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ЭКСПЕРИМЕНТАЛЬНОЕ ПОДКЛЮЧЕНИЕ ИНТЕГРИРОВАННОГО МИКРОЭЛЕКТРОННОГО ФОРМИРОВАТЕЛЯ ИМПУЛЬСОВ НА СТАНЦИОННЫХ И ПЕРЕГОННЫХ СИСТЕМАХ

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Аннотация: В данной статье показывается современное положение систем автоматики и телемеханики, так как всегда не мало важное место отводилось устройствам сигнализации, централизации и блокировки, в обеспечении безопасности движения поездов, проблемы в системах автоблокировки, а именно в цепях кодирование. Необходимость начать внедрение интеллектуальных систем управления движением поездов. А в этой статьи рассматривается разработки отдельных элементов систем автоматики и телемеханики железнодорожного транспорта, в частности интегрированного микроэлектронного формирователя кодов, предлагающий взамен маятниковых трансмиттеров и кодовых путевых трансмиттеров. А конкретно приведен опыт испытательного подключения интегрированного микроэлектронного формирователя импульсов в действующих системах сигнализации, централизации и блокировки.

Ключевые слова: кодирование систем автоматики и телемеханик, микропроцессорные блоки, программное обеспечение, обслуживание систем, маятниковые трансмиттеры, датчики.

EXPERIMENTAL CONNECTION OF THE COMBINED MICROELECTRONIC PULSE GENERATOR TO THE OPERATING STATION AND DISTILLATION SYSTEMS

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Abstract: This article shows the current state of automation and telemechanic systems, since there has always been an important place for signalling,

centralization and blocking devices, in ensuring the safety of train traffic, problems in automatic blocking systems, namely in coding circuits. The need to start introducing intelligent train control systems. And this article examines the development of individual elements of automation and telemechanic systems for railway transport, in particular, an integrated microelectronic code generator, which instead of pendulum transmitters and code track transmitters is considered. Specifically, the experience of test connection of an integrated microelectronic pulse generator in operating systems of signalling, centralization and blocking is given.

Key words: coding of automation and telemechanics systems, microprocessor blocks, software, system maintenance, pendulum transmitters, sensors.

1. Introduction

Joint-stock company "Uzbekiston Temir Yullari", since its foundation - November 7, 1994, for more than 20 years has been the most important structure-forming link in the formation and development of the economy of the Republic of Uzbekistan. Sustainable development, stability, introduction of innovative technologies, dynamic increase in the rates of economic and industrial growth of enterprises of JSC "Uzbekiston Temir Yullari" create favorable conditions for the development of the transport industry and the entire economy of the Republic of Uzbekistan as a whole.

Considering that the Republic of Uzbekistan occupies a strategic geographical position in Central Asia and is the center of the region's geopolitical development, the main transit corridors connecting the North and South, East and West of the continent pass through the territory of the Republic of Uzbekistan. This is one of the determining factors in planning the development of a joint-stock company and identifying issues that need additional study and optimization.

Modern technologies and manufacturability of production will meet the need of the country's economy for high-quality transportation.

An increase in the speed and reliability of cargo delivery will help reduce the needs of commodity producers for working capital and, consequently, reduce the cost of production and sale of goods, and increase the competitiveness of the economy. The quality policy of JSC "Uzbekiston Temir Yullari" is aimed at increasing the number of consumers of railway services by constantly improving the quality of services provided, meeting the needs and expectations of customers, creating and strengthening sustainable competitive positions. [1]

The main activity of the company is aimed at providing high-quality services for the organization and management of railway transport that meet the requirements of safety, reliability, competitiveness, fully satisfying the wishes of consumers and meeting the world level, taking into account the regulatory documents regulating the company's activities.

The most important place in ensuring the safety of train movement has always been assigned to signaling, centralization and blocking devices. Built on electromagnetic relays of the first class of reliability, having a large margin of safety, they made it possible to build reliable, but ineffective systems that solve few functions.

2. The need for the introduction of intelligent systems in automation and telemechanic

The last twenty years of the development of railway automatics and telemechanic is characterized by a qualitatively new stage; microelectronic and microprocessor element base, as well as control microcomputers, began to be widely introduced into signaling, centralization and blocking devices. Microprocessor technology is characterized by such indicators as high functional flexibility, high reliability, small dimensions. Intellectualization of these reaper systems is a necessary factor in ensuring guaranteed safety and accurate automated control of technological processes. Intelligent transport systems include a number of independent subsystems operating in a single complex, such as an intelligent train, station, etc. Intelligent technical means can facilitate the work of personnel, provide logical control over their actions in normal and emergency situations. With their help, you can perform advanced and operational diagnostics of equipment, make decisions on ensuring the reliability, safety and survivability of the transportation process, etc.

3. Experimental results

At present, the weight of obsolete, but still obsolete devices in the systems of railway automation and telemechanics on the roads of JSC "Uzbekistan Railways" is large. The most common systems of train control in the country are digital code autoblocking, pulse wire autoblocking, which are based on electromechanical relays and have been in service for more than 50 years. The main disadvantage of these systems is the electromechanical devices (pendulum transmitters, relays, coded path transmitters), which are constantly dynamic during operation, resource is rapidly consumed.

We have seen a solution to this problem in the development of a microprocessor device that can perform a generalized universal function. [2]

On the basis of the algorithm of work MT - 1, MT - 2, КПТШ -5 and КПТШ - 7 developed experimental models of microprocessor analog transmitters, in which the functions of the pendulum transmitter MT - 1, MT - 2 and functions КПТШ -5, КПТШ- 7. [3]

The microprocessor-based code generator makes it possible to self-diagnose and monitor the operation of the circuit using the indication, which effectively reduces maintenance costs and the number of failures in self-locking systems due to the pendulum and code path transmitter.

