are already taking steps leading to, for example, the support of intermodal transport, the support of the system of individual wagon shipments, and others.

The largest railway transhipment station in the Slovak Republic is located at the Slovak-Ukrainian border near the town of Čierna nad Tisou. Its biggest advantage is that it extends at the meeting of two gauges, namely the wide so-called Russian and normal so-called European gauge. Its advantageous position lies in its allocation and the fact that it is located at the mouth of the Carpathians, on the Schengen border and at the same time in the center of Europe on the fifth transport corridor.

The favourable geographical location together with the possibility of possible expansion of the terminal gives the transhipment a significant competitive advantage. On the other hand, there is outdated infrastructure, which in some cases has not been modernized for decades, and there are no funds available for development. East Slovak transhipment stations are not using their capacities. They also offer only limited services to their customers and overall promotion is low.

Increasing the quality and reliability of rail transport as well as developing transport infrastructure and strengthening international cooperation is also an opportunity for East Slovak transhipment points. However, this goes hand in hand with the demand to improve the position of eastern Slovakia, especially from the point of view of insufficient and undeveloped infrastructure.

East Slovakian transhipment points face the challenge brought by the future in the form of rising input prices, increasing competition and, above all, a lack of support from the state, which does not realize that it is necessary to invest in state transport infrastructure and support logistics in the field of international transport of goods.

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References

[7] Ministry of Transport and Construction of the Slovak republic. Available: https://www.mindop.sk/statistiky-15/statistiky/?filter%5Bsector%5D=18&filter%5Barea%5D=122&filter%5Bterm%5D=&filter%5B_token%5D=egRpXmZeuaF5YW3_IR8ebNiWAlSvDxKrkHnx4XkSio [25 May 2022], 2022. (Original in Slovak)
[9] Railway transhipment point Čierna nad Tisou, [Online], Available: https://www.retromania.sk/1950-
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Review process
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