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ЭКОСИСТЕМА ТРАНСПОРТА: ОБЩЕСТВО, ГОСУДАРСТВО И ГЛОБАЛЬНЫЕ ВЫЗОВЫ

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State and growth of container cargo flow in Russian railway transport (during COVID-19 pandemic)

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ABSTRACT The COVID-19 pandemic period in rail freight transportation in Russia is marked by indicators of rapid growth of transit traffic, export and import volumes, the average speed of transportation increase and delivery speed of transit container traffic. The positive dynamics point to the necessity of continuing research in the field of improving the quality of service in this sector of the railway industry.

Information materials of transport and logistics companies services were used. The methods and technologies used to improve the quality of service in railway transport were analyzed: reducing the delivery time of goods, increasing the average delivery speed of transit container traffic, identifying the most demanded nomenclature of goods, increasing the total volume of transit container traffic in Russia.

Currently, according to the approved Complex Plan of Modernization and Expansion of Mainline Infrastructure, by 2024 the estimated delivery time of transit container transportation across Russia in the West-East direction should be seven days, average delivery speed of transit container traffic should reach 1319 km/day, and the volume of transit container transportation should reach the level of 1656 thousand TEU (Twenty-foot equivalent unit). In this regard, it is necessary to develop a reliable methodology for determining the perspective volumes of container transportation in regular, express and high-speed trains with the identification of the most demanded nomenclature of cargo, taking into account the speed of delivery.

KEYWORDS: railway transport; JSC "Russian Railways"; COVID-19; freight traffic; transit; international transport corridors; accelerated container trains

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Научная статья

Состояние и рост потока контейнерных грузов на железнодорожном транспорте России (в период пандемии COVID-19)

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АННОТАЦИЯ Период пандемии COVID-19 в области грузоперевозок железнодорожным транспортом в России отмечен показателями стремительного роста транзитных перевозок, объемов экспорта и импорта, увеличением средней скорости перевозки и скорости доставки транзитного контейнеропотока. Положительная динамика указывает на необходимость продолжения исследований в области повышения качества обслуживания в данном секторе железнодорожной отрасли.

Использовались информационные материалы сервисов транспортно-логистических компаний. Анализировались применяемые методы и технологии в области повышения качества обслуживания на железнодорожном транспорте: сокраще-

ние сроков доставки грузов, увеличение средней скорости доставки транзитного контейнеропотока, выявление наиболее востребованной номенклатуры грузов, увеличение суммарных объемов транзитных контейнерных перевозок в России.

В настоящее время согласно утвержденному Комплексному плану модернизации и расширения магистральной инфраструктуры к 2024 г. прогнозируемые сроки доставки транзитных контейнерных перевозок по России в направлении Запад – Восток должны составить семь суток, средняя скорость доставки транзитного контейнеропотока достичь 1319 км/сут, а объемы транзитных контейнерных перевозок выйти на уровень 1656 тыс. ДФЭ (двадцатифутовый эквивалент, от англ. Twenty-foot equivalent unit — TEU). В связи с этим необходима разработка надежной методики определения перспективных объемов контейнерных перевозок как в обычном, так и в скоростном и высокоскоростном движении поездов с выявлением наиболее востребованной номенклатуры грузов с учетом скорости их доставки.

КЛЮЧЕВЫЕ СЛОВА: железнодорожный транспорт; ОАО «РЖД»; COVID-19; грузопоток; транзит; международные транспортные коридоры; ускоренные контейнерные поезда

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INTRODUCTION

In 2021, the total volume of containers transported by Russian railroads totaled 6.5 million TEU, and for the first time in transit traffic reached the level of 1 million TEU (twenty-foot equivalent unit) [1]. It is interesting that 93 % of these transit services are accounted for by a new type of service — transportation in container trains.

As experts note, due to transportation in container trains, there is a growth in container traffic in general. According to statistics, in 2021 the number of container trains simultaneously in motion in the range of Russian railroads (*Fig. 1*) on some days exceeded 700 units and accounted for 15 % of all network trains. This is higher than in the previous two years: in 2020 — 550 trains (10 % of all network trains), in 2019 — 400 trains [1].

MATERIALS AND METHODS

The growth of container transportation is explained with the high pace of development of two major subsidiary enterprises of JSC “Russian Railways” — JSC “Russian Railways Logistics” and JSC “United Transport and Logistics Company — Eurasian Railway Alliance” (JSC “UTLC ERA”).

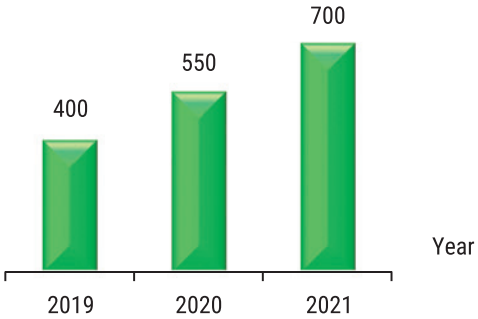

Fig. 1. The number of container trains simultaneously in motion on the Russian rail network’s polygon on a single day [1]

JSC “Russian Railways Logistics” is a huge logistics operator, which carries out transportation along the international transport corridors (ITC) East – West and North – South. In the direction of ITC East – West on the route China – Europe – China delivery time by express container trains is 14 days. All transit transportation is carried out through Russia, Mongolia and Kazakhstan. The main transit routes include the following directions: China – Europe, Korea – Europe (through China), Japan/Korea – Europe.

Since October 2016, the company is the first operator on the North-South ITC (route Mumbai (before 1995 – Bombay, India) – Moscow – Mumbai). Regarding the Caspian Sea region, the North – South ITC includes the following routes: Trans-Caspian (through the ports of Astrakhan, Olya, Makhachkala), Eastern (direct rail service through Kazakhstan, Uzbekistan and Turkmenistan) and Western (Astrakhan – Makhachkala – Samur, then through the territory of Azerbaijan to the planned border station Astara). The new 7,200 km western route from St. Petersburg to the port of Mumbai is a good alternative to the existing sea route through the Suez Canal.

In May 2019, the RZDL Trans-Siberian LandBridge service was launched for accelerated delivery of container cargo from Japan and Korea to Europe (up to 19 days) via the port of Vladivostok and the Trans-Siberian Railway.

JSC “OTLK ERA” is a joint project of Russia, Belarus and Kazakhstan to provide international rail transport. During the COVID-19 pandemic (2019–2020), the company became a leader in the Eurasian rail transit market. Over the past six-year period, there has been a steady growth in traffic volumes. In 2021, the transport network includes 84 new directions, 15 of which on the route Europe – China and 69 in the opposite direction the volume data for 2021 is almost seven times higher than in 2016 (*Fig. 2*). The specialists of

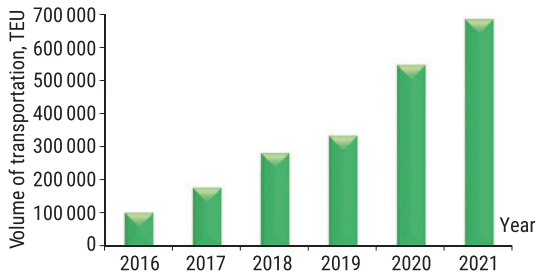

Fig. 2. JSC "OTLK ERA" transportation volumes [4]

JSC "OTLK ERA" forecast an increase in transportation speed to 1350 km/day and a reduction in transit time to 4 hours/day by 2024.

RESULTS OF RESEARCH

The results of growth in cargo transportation by railways in 2021 in comparison with the indicators of 2020 are as follows [1]:

- the share of transportation in the country increased by 6 %;
- the volume of exports — by 8 %;
- the volume of imports — by 14 %;
- the increase in transit traffic is 36 %;
- the share of loaded container shipments (of the total volume of container transportation by 2,9 %;
- the increase in the average speed of transportation was 830 km/day;
- the increase in the speed of delivery of transit container traffic — 1050 km/day (the forecast for 2024 — 1300 km/day).

In the conditions of the limited traffic-capacity of the Eastern Polygon, the use of technology for the organization of the passage of combined container trains is very relevant. According to published data, more than 4 thousand container trains will be transported in 2021 using this technology, which is 40 % more than in 2020. [1].

Experts say that one of the factors that guarantee the future growth of container transportation and optimization of time of delivery by the Russian railroads is stability of business relations between the countries of Asia – Pacific region and Europe.

Currently, JSC "Russian Railways" together with JSC "FGC" and JSC "Railway Research Institute" are developing technologies for accelerated container transportation at a speed of up to 140 km/h. The prototypes of the platform are being tested [1].

