AUTOMATIC SYSTEM OF EFFICIENT ELECTRONIC DOCUMENT MANAGEMENT IN THE RAILWAY SYSTEM

Astanaliev Elmurod Tursunali ogli
"Department of Automation and telemechanics of Tashkent state transport university" master's student, Tashkent state transport university

Abstract

The article illustrates the functional features of the automated system of operation of signaling, centralization and blocking devices, shows the interface of the automated system of accounting and control of railway automation and telemechanics devices, presents the system requirements and testing of the automated method. The process manage and metering devices of automatics and telemechanics in the use of QR-coding method should be used for automated identification of devices of signaling, centralization and blocking with the aim of collecting data about installed devices, checking the correct replacement devices, data input on the implementation of the repair and acceptance, automated input of data on new devices submitted for repair and process areas.

Keywords:

Railway automation and telemechanics, signaling, centralization and blocking devices, technological process, automated accounting and control system of devices.

The proposed formal models of electronic document of technical documentation (EDTD) are implemented in the software module "Automated control and accounting system for railway automation and telemechanics devices" (ACA-SRAT), which is registered in the state register.

The automated accounting and control system of SRAT devices is designed to automate the accounting and control of railway automation and telemechanics devices, as well as to plan the work of a repair and technological site or a control and measuring point.

The automated system is used in railway automation and telemechanics distances. The main functions of the automated system: creation and maintenance of a database, including passports of specific devices and information about the place of their installation; tracking the movement of devices in connection with periodic replacements, write-offs, receipts, etc.; planning the replacement of devices with the issuance of technologically necessary information; monitoring the implementation of plans for the replacement of devices; analysis of failures of devices for signaling, centralization and blocking devices; planning the work of repair and technological areas; issuance of output documents, the ability to search for devices in the database for arbitrary requests.

The functioning of ACA-SRAT is based on the use of a special program — a document management server. The server carries out the main functions that ensure the work of users: search for equipment from the database, report on the number of devices, reading a QR code. Until the main program is launched, user interaction with the document management system and work with documents is impossible.

The main objects of the program are lists of devices and places of installation of devices, documents (forms). When carrying out a planned replacement, the lists are displayed in pairs: one (lower) list of field devices and empty places — where the device can be installed or an existing one can be replaced; and the second (upper) list is a list of devices that can be replaced.

The program uses several toolbars to simplify work with forms, list of fixtures, replacement plans, etc. Panels of the list of devices and installation locations are shown in Fig. 1.

Fig.1. Toolbar.

The toolbar contains the following main functions in the form of icons, which allow:

— update information;

— add a workshop for signaling and communication distance;

— add a separate item;

— add a device;

— edit information about the device;

— viewing information about the devices;

— remove the device;

— replace the device;

— read the QR-code of the device;

— print the QR-code of the device.

The automated accounting and control system of SRAT devices is designed to automate the accounting and control of railway automation and telemechanics devices, as well as to plan the work of a repair and technological section (RTS) or a control and measuring point. The model of an automated system for the station part of the control and management of alarm systems are presented in Figure 2.
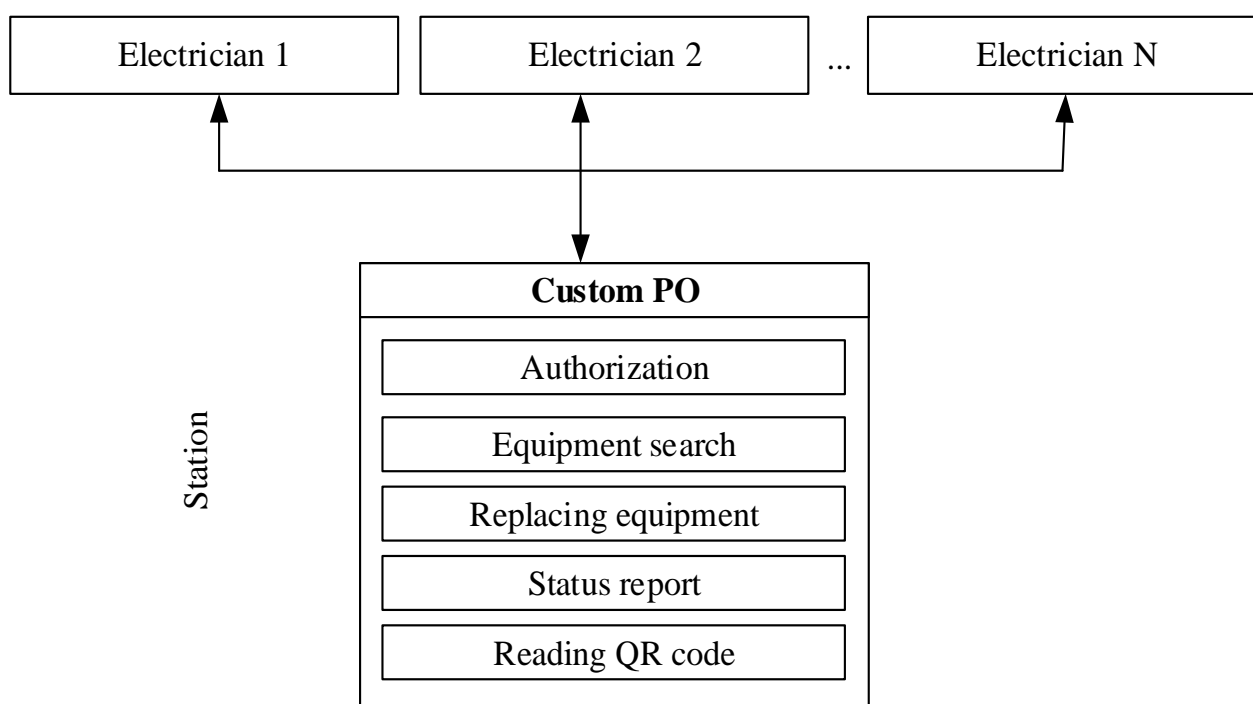

