знизити рівень шкідливих викидів та збільшити довговічність. Подальший розвиток цієї технології зробить вантажний транспорт ще більш ефективним, економічним та екологічно безпечним.

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# DEVELOPMENT OF INTELLIGENT TRANSPORT SYSTEMS WITH HIGH RELIABILITY AND EFFICIENCY OF OPERATION ON RAILWAYS

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Rail transport has been and remains the leading link in the integrated transport system of Ukraine. In the long term, rail transport will remain the most cost-effective way to transport significant volumes of stable flows of bulk cargo delivered over

medium and long distances [1, 2]. In recent years, the overwhelming majority of the increase in transportation volumes and freight turnover in rail transport has been achieved by increasing its competitiveness through the use of modern and promising scientific developments embodied in innovative technologies, services, equipment, automated control systems and centralized organization of the transportation process.

One of the fundamental requirements for the sustainable operation of the railway transport infrastructure are the requirements for the reliability, failure-free operation and safety of telecommunication structures that ensure the operational activities of Ukrainian railways. Modern management technologies provide for the use of multidimensional situational models, monitoring and forecasting systems for the transportation process, the latest logistics methods, dynamic operational reserves of throughput and carrying capacity for main railway lines, as well as the use of intelligent automated control systems [3].

Intelligent traction rolling stock and infrastructure are created on the basis of self-monitoring and self-diagnosing objects that ensure the transmission of operational information about the technical condition, remaining resource, etc. to traffic control centers. The implementation of the above-mentioned projects is impossible without the clear operation and interaction of all computer control systems, automation and communications on the country's railways.

Intelligent transport systems help to solve such problems as: optimizing the distribution of traffic flows in the network in time and space, increasing the capacity of the existing transport network, providing priorities for the passage of a certain type of transport, managing transport in the event of accidents, disasters or events that affect traffic, improving road safety, which leads to an increase in capacity, reducing the negative environmental impact of transport, providing information about the state of the roads to all interested parties.

At the moment, the state of automation in the sphere of production management of Ukrainian railways is characterized by the following main features. Existing complexes are mainly information databases. They do not provide decision support, do not allow managing production processes in real time, planning work, modeling and forecasting the development of situations. The architecture and functionality of railways were laid down more than 30 years ago, and today their modernization is almost impossible. As a result, they often do not meet modern business processes and new requirements for the interaction of participants in the transport services market. As a result, there are no methods and means to ensure the coordinated work of participants in production activities, there is no support for end-to-end business processes.

Intelligent transportation systems can use different types of wireless communication. Over short distances, wireless communication according to IEEE 802.11 (Wi-Fi) standards can be used, especially the IEEE 802.11p (WAVE)

standard. Also, for example, in the United States, the DSRC standard is used, promoted by the American public organization Intelligent Transportation and the US Department of Transportation. Intelligent transport systems provide for the integrated use of satellite technologies for train traffic control, construction, modernization, repair of railways, monitoring of track infrastructure, property management and environmental protection. All these technologies assume the presence of a single coordinate space and positioning systems with varying degrees of accuracy.

**Conclusion**

Thus, the development of intelligent transport systems allows us to reach a qualitatively new level of creating systems with high reliability and efficiency of operation, to ensure the level of quality of transport services and safety of transportation on railways. The use of intelligent transport systems will allow us to reveal an effective business concept for achieving competitive advantages of railway transport, taking into account the methods, techniques, forms and means of achieving the set goals.

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