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Automated System For Control Of The Operation Of Special Rolling Stock

Mr. Igor Saveliev1, Mr. Alexander Adadurov2* and Ms. Kseniya Arinushkina3

1 Chief Engineer, VNIIZhT-ENGINEERING LLC, St. Petersburg, Russia, savelev.igor@vniizht-engineering.ru

2 CEO, VNIIZhT-ENGINEERING LLC, St. Petersburg, Russia, adadurov.aleksandr@vniizht-engineering.ru

3 Engineer, VNIIZhT-ENGINEERING LLC, St. Petersburg, Russia, ksu271271@gmail.com

Abstract

The report discusses the experience of developing and implementing an automated system for monitoring the operation of special rolling stock on the Russian Railways railway network. The principles of construction, the main characteristics of the system, the economic effect of implementation, as well as the prospects for the development and improvement of the system are outlined.

Introduction

The work of people can be greatly simplified by an automated system capable of generating data on wheel measurements during movement and forming a conclusion about the need for repair [1]. Currently, a number of modern automated systems are being actively introduced on the Russian railway network, designed to improve the safety of railway transport, both experimentally and in continuous operation. Such systems make it possible, through timely detection and notification, to prevent the occurrence of dangerous situations caused by the unsatisfactory technical condition of one or another structural element of a rail vehicle or the railway infrastructure itself.

The requirements for the parameters of wheel sets in the automated system for monitoring the operation of special rolling stock (AS MOSRS) correspond to laser profilometers that are designed to measure: the height of the ridge, rolled stock, thickness of the ridge, steepness of the ridge, thickness of the tire, removal and analysis of the full profile of the wheel rolling surface, support an electronic database on the wear of wheelsets, carrying out tolerance control and sorting during technical inspection, certification, repair and formation of railway wheelsets of rolling stock [1,2]. Measurements are made directly on the rolling stock, without wheel sets rolling out.

The laser signal leaves a wide line on the photomatrix covering several points at once. In this case, the inverted image of the wheel profile on the matrix is shown in Fig. 1.

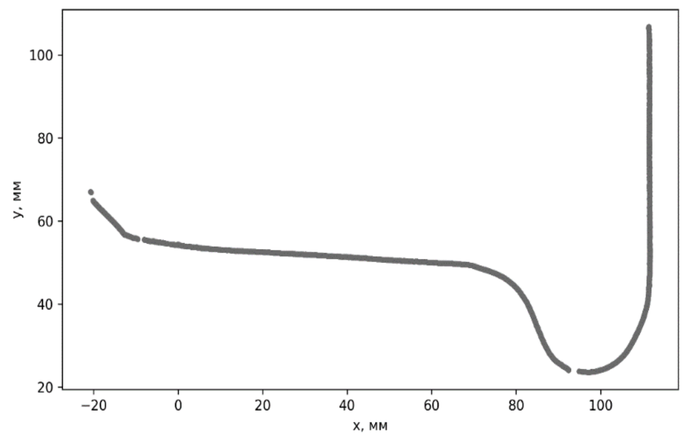

Figure 1. Wheel profile.

The main results of the work of the CA CRSPS include:

- Reducing non-production losses;
- Extended equipment life;
- Reduction of repeated visits for carrying out repeated work of the SPS;
- The influence of the human factor is excluded.
- Controlled parameters:
- Lack of fasteners;
- Bad fasteners;
- Absence or excess of crushed stone;
- Availability of automation and signaling systems, power systems on rail.

The proposed automated system for monitoring the operation of special rolling stock will expand the functionality and improve the reliability of automated control, improve the operational processes of the SPS used in the repair and maintenance of railway infrastructure facilities, and also ensure the transfer to the end user of an estimate of the amount of work actually performed, taking into account the time and place of execution works, including providing the ability to recognize the load moved by a crane, spent and residual fuel resources of the SPS, fuel efficiency indicators of individual technological operations, excluding the participation of the human factor in training and information transfer.

[1] Antimirov V.M. «Proyektirovaniye apparatