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STATE AND DIRECTIONS OF TRAVEL FARM DEVELOPMENT BELARUSIAN RAILWAY

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The track economy is the most important branch of the republic's railway transport, on the state of which the robotic capacity of the entire railway depends. The normal functioning of the track facilities is impossible without the use of modern resource-saving technologies, high-performance and modern technology, without the regular provision of materials for the repair and maintenance of the track.

The purpose of the article is to analyze the state of the track and its main elements. The main task is to ensure the safety of train traffic. As shown by the safety analysis in 2020, 9 events were admitted related to the violation of traffic safety rules and the operation of railway transport. To ensure the safety of train traffic, it is necessary to study a number of issues on the maintenance of continuous-welded rail strings, including avoiding lateral wear by re-laying them, reducing the number of defective rails, including through the introduction of aluminothermic welding and surfacing of rails.

In 2020, due to the implementation of the repair program and according to the actual state of the track, train speeds were increased by almost 350 km.

In order to further strengthen the track facilities of the Belarusian Railway, ensure the safety of train traffic and increase the efficiency of planning of labor and material resources, in 2020, the Program for the repair of railway tracks of the Belarusian Railway for 2021 - 2023 was developed.

The implementation of the Program for the repair of railway tracks of the Belarusian Railways for 2021 - 2023 will allow to exclude kilometers of railway tracks with overdue repairs available as of 01.01.2021 and prevent an increase in their number in subsequent years.

Key words: railway, track facilities, economics, technology, track.

СТАН І НАПРЯМКИ РОЗВИТКУ КОЛІЙНОГО ГОСПОДАРСТВА БІЛОРУСЬКОЇ ЗАЛІЗНИЦІ

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Шляхове господарство - найважливіша галузь залізничного транс-порту республіки, від стану якої залежить роботоспроможність всієї залізної доро-ги. Нормальне функціонування колійного господарства неможливо без застосування сучас-сних ресурсозберігаючих технологій, високопродуктивної і сучасної техніки, без регулярного забезпечення матеріалами для ремонту і утримання колії. Реалізація Програми ремонту залізничних колій Білоруської залізниці на 2021 - 2023 роки дозволить виключити

кілометри залізничної колії з простроченими зро-ками виконання ремонтів, наявні на 01.01.2021, та не допустити зростання їх кількості в наступні роки.

Ключові слова: залізниця, колійне господарство, економіка, техніка, шлях.

Problem statement. The Belarusian Railway is one of the main links of the transport and economic complex of the country and occupies an important place in the life support of the Republic of Belarus and its multi-industry economy. Track management is the most important branch of railway transport in the republic, on the condition of which the robotability of the entire railway depends. The normal functioning of the track economy is impossible without the use of modern resource-saving technologies, high-performance and modern equipment, without regular provision of materials for the repair and maintenance of the track. The working capacity of the railway, the speed of trains, the capacity of sections and the safety of traffic depend to a great extent on the state of the track economy and its arrangements.

Analysis of recent research and publications. Interest in the development of the track economy is constantly growing. The Belarusian State University of Transport [1, 2], the All-Russian Research Institute of Railway Transport [3], the Ukrainian Universities of Railway Transport [4, 5] and other scientific centers are engaged in the study of the development of the track economy. General trends in the analysis of the works of foreign scientists dealing with this problem can be distinguished in three directions: organizational, technological and technical [6, 7].

Highlighting the unsolved parts of a common problem. To date, the role and importance of the track economy continues to prevail among the main services, as it accounts for more than 50% of the funds of the entire Belarusian Railway. As of 01.01.2021, the track economy of the road is 11,729. 7 km of the developed length of railway tracks, of which 7,231. 7 km are main, 3,621. 2 km are station tracks and 876.8 km are non – public, more than 12 thousand switches, 1,744 crossings, 4,426 artificial structures, including: 1,913 bridges, 2,467 pipes, 46 pedestrian bridges.