The microprocessor unit is based on a microcontroller. The microcontroller is designed to generate code pulses. The correctness of the forming codes of the microcontroller is checked by another independent microcontroller; in case of an error, pulses are not transmitted. Observation of the generation of code pulses, checking the operability of the microcontroller will be carried out using the indication circuit. [4]

With the help of a jumper, the decoder can be converted into a shaper, if it is necessary to operate КПТШ-5 and КПТШ-7 in parallel. The transmitter can be connected to an AC mains voltage of software or 220 V. Power supply unit to provide + 5V for microcontroller inputs. Transmitters are supplied with the upper part of the connector separately for КПТШ and MT. Before turning off the operating systems of automation and telemechanic, the integrated microelectronic generator was checked in the (Control and measuring point) of the instrumentation. In the instrumentation, a full check of the technical characteristics of the multifunctional transmitter was carried out and the corresponding act was drawn up. (figure 1) The figure shows a stand for checking the codes KZh, Zh, and Z.The stand consists of blocks of a numerical code auto-blocking decoder, impulse relays, toggle switches for selecting КПТШ -5 or КПТШ -7, indicating which code is generated, and also КПТШ is directly connected. On the stand in the second photo, the timing and electrical characteristics of the relay are measured. Since we have a microelectronic device, we checked through the ТШ relay.

Figure. 1. Measuring stand for signalling, centralization and blocking devices

On the basis of the act, it was allowed to conduct a pilot test with the installation of signaling devices on the operating devices at the Hamza station, cabinet 44, place device 14 on the side tracks. (figure. 2.) after installation, the device readings were regularly taken. The integrated microelectronic pulse shaper worked without failure for 3 months. The economic efficiency of the introduction of a microprocessor-based pulse generator of automation and telemechanic systems on the example of the implementation of the Tashkent signaling and communication distance at the Hamza station is achieved due to:

- reduction of labor costs for current repair of units (КПТШ and МТ) in the repair and technological section of the distance;

- reducing the cost of material resources, spare parts and components for their periodic maintenance;

- reduction of energy consumption both due to the constructive modernization, and when carrying out the TR of units in the RTU;

- increasing the reliability of functioning, eliminating the human factor during operation and, as a result, reducing the cost of troubleshooting and compensating for damage due to train delays due to failure of units before the warranty post-repair periods;

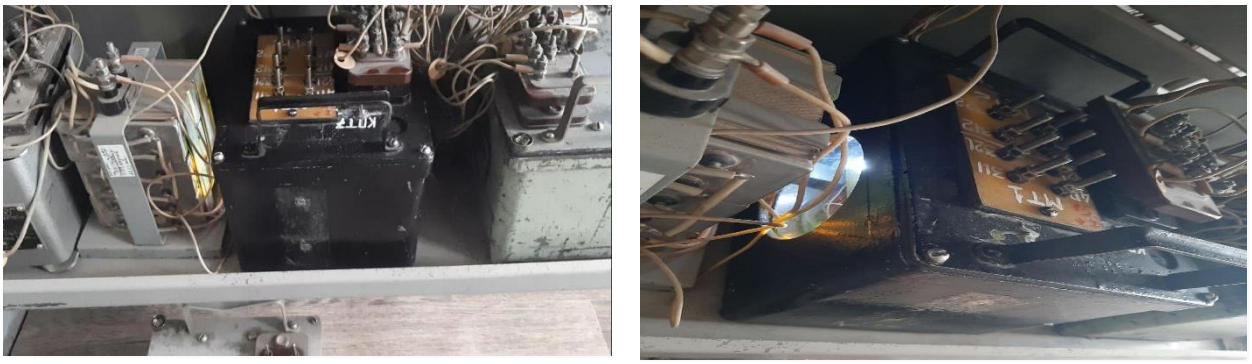

Figure. 2. Hamza station, connection of a microelectronic transmitter instead of КПТШ-5 and КПТШ-7

- significant savings in monetary funds from the localization of production in the territory of the Republic of Uzbekistan. The amount of savings from the introduction of a microprocessor pulse generator at the Hamza station per year can save at least 94,019,547 soums.

Conclusion

The integrated microelectronic shaper proved to be excellent as КПТШ-5 and КПТШ-7. The integrated microelectronic shaper can be used in existing relay systems, as well as in new construction projects in microprocessor systems. The integrated microelectronic shaper can be used in existing relay systems, as well as in new construction projects in microprocessor systems, which is important in the current trends in the development of railways in Uzbekistan. The use of individual electronic elements in automation and telemechanic systems will become an irreplaceable experience for the creation and transition of local intelligent train control systems.

The digitalization of railway transport requires reliable information on the state of mobile objects and infrastructure and provides for a mandatory digital description of objects within the framework of high-precision coordinate systems. modern technologies make it possible to create not only fundamentally new security systems and system interfaces, but also a complete complex of intelligent control. [5,6]

The digitalization of railway transport requires reliable information on the state of mobile objects and infrastructure and provides for a mandatory digital description of objects within the framework of high-precision coordinate systems. modern technologies make it possible to create not only fundamentally new security systems and system interfaces, but also a complete complex of intelligent control. [7,8]

A clear system of interconnected structural components is traced: automation, communications, traffic control systems, transport security, information security and law enforcement. The main task is to improve the quality of management of the transportation process by developing integrated solutions, taking into account the situation and the scale of automation of dispatch control functions. The ultimate indicators of efficiency should be full automation of monitoring of infrastructure and rolling stock, a transition to the management of train flows taking into account their energy efficiency and the maximum implementation of sparsely populated and unmanned technologies in the transportation process.

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