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FOREIGN EXPERIENCE IN ESTABLISHING TRACK DEVELOPMENT OF SORTING PARKS OF STATIONS

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ABSTRACT

The main purpose of the work is to study foreign experience for the development of road networks of sorting stations under the management of JSC "Uzbekiston temir yollari". The work activities of the largest sorting stations of the USA, Germany, Russia, Switzerland, and Canada, which have developed railway networks in the world, were analyzed. According to the results of the analysis, it was found that the useful length of the sorting station sorting park tracks on the railways of most countries is significantly different from the tracks of existing stations in our country. In addition, automated systems and devices are widely used to control the process of assembling wagons in the sorting park.

Keywords: sorting station, track development, track capacity, composition processing, sorting park.

The experience of foreign railways in the modernization and automation of sorting stations is of interest to specialists in the railway transport of the Republic of Uzbekistan [1-8].

The growth of freight traffic and the development of routing lead to a decrease in the importance of traditional sorting stations in the transportation process of railways around the world. Recently, on foreign roads, the processing of wagons has been concentrated in a smaller number of stations. In the USA and Canada, as a result of the merger of small, low-productivity stations, powerful stations and sorting complexes have been created to serve the enlarged railways. In European countries, sorting work is also concentrated on the most developed nodes, with a small and medium capacity hump and the rest are closed [9].

The largest sorting stations in the world today - Bailey Yard - is located in the US state of Nebraska. This two-way station has 114 tracks in its sorting stations. Only slightly inferior to it (112 tracks) is the Maschen sorting stations in Germany. In China, the most powerful sorting stations in Asia, Zhengzhou, has recently been built, which has two sorting stations with 34 and 36 tracks. In South Africa, there is a large in South Africa, there is a large sorting station at Centrarad station - 64 tracks in the sorting station and eight in the sub-sorting yard at Centrarad station - 64 tracks in the sorting station and eight in the sub-sorting yards.

Sorting arrangements, groupings of tracks into parks and connections are determined by historical development and local operating conditions. The most rational for one-way sorting stations is considered to be a scheme with sequentially located reception parks, sorting and departure, combined and departure, combined for both directions [9].

At developed sorting stations with a significant amount of work with local wagons and group trains, grouping parks and special sorting devices are being built to speed up the processing of local wagon traffic and reduce the delivery time of goods. Grouping yards are often placed in series with the main sorting yard (Montreal and Toronto

stations in Canada, Tinsley and Tyne stations in England, etc.). This location of the parks ensures the full flow of re-sorting of wagons for local purposes and creates more favorable conditions for automating station processes. Such stations have a high processing capacity due to the presence of a larger number of tracks in the parks: reception - up to 12, departure - up to 20, in sorting - up to 60 - 80. The average length of the tracks is 1200-1700 m.

Sorting parks can have either the same length as other parks or reduced ones. Shortened sorting stations are used, in particular, in the USA, where, in conditions of favorable terrain and long distances between stations, long multiple trains are formed. Short trains (semi-trains) from the sorting station are delivered to the departure route, where they are coupled with other half-trains. In some cases, it is more profitable, on the contrary, to design sorting paths of greater length [9].

Of great importance in the work of the personnel of modern sorting stations is the use of mobile communication devices, with the help of which the train processing process is supported from arrival to departure. The employee, who is directly on the tracks, receives the information necessary, for example, to check the location of the wagons in the train or to control the operation of the wagon brakes. At the end of the work, it transmits information about readiness to the central computer system. The latest convenient compact devices (communicators) are used, which are a combination of a mobile phone and a pocket computer. The introduction of new mobile communication systems can reduce operating costs by almost 70%.

Automation of the calculation of wagon sorting plans is being actively implemented, taking into account the employment of tracks in the sorting station, the process of disbanding and drawing up documents for the formed trains. Much attention abroad is paid to the automation of the transmission of information about approaches and wagons, accounting for the accumulation and formation of trains. Systems for automatic reading of information from a moving rolling stock have been developed.

In order to improve the quality and efficiency of work at the Basel-Muttenz sorting station of the Swiss Federal Railways, Siemens has created a modern automated control system BALDIS. Station Basel - 1 serves the direction North - South and is a classic sorting station, where arriving trains with the help of locomotives move towards the sorting station. Basel-1 station processes an average of about 3,000 wagons per day. Station Basel - 2 serves the South-North direction and is a sorting station on a continuous slope. It processes an average of about 4,500 wagons daily.

The BALDIS control system performs the following functions: planning the production process of the station (from the moment the trains arrive), pre-allocating decoupling wagons and managing the disbanding process; load forecast for sorting and departure park tracks.

Class I railroads in North America are upgrading rail yards to meet growing traffic volumes. Increasing their productivity is also carried out by improving the technology of work and the technical base.

At large sorting stations in a number of countries, a transition has been made from local automation devices for individual operations to continuously operating systems for managing the disbanding and formation of trains. Thus, the Selkirk sorting station (USA) was designed to operate under the control of digital computers. The duration of the disbanding of a 150-carriage train at the station, supported by the systems of automatic disbanding of trains and the GAC, is less than 1 hour. The processing capacity of the station is over 3200 wagons / day. The number of wagon destinations can be up to 70.

To increase the capacity of the MacMillano sorting station, Canadian National Railways introduced a number of technical innovations, including the installation of a PRO YARD II automated control system. This sorting station has a double hump and 76 marshalling tracks. AAA Sales Engineering lnc moderators were upgraded on it. By replacing the electromechanical motor with a hydraulic power drive. As a result, the productivity of sorting processing increased to 3300 wagons/day [9]. Moving the

wagons up the hump is carried out using the remote control system of the hump locomotive, which delivers the wagons up the hump at a speed of 24 km/h. The PRO YARD II system determines the required thrust speed on the hump, taking into account a number of factors, including the weight of the load. The exact determination of the moment when the wagon is at the top of the hill and further control of its movement is carried out by the computer.

Currently, the Jerry R. Davis sorting station is a fully computerized system with a single yard supervisor overseeing all operations. The station is capable of processing 2100-2200 wagons/day. According to the developers, the most important difference from other American sorting stations is the installation of 6824 Track master hydraulic piston retarders from the British company Ultra Dynamics Ltd.

The high efficiency of technological processes at sorting stations abroad is achieved through the introduction of new technical means and technologies. At many sorting stations, a transition has been made from local devices that automate individual operations and are switched on for the duration of their execution, to continuously operating systems for managing the disbanding and formation of trains. Round-the-clock input of information from sensors, control of their functioning and protection against failures can significantly increase the safety of the sorting process, reduce the influence of the human factor in the management process.

Based on the wide application of best practices in intensifying the use of technical means, sorting stations Lyublino - Sorting, Orekhovo - Zuyevo, Leningrad - Sorting, Sverdlovsk - Sorting, Perm - Sorting, Gorky - Sorting, etc. the disbanding of wagons from the hill, the method of dispatching control over the operation of the station is being improved, the quality of information and the approach of trains is improving, and the operational planning of work is improving [10].

The main sorting stations in the United States and in Western Europe used to be built according to bilateral schemes. At present, in the construction of new and reconstruction of existing stations, predominantly one-sided schemes are used and

there is an attempt to concentrate the processing of wagons at a smaller number of well-equipped stations.

The sorting parks have a large number of tracks: at 20 stations, their number reaches 48 or more (Young - 72, Bensenville - 70, Pearlman - 70, Bailey - 62, Citico - 60). The length of tracks in marshalling yards is less than in receiving and departure yards, at many stations it ranges from 400 to 900 m.

The sequential arrangement of parks when handling long trains requires a very large area, which is not always possible due to local conditions. Therefore, in many cases, combined schemes are used, in which the receiving and sorting parks are located in series, and the departure parks are parallel to the sorting one.

Even at the large one-way Yang station, there are 15 tracks in the combined reception park of this station, 72 in the sorting park, 5 in the eastbound departure park and 6 in the western direction. The sorting park has 8 bundles of 9 tracks each. Most of them contain from 32 to 49 wagons, and only the tracks of the outer bundles can accommodate from 49 to 88 wagons. In series with the main sorting station, there is a sorting yard for the recycling of local wagons and parking tracks for wagons requiring repair.

In Canada, over the past 10-12 years, five large one-way sorting stations have been reconstructed and automated: Moncton, Montreal, Symington, Toronto and Alight. At the Montreal station, in series with the main sorting station of 84 tracks, there will be a second sorting station for the sorting yard of local wagons of 40 tracks.

In England, in recent years, significant work has been carried out on the reconstruction and construction of nine large sorting stations, including two new two-way yards. New one-way stations in reception parks in most cases have 12-14 tracks, in departure parks - 8-12, in marshalling yards - 40-50. The track capacity in the parks is calculated for 60-80 wagons. The processing capacity of one-way stations ranges from 3 to 4.5 thousand railcars. The two-way station Carlisle, which replaced 9 low-capacity sorting stations, has 10 tracks each in the reception and departure parks, except

for the even-numbered reception park, which has 8 tracks; in the odd sorting park 37 and in the even 48 tracks.

Another two-way station Tees, which replaced 6 stations, has 12 tracks in the reception parks, 40 tracks in the sorting stations, and 12 and 8 tracks in the departure parks. The speed slope on the hills of these stations is $62,5^{0}/_{00}$.

The railways of France are also characterized by the concentration of sorting work at a smaller number of stations. One of the reasons for the reduction in the number of sorting stations, along with the desire to reduce operating costs, was also the desire to reduce the cost of electrification for the contact network and lengthening the tracks to 800-900 m.

Many major sorting stations in France have overpass interchanges for receiving and departing trains and intra-station crossings. Among these stations is the station Gevrey. In the reception and departure parks of this station, there are 14 tracks with a length of 800 m. 8 sorting station has 59 tracks [10].

In the post-war period in Germany, several sorting stations were reconstructed (Braunschweig, Gremberg, Mannheim, Bebra, etc.), and some two-way stations (Braunschweig, Saute) were converted into one-way. At the two-way Mannheim station, the east-west sorting system was reconstructed, with an increase in the number of tracks in the sorting park to 42 due to the auxiliary (third) sorting system that was available at the station. A new two-way sorting yard Maschen is being built in the Hamburg junction with a processing capacity of 11,000 wagons per day. It will replace five existing sorting stations.

In Japan, in 1968, an automated one-way sorting station Koriyama was put into operation, where the decommissioning park (5 tracks) and sorting (36 tracks) are located in series, and two receiving and dispatching parks (10 tracks) are parallel to the sorting station. The features of the station are the control of the operation of the station using a computer and the presence of three-track bundles, in which the extreme tracks are divided by ramps into sections for arranging wagons in such a way that, by

connecting them, you get a multi-group train. The processing capacity of the station is 4300 wagons per day.

CONCLUSION

From the results of the analysis, it can be concluded that the extensive use of modern equipment and technologies to minimize the waiting times of wagons and increase the level of performance of the station's work indicators in the large sorting stations owned by the railways of most developed countries created an opportunity to achieve high results in the transport market.

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