ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 6, Issue 9 , September 2019

Use of Modern Axles Counting Devices in Railway Automation and Telemechanics

Toshboev Zokhid

Assistant, Tashkent institute of railway engineering, Republic of Uzbekistan

ABSTRACT: The article discusses the development of electronic educational modules (EEM) for disciplines that integrate computer, information and pedagogical technologies, intended for the presentation of structured educational material, ensuring current control and intermediate certification, as well as managing cognitive activity of students in the implementation of the main educational programs of universities with the use of multimedia technology is an urgent task.

KEYWORDS: automation and telemechanics, rail chains, switch devices, electronic axis counting system (EACS), connectors, insulated containers.

I. INTRODUCTION

Currently, relay devices that fulfill the required dependencies of arrows and signals are being replaced with electronic equipment, including microelectronic, including microprocessor ICs. But there are no similar processes in the field of transformation and modernization of rail chains. True, tonal rail chains (RC) equipment is being developed, which has lower power consumption and enhanced functionality, which can improve reliability. Along with this, such disadvantages of RCs as high material consumption, a significant dependence of functioning on climatic conditions, conductive insulation properties of ballast and sleepers, the influence of traction current or electric heating current of cars, etc., remain unchanged.

II. ANALYSIS OF THE STATE AND DEVELOPMENT OF RAILWAY AUTOMATION AND TELEMECHANICS SYSTEMS

Of the foreign devices that have the best technical, economic and operational indicators, we can name the microprocessor axle counting system of Siemens. But its trial operation in Russia showed that adapting this system to the conditions of domestic railways is difficult and economically inefficient. In addition, the cost of this equipment is several times more than domestic systems.

The shortcomings of the existing domestic and foreign axis counting devices and the results of the RC failure analysis determined the implementation of scientific research and the development on this basis of more advanced (railway automation and telemechanics systems RATS) devices based on the use of the electronic axis counting system (EACS). In addition, the goal of research and development is to achieve large, in relation to existing systems, functional capabilities of the application. This is required for a longer competitiveness of the developed and mass-produced equipment and at the same time to obtain sufficiently high operational and technical indicators in different sections of the Russian road network, with different traffic parameters and for various types of distillation, station and other RATS devices. If necessary, the compatibility of EACSs with various hierarchical levels of modern multilevel RATS systems should be ensured.

The use of axle counting devices is not limited to mainline railways. The identity of the principles of regulating the movement of trains and ensuring traffic safety extends the scope of EACS to industrial transport, where the service culture of automation and telemechanics devices is incomparably lower, which imposes certain difficulties on the operation and maintenance of them in working condition. Experience shows that traditional compressed air devices using RCs in industrial vehicles often fail to resolve failures, and the only alternative to them are EACS devices.

EACS can also be used as a means of increasing the reliability of station devices RATS and increasing their economic efficiency. This can be seen in the example of a station with complex track development with a large number of paths. If the intensity of train traffic along the tracks of these stations is different, then the main tracks and pick-up and drop-off routes for passenger trains equipped with RCs with coding can be supplemented with EACS devices. It is better to control the freedom of the remaining paths with cheaper EACS devices.

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 6, Issue 9 , September 2019

The use of EACS devices determines the possibility of a significant improvement in the operational indicators of automatic leveling alarm (APS). This translates into a reduction in the downtime of vehicles before a closed level crossing. Research in this area, as well as the development and implementation of practical equipment will reduce the time of the closed state of moving.

Stationary equipment of EACS is complex, which is expressed, in particular, by a large number of cable communication lines and their considerable length. in this regard, work to reduce the material consumption of communication lines in terms of cable products is very relevant. The study and development of the principles of organizing communication between the functional units of EACS station devices have shown the practical possibility of two-way transmission in one physical pair of an information signal and an energy signal used to power remote station devices.

The practical replacement of existing RATS with rail circuits by axle counting devices cannot be accepted without a feasibility study on the introduction of EACS. There are two main aspects of the implementation process.

III. ANALYSIS OF AXLES COUNTING DEVICES SYSTEM

The first and, obviously, the most important one is the economic rationality (or irrationality) of replacing the COMPRESSED with rail chains by EACS. It should be expressed by analytical data, due to which it is possible to calculate the economic efficiency of replacement for specific sections of the road network with their specific operational and technical features. It necessarily assesses the income from the implementation of EACS projects and payback periods.

The second side is determined by the new and fundamentally different functional capabilities of the EACS and the methods of their use in modern and promising RATS equipment. This can be explained by the data given in table 1, which shows the technical and operational characteristics of the comparison of methods for monitoring the freedom of sections of the track, performed in two ways: using rail circuits and EACS devices. It can be seen that the EACS has a number of positive qualities that determine the real advantages of this system over traditional compressed air devices using rail circuits.

Table 1
EACS functionality

Characteristics	Control rail chains	Control EACS
Sensitivity to ballast insulation resistance	high	no
The need for insulating joints and rail connectors	yes	no
Negative influence of traction current and devices of its sewerage	yes	no
Automatic configuration of the control device	no	yes
Adaptation to changes in environmental characteristics (temperature, humidity, etc.)	no	yes
The number of wires required for the functioning of the control	4	2
The average length of the controlled section of the track with reduced ballast resistance, m	300	OC
Information on the number of conventional units of rolling stock on the track	no	yes
Information about the speed of the train and its acceleration (deceleration)	no	yes
The ability to exchange control, diagnostic and control information using modern digital technologies	no	yes
The probability of theft of parts made of non-ferrous metals	high	low

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 6, Issue 9 , September 2019

The structural and circuit design of the EACS, which is radically different from the implementation of station devices with RCs, requires analysis and the development on this basis of optimal design methods that can be extended to the road network with the introduction of EACS.

The advantages of axis counting devices shown in Table 1 define new areas of application for EACS. in particular, to increase the reliability of operation of functionally complete station and distillation devices through the joint use of rail circuits and axle counting devices, which will be shown below. There are also other features of the application of axle counting devices.

The methodology for analyzing the economic efficiency of introducing EACS and the results obtained in this way depend on the functions performed by the implemented devices and on the reasons for the implementation of EACS.

IV. CONCLUSION

Currently, the requirements for the transmitter and signaling equipment are replaced by electronic equipment, including microprocessors, microphones, IMS. However, there are no similar modifications and modernization processes in the railway chain. Tone chain chain equipment is currently being developed that provides low power consumption and wide functionality, which improves productivity. At the same time, the following drawbacks of rail chains are a large amount of material, the performance of which seriously depends on climatic conditions, characteristics of ballast and transverse insulation, current flow or wagons, which depend on wiring, etc. Therefore, it is recommended to use EACS.

REFERENCES

1. Khodiev B.Y., Musaliev A.A., Begalov B.A. "Introduction to information systems and technologies." Tashkent. TSEU. 2002.
2. Galatenko V.A. The basics of information security. - M.: INTUIT RU “Internet University of Information Technologies”, 2003.
3. Automated Information Technology in Economics: A Textbook. / ed. M.I.Semen. -M.: UNITY, 2003.
4. Khodiev B.Yu., Musaliev A.A., Begalov B.A. "Introduction to information systems and technologies." Tashkent. TSEU. 2003.