Fig.2. Model of an automated system for the station part of the control and management of alarm systems

The automated system is used in the railway automation and telemechanics distances. The main functions of the automated system:

– creation and maintenance of a database, including passports of specific devices and information about the place of their installation;

– tracking the movement of devices in connection with periodic replacements, write-offs, receipts, etc.;

– planning the replacement of devices with the issuance of technologically necessary information;

– monitoring the implementation of plans for the replacement of devices;

– analysis of failures of devices of alarm devices, centralization and blocking;

– planning the work of repair and technological areas;

– issuance of output documents, the ability to search for devices in the database for arbitrary requests.

The functioning of ACA-SRAT is based on the use of a special program — a document management server. The server carries out the main functions that ensure the work of users: search for equipment from the database, report on the number of devices, reading a QR code. Until the main program is launched, user interaction with the document management system and work with documents is impossible.

The ACA-SRAT server program is executed on a computer connected to the signaling and communication distance network, which is also called a server. It is possible to select a separate computer for the server or use one of the network workstations. It should be noted, however, that registering new instruments and generating instrument-related jobs and reports will increase the size of the database and the disk space it occupies, so you should ensure that you have sufficient hard disk capacity to take into account the growth prospects of information flow.

The administrative part of the program. A system with which many users work should have centralized management. This function is performed by a specially designated employee or employees who implement a single consistent policy for setting up and managing the system, who are called system administrators.

The responsibilities of the system administrator include, in particular, the following:
– reflection in the system of the current structure of the organization;
– registration of users;
– viewing system messages and error messages;
– updating database tables.

In addition to these functions, the system administrator also provides starting and stopping the ACA-SRAT server, configuring and maintaining the system, creating backup copies of the system databases and restoring the system in case of failures.

User part. Signaling and communication distance employees registered in the system determined by their job duties are called system users. Depending on the type of activity, the system user is assigned by the administrator the rights to perform certain actions and access certain functions.

Functional features of the system. After connecting to the user's server, the main window is presented for working with the program. In essence, it is an SDI (single document) window with a main menu and toolbar. In this dialog box, all the basic functionality of the automated system is presented to the user in an ergonomic manner, namely:
– input of data about devices;
– device receipts;
– write-off of devices;
– devices exit from repair;
– planned replacement of devices;
– stock of devices;
– dismantling of devices.

After filling in the required fields, these data must be saved in the form of a database table, and the device must be assigned a serial number in the automated system. After that, further work with the system continues. For quick access to information stored in a single database, a search procedure is required by various parameters. The main search parameters in the document management system include the brand and address of the device.

The presented control and accounting system for automation and telemechanics devices using a QR-coding system is advisable to use for automatic identification of signaling devices in order to collect data on installed devices, check the correct replacement of devices, enter data on repair and acceptance, automated data input on new devices, received at the repair and technological areas

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