Work is constantly being done to modernize the railway infrastructure in order to increase the throughput capabilities of the container flow at the most in-demand sections and directions [2].

For the growth of transit container traffic on the East-West ITC route, most attention is paid to the development of railway checkpoints, in particular at the border crossings with China.

The holding company JSC "Russian Railways" participates in the federal project "Transport and Logistics Centers" (TLC). The aim of the project is to form multimodal freight hubs with a total capacity of at least 52.9 million tons to ensure the growth of the average commercial speed of goods movement by rail transport up to 417 km/day.

In 2022, a 2.2 km long railway bridge across the Amur River on the Russian-Chinese border section Nizhneleninskoye – Tongjiang was launched, reducing the route from Heilongjiang Province to Moscow by more than 800 km. The specific feature of the structure is a double track design for alternate passing of trains from 1520 mm rail gauge to Chinese rail gauge (1435 mm) [3].

As for the nomenclature of container cargo, for the past year 2021 positive growth dynamics was observed for all types of cargo, in particular: industrial goods — by 28 %, chemicals — 8 %, ferrous metals — 22 %, timber — 10 %, food — 19 %, higher than the previous year. Special attention is nowadays paid to the transportation of alimentary goods, such as fish products by refrigerator container (reefer).

In October 2021, the Far Eastern Railroad's loading of fish and fish products was 87.4 thousand tons, a record high for the past 10 years, and for the year — 700 thousand tons, which is 150 thousand tons more than in 2020 [1]. The positive dynamics is also noted in 2022 (*Fig. 3*). The total volume of fish products in the first half of the year amounted to 354.6 thousand tons, which is 19.6 % higher than the result for the same period of 2021 [4]. Market participants in this sector affirm that the growth of volumes is associated with the reorientation of cargo flows from road to rail transport and predict the preservation of positive dynamics.

In Russia today the largest transport and logistics center Vostok – West at the station Chernyakhovsk in Kaliningrad region is implemented. In 2019–2021 the volume of containers transit through the Kaliningrad region has increased by 7 times. The new transport and

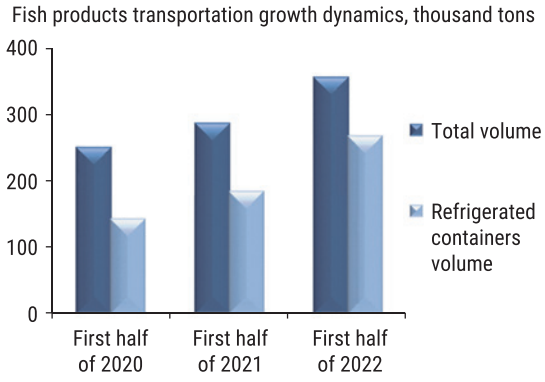

Fig. 3. Volumes of fish products transported by rail from the Far East [4]

logistics center is unique in having Russian and European railway gauge formats, is equipped to handle up to 450 thousand TEU per year and in the future can become one of the key transport and logistics hubs on the new Silk Road [5].

Express (specially organized) container trains (ECT) significantly save resources on sorting and other intermediate costs compared with single shipments [6]: the cost and delivery time is reduced. ECT can master up to 15 % of the existing volume of transit from China to Europe with the launch of new container trains in the amount of 11–16 million tons annually. The main difference between the effective operation of the ECT is regular dispatch starting from 57 conditional cars. As soon as the transit delivery time of the ECT reaches 15 days, and the train departs with a delay of one week (for example, due to weak accumulation), the use of the ECT becomes inefficient.

CONCLUSION

Represented data, as well as the research [7] show that container rail freight transport is in high demand and has a positive growth dynamics. According to the Complex plan of modernization and expansion of mainline infrastructure for the period up to 2024, by 2024 delivery time of transit container transportation in the direction West – East (Krasnoe, ports and border crossing of the North – West – Naushki, Zabaikalsk, ports and border crossing of the Far East) should reach 7 days, the average speed of transit container flow to reach 1319 km/ day, and the volume of transit container shipping to reach 1656 thousand TEU. In this regard, it is necessary to develop a reliable methodology for determining the prospective volume of container traffic in both regular and express and high-speed train traffic [8, 9].

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