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DISPATCH CENTRALIZATION DEVELOPMENT IN RUSSIA

Abstract: this article examines the history of the development of domestic dispatching centralization, as well as shortcomings at each stage of its development and the prerequisites for its further modernization.

Key words: dispatching centralization, railway, traffic safety, telephone communication, station.

Dispatch centralization (DC) is a set of devices for railway automation, telemechanics and communication, consisting of automatic blocking on railway tracks, electrical interlocking at stations, as well as telecontrol and remote signaling systems, with the help of which the train dispatcher sets train and shunting routes at points of the dispatch section from one central point - DC post.

Today, the railway cannot be imagined without this term. But the first railways were not equipped with DC, since on most road sections the traffic intensity was so low that it was enough to just follow the train schedule. A properly developed schedule ensured traffic safety and did not allow emergencies.

On sections with high traffic intensity, a "live blocking" was used, which consisted in the fact that signalmen stood at certain sections of the path and gave instructions to trains passing by them.

The telephone network served as a simplification in the control system for the movement of trains on the railways, thanks to which the attendants of

neighboring stations could carry out various maneuvers in coordination with each other.

Also, from the end of the 19th century, the "rod system" was used. In this system, a metal rod served as permission for the train to occupy the section. In this case, the locomotive driver receives a baton from the person on duty at the departure station and returns to the person on duty at the arrival station. At adjacent stations there were two apparatus that issued wands, and the number of wands in each apparatus was even. It was possible to remove the wand from one of the apparatus only when both apparatus had an even number of wands. This is exactly how the principle of one train on the track is ensured.

The first steps towards dispatch centralization began in Soviet Russia, when the first dispatchers appeared (1918). With the help of telephone communications, they could interrogate the station attendants and give them commands in the order of the passage of trains. But at the same time the dispatchers could not regulate the movement, they only watched him.

Dispatch centralization, in its full understanding, appeared in 1936 on the railways of the USSR. The system was called DC time code. In the future, this system was modernized, but the shortcomings were never eliminated, namely: low speed, low noise immunity, difficulties in operating relay contact equipment, requiring frequent and careful adjustment.

Since 1955, instead of the time code DC system, the railway network began to introduce polar-frequency dispatch centralization, in which telecontrol signals were transmitted by polar ones, and tele-signaling signals - by frequency pulses. This system was faster and more powerful. This system was widely used and was equipped with about 4,000 km of the railway section.

In 1961, frequency dispatching centralization was created. It differed from the previous systems in that for the first time the coding equipment for remote signaling was made on non-contact elements, the transmission time of

the telecontrol signal was reduced to 1 second, and the remote signaling signal - to 0.3 s.

But along with the high reliability and reliability of signal transmission, the frequency DC also had disadvantages, namely, that the sequence of transmission of telesignalization signals from various line points was ensured with the help of relays, the contacts of which were included in the linear circuit. Due to this, there were interference and delays in the transmission of tele-signaling signals when they were accumulated at the line points.

The "Neva" system, which had cyclic monitoring of the state of objects, was first used in 1967 on a double-track suburban section of the Oktyabrskaya road. The duration of the inspection cycle for about 1300 objects in this system is 5 s.

Despite the fact that the "Neva" system has proved itself well, nevertheless, the railway "does not stand still" and the development of semiconductor technology continued, which made it possible to further improve the system.

Later, the Luch system was created on the basis of the Neva system. In this system, it became possible to control not only train, but also shunting work at intermediate stations. It was also possible to transmit responsible commands, for example, to change the direction of movement on a one-track stretch.

By the beginning of the 21st century, the working conditions of the railways had changed dramatically: the traction arms of locomotives increased, the requirements for the level of automation of the work of train dispatchers increased. In this regard, it became necessary to create new automated systems for dispatching train traffic.

So after a while microprocessor computer systems of DC were developed and implemented, such systems as DC "Yug", DC-MPK, DC "Dialogue", DC "Setun", DC "Tract".

The first version of DC "Yug" was developed back in 1988 and operated on the North Caucasian Railway. But starting in 2001, a subsequent version with distribution control points was introduced. Here the transition to new technical means of the central control post based on a personal computer has already been made. The hardware and software complexes of the controlled points and the central control post were connected using local networks.

All these complexes provide the ability to unite (disconnect) dispatching circles, as well as to organize remote automated workstations (AWS) in real time.

DC-MPK is a dispatch centralization based on microcomputers and programmable controllers. It is the first domestic microelectronic train control system. The system was put into continuous operation in October 1995.

This microelectronic system makes it possible to implement modern principles of management of operational work, it is also designed to ensure the specified throughput of railways and traffic safety with centralized control of signaling devices at stations and tracks.

DC "Setun" is a new generation dispatch centralization system. It contains a modern telemechanics system with high-speed information exchange between line points and the central post.

It is also designed for the use of any automation devices at stations and railways. The length of the controlled and monitored section depends on the intensity of train traffic and can reach 200-1000 km or more. In this system, the number of objects controlled and monitored by the system at linear points is practically unlimited.

DC "Dialogue" is a system that has no restrictions for use: railway junctions and sections of railways for single-track or multi-track trains with electric or autonomous traction. The system devices include complexes of line stations and a central control post, which are interconnected by a modem communication channel built on a line-ring structure.

The system has protection against unauthorized access and uses anti-jamming coding. The number of objects managed and controlled by this system at linear points is practically unlimited.

DC "Tract" - this system is made on special complexes that use industry standard and produced by PC. It consists of interconnected control points, controlled points at the station stations and a communication subsystem with a distributed structure. The number of checkpoints in the dispatching section is determined only by the permissible load of the train dispatcher.

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