



Information Exchange in Automated Railway Transport Management Systems

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***Annotation:** The issues of ensuring the exchange of information on railway transport aimed at uninterrupted, optimal organization of freight and passenger transportation through the use of automated systems are considered. The use of models of the transportation process is aimed at increasing the competitiveness of railway transport. The automated control systems used for effective management of the transportation process in the republic are given.*

***Keywords:** information, automation, transportation process, data transmission, communication channels, information exchange, technical means.*

Introduction: Currently, "Uzbekistan Temir Yullari" Joint Stock Company (JSC UTY) has a number of automated systems that allow efficient management of cargo and passenger transportation. It should be noted that rail transport accounts for the bulk of both freight and passenger traffic compared to other modes of transport. Automation of railway transport management is an important factor in improving the transportation process, which is organized using modern technical means of data transmission, computer technology for processing and storing information.

Consequently, the issues of ensuring uninterrupted, optimal organization of freight and passenger transportation through the effective use of existing automated systems are very relevant.

The main part: Effective management of railway transport (RT) is associated with the processing of significant amounts of information about car traffic and the adoption of appropriate influencing decisions on this basis in order to transfer it to the new required state. Further improvement of management methods requires, in turn, the study of the process of forming car traffic in railway transport as an object of automated control. The models of the transportation process currently used for the effective management of car traffic are focused on economic criteria that make it possible to increase competitiveness in comparison with other modes of transport. To solve various functional tasks of the railway, automated control systems are used, which are aimed at expanding the planning range with dynamic control of car flows based on a variant plan for the formation of trains, using the technical and economic characteristics (both static and dynamic) of each car involved in this process [1]. The exchange of information between different levels of management on the housing and communal services: network, road, linear is provided by means of an extensive data transmission network (DTN) using air, cable, radio relay, fiber-optic communication lines (FOCL). In Uzbek railways, the exchange of information at the linear and road level is carried out using mainly fiber optic and cable communication lines.



The use of information technologies based on modern computers in the Information and Computing Center (ICC), databases at the road management level, the use of identifiers of modeling objects, standardized names of attributes and relationships, common classifiers, ensured synchronization of the same type of databases on different computers (at the road and network levels) [2]. As a result, a single information field has been created that adequately reflects information about the objects of the transportation process - cargo, wagons, trains, locomotives.

JSC UTY uses a number of automated control systems: ASOUP 2 - automated system of operational management of transportation; Express-3 - designed for complex automation of ticket and cash operations at the landfills of the network, including tens of thousands of ticket offices and a number of computer centers of the automated control system "Express"; DISPARK - Automated system of dimensional accounting, control, dislocation, analysis use and regulation by car fleets; DISCOR is an information and reference system linking the complexes of ASOUP, integrated processing of the driver's route (IOMM), a single complex of integrated processing of the road list (EC IODV), as well as various programming tools, and also allows you to get information about the main indicators of the road, such as loading, unloading, operation of rolling stock, acceptance and delivery of wagons etc.

In order to manage the transportation process, JSC UTY uses a set of technical means complex (TMC) that meets the following requirements:

- branching - transmits information to the ICC from all road divisions, starting from intermediate stations;
- bandwidth - communication channels ensure the transmission of the entire volume of information related to both the management of the transportation process and other information;
- the reliability of the transmitted information is within the limits of available errors;
- characterized by a large number of devices for collecting, storing, primary processing and transmitting information;
- users are serviced in real time, which is important for the operational operation of linear sections, nodes, divisions of the railway.

The TMC of the automated control system information system consists of devices: subscriber points (SP), DTN and the computer of the ICC. The exchange of digital information is carried out through the communication channels of the global Internet network, as well as the use of corporate systems - Intranet technologies. The exchange of information between linear and road-level computers is provided by the DTN, terminal equipment for transmitting and receiving information, personal computers of automated workstations (AW) located at the linear level and at the level of the Information and Computing Center of the Road Management of JSC UTY.

The central node of the DTN is located in the ICC of the road, provides reception of information from primary sources, and peripheral and terminal nodes are located at linear enterprises – stations, wagon and locomotive depots, and other divisions.

Figure 1 shows the connection diagram in the data transmission network of JSC UTY. Note that the thicker lines in the figure depict nodes, the exchange of information between which is provided at high speeds. The communication of the ICC with the main computing center located at the network level is carried out using high-speed data transmission channels. Network users have the opportunity to use various communication channels: a public switched telephone network, high-speed dedicated communication channels [2, 3].

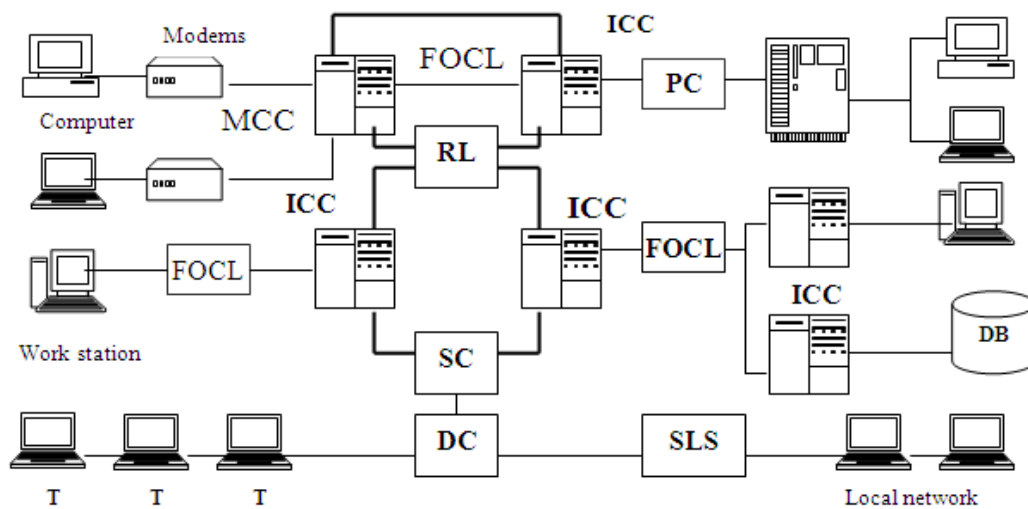


Fig. 1. Diagram of possible connections in the data transmission network of JSC UTY.

Symbols: MCC - main computing center; ICC - information and computing center; FOCL – fiber-optic communication lines; RL – radio relay line; PC – wired channel; SC – satellite channel; CD – data concentrator; DB – data bank; SLS – LAN server; T - terminal.

Conclusion

The automated railway transport management system of “Uzbekistan Temir Yullari” JSC has a hierarchical structure: the upper level is an automated dispatch center for transportation management with automated workstations for managers of the transportation process; the lower level is based on data concentrators and corresponding automated workstations for the purpose of information support for loading and unloading operations, providing information services to the cargo owner when receiving or delivery of cargo, as well as in the process of their transportation.

Information exchange at the linear level can be organized using local networks based on non-switched analog channels and physical circuits of local communication lines.

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