As you know, the capacity of the upper structure of the track is largely determined by the state of the rail economy. In 2020 (figure 1) completed:

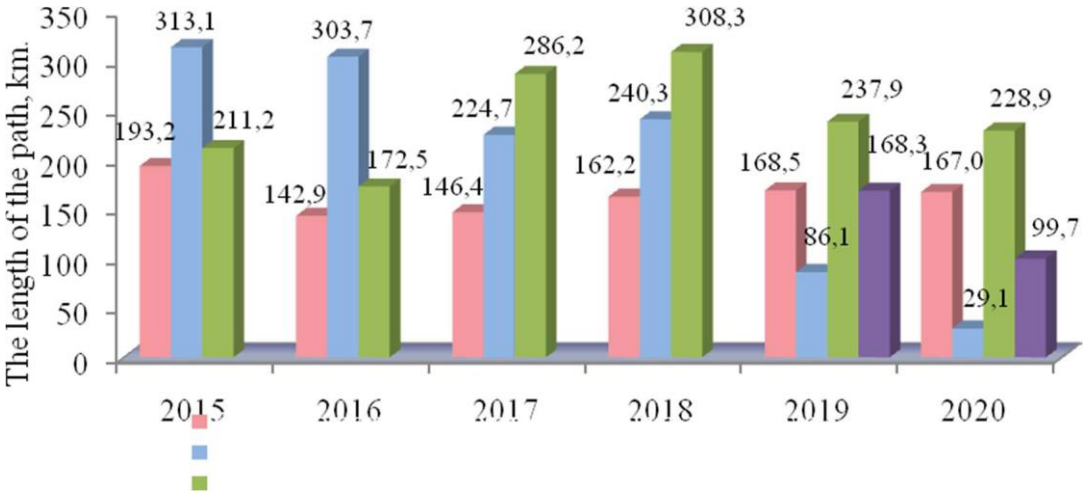

Fig. 1. Completed repairs

– restoration of the track on new materials 167.0 km or 100.7 %, on old materials 99.7 km or 108.3 %;

– average repair of 29.1 km or 145.5 %;

– laid lashes of a non-jointed track of 228.9 km or 108.2 %;

– replaced 239 sets of switches or 97.6%, of which – 204 sets on reinforced concrete beams.

Along with this, work was carried out to strengthen the switch economy by relaying 216 sets of oldfashioned switches. Also in 2020, work was carried out to preserve 15.1 km of rail weaves.

At present, there are no inventory rails on the fronts of the restoration repair of the track on new materials, and there is one long-term warning on the road about the speed limit of trains at the Minsk branch in connection with the construction of the second transport ring in Minsk.

In 2020, due to the implementation of the repair program and the actual condition of the track, train speeds were increased by almost 350 km. The length of the main track (figure 2) on a reinforced concrete base is 7,077.6 km or 98 %, of the station tracks – 2,365. 3 km or 65 %, the non-jointed track is laid on 4,797. 8 km or 66% of the length of the main tracks (figure 3).

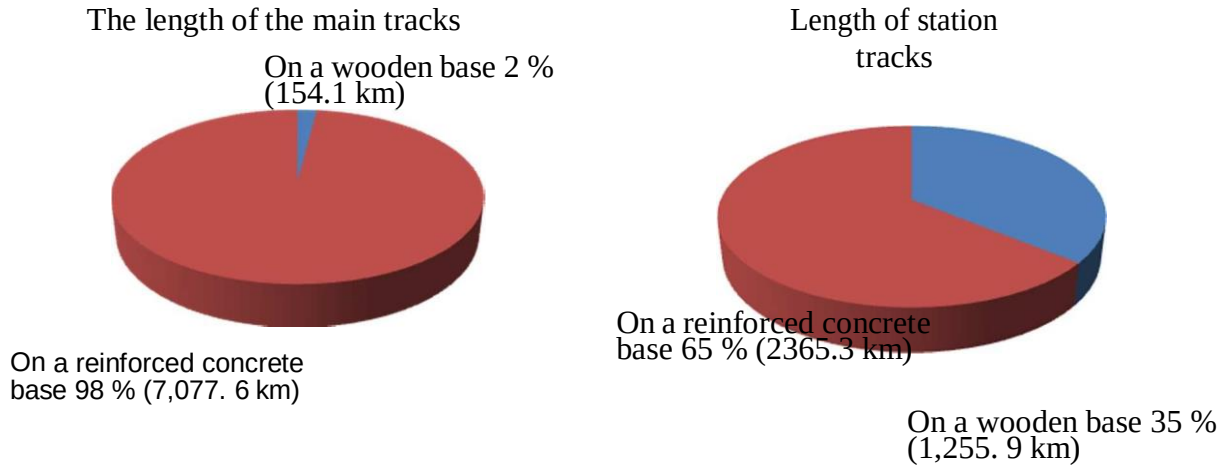

Fig. 2. Length of main tracks

In the main and receiving routes, 3,480 sets of switches were laid on a reinforced concrete base, which is 53 % of the total number.

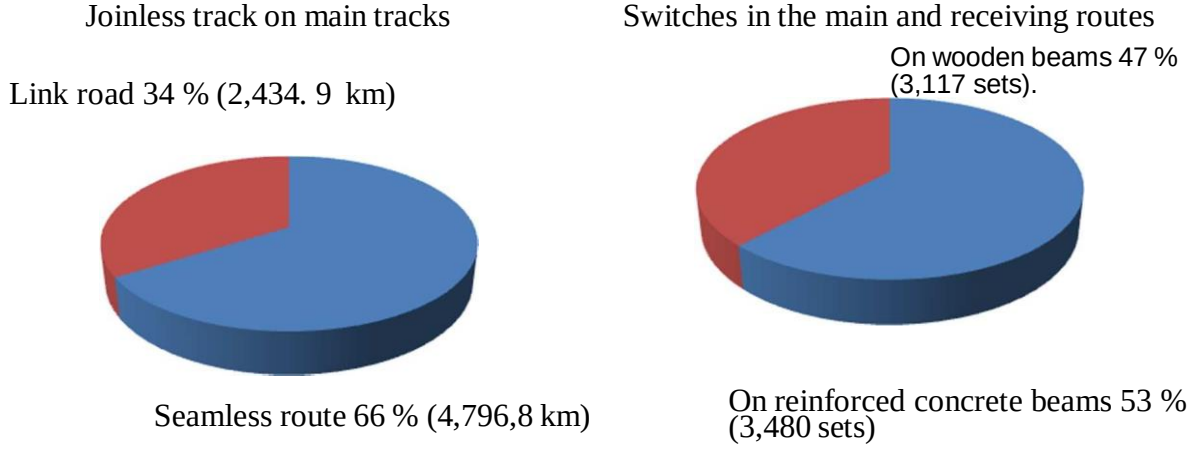

Fig. 3. Characteristics of the structure of the railway track and switches

As of 01.01.2021, the number of kilometers with excess repair deadlines is 545 km or 7.5 % of the length of the main tracks (Figure 4).

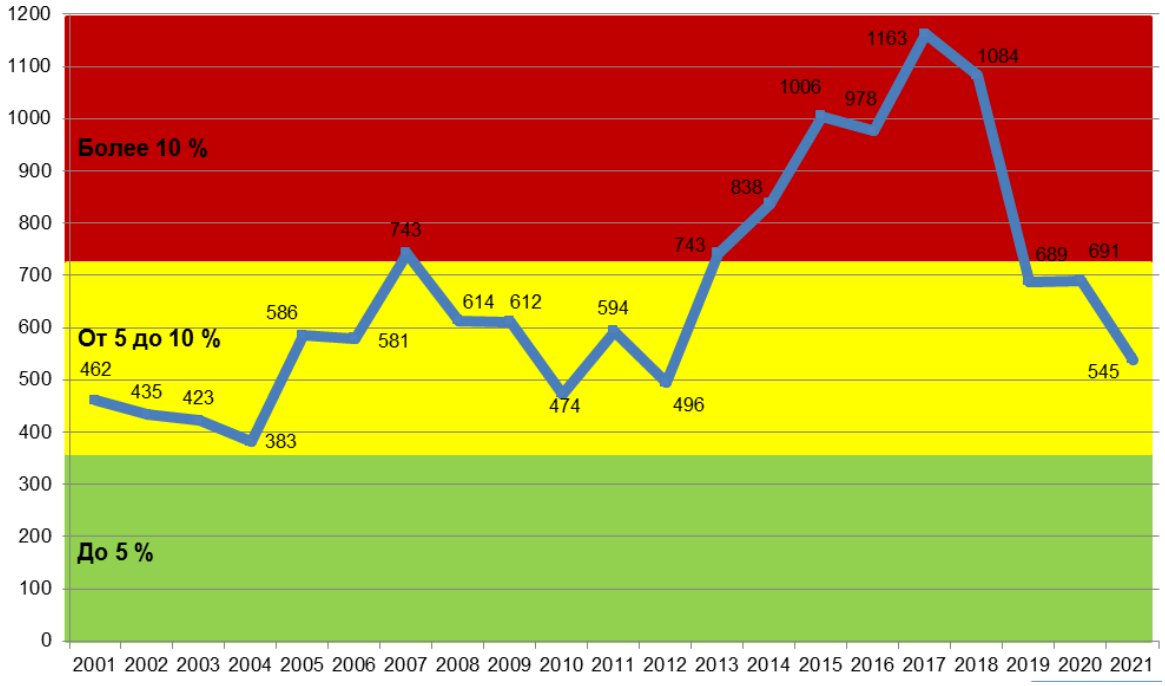

Fig. 4. The length of the track with excess repair deadlines

For 2020, the assessment of the state of the rail track on the road was 20 points with a plan of 41. In 2019, with a plan of 46 points, the implementation was 24 points.

All path distances contain a path with an "excellent" rating. In 2020, track-measuring cars on the main tracks revealed 30.6 unsatisfactory kilometers (in 2019 – 51.8 km). It should be noted that at the Orsha, Lida, Voropaevskaya, Polotsk, Vitebsk, Krichevskaya, Kalinkovich and Bobruisk distances of the route in 2020, no unsatisfactory kilometers were detected. In 2020, 11 unsatisfactory transit routes were identified, which is 14 less than in 2019.

In 2020, the number of speed limits due to track faults more than doubled to 303, compared to 131 in 2019. In 2020, financing in the amount of 142.7 bel.rub. million was allocated for the purchase of materials for the upper structure of the track.

In 2020, 29.04 thousand tons of new rails or 224 kilometers of track were purchased (figure 5).

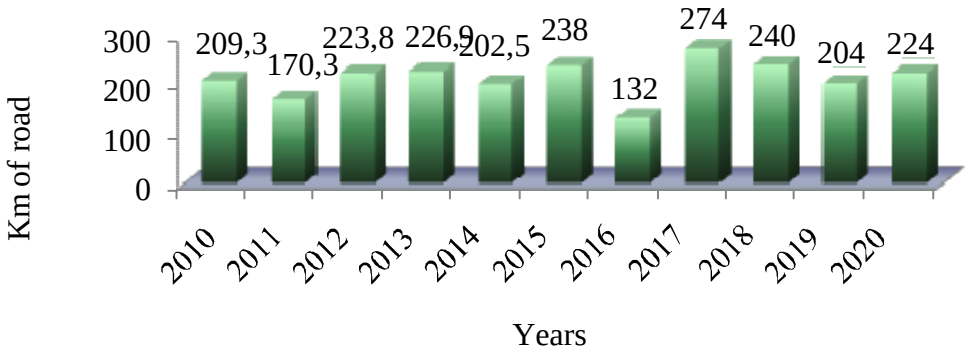

Fig. 5. Volume of purchase of new rails

The purpose of the article is to analyze the state of the track, its main elements and their compliance with the requirements, including the safety of train traffic.

Summary of the main research material. As the safety analysis shows, 9 events related to violations of the rules of traffic safety and operation of railway transport were allowed. To ensure the safety of train traffic, it is necessary to work out a number of issues related to the maintenance of rail weaves of a non-jointed track, including avoiding side wear by re-laying them, reducing the number of defective rails, including through the introduction of aluminum-thermite welding and surfacing of rails.

In order to improve the quality of repair work in 2020, the procedure for accepting work on the repair of the railway track was revised. It is also necessary to improve the system of bonuses for employees of the state enterprise «Remput of the Belarusian Railway» and track distances in order to stimulate the quality performance of their duties.

Due attention in the implementation of the current content of the path should be paid to small radius curves with the use of technical measures to strengthen the upper structure of the path.

It is necessary to pay attention to ensuring the safety of work with the use of removable mobile units, to their fencing, taking into account the path that has a staff of fitters. It may be necessary to change the approaches to the fencing of removable mobile units. It is also necessary to improve the rules of interaction between work managers and signallers, including by equipping employees with portable radio stations.

Currently, work has been established on video monitoring of the upper structure of the track using recently purchased diagnostic tools. Various parameters are recorded – butt gaps, rail wear, curve device parameters, etc. As a result, in January of this year, 23 kilometers with an unsatisfactory rating were identified, of which 19 km-according to additional parameters of the state of the path.

Obviously, more attention needs to be paid to the current content of the path. In this regard, the organization of inspections of the track service with the associated services, in our opinion, will improve the quality of their conduct and the timeliness of identifying deviations in the content of the track.

The available accounting and reporting documentation, which is maintained by the road master, is redundant; in some cases, there is a formal approach. This distracts mid-level managers from performing the main duties and functions of the content of the path. In this regard, it is necessary to optimize the forms and methods of maintaining documentation in order to cover the necessary parameters of the railway track, which have a direct impact on the safety of train traffic and characterize the values on the basis of which decisions are made on the performance of work on the replacement of certain elements of the upper structure of the track within the current content or performing the next repair of the track. It is also necessary to avoid duplication of the same parameters in different accounting forms.

To date, there is a problem of theft of rail lashes laid with the SB-3 rail fastener in its original design, i.e. before the certification works are carried out. For an in-depth study of this problem, at the request of the Belarusian Railway, the Belarusian State University of Transport conducted tests of spring terminals removed from sections of track with different service life and missed tonnage in order to determine the existing deformations after exposure to static and dynamic loads.

On the basis of this work, the order of 04.01.2021 №5N «On the production of track works in 2021» provides for the purchase of elements of the SB-3 rail fastening (gaskets and insulator) in the amount of 10 % of the length of the sections of the main tracks with the SB-3 fastening to secure primarily the "breathing" ends of the rail lashes laid before 2018. This year, tests of the SB-3 rail fastener

will continue to determine the total service life of the fastener and the service life of its individual elements.

In order to reduce the cost of maintaining and repairing special railway rolling stock, 10 physically and morally obsolete units were written off in 2020. In 2021, this work will continue, it is planned to write off five more units.

Conclusions. In order to further strengthen the track economy of the Belarusian Railway, ensure train safety and improve the efficiency of planning labor and material resources, a Program for repairing the railway tracks of the Belarusian Railway for 2021-2023 was developed in 2020 [8].

The implementation of the Program for the repair of railway tracks of the Belarusian Railway for 2021-2023 will make it possible to exclude kilometers of railway track with overdue deadlines for repairs, available on 01.01.2021, and prevent their number from growing in subsequent years.

The switch switch replacement program for 2021-2025 [9] is aimed at transferring the switch switches lying in the main tracks from a wooden to a reinforced concrete base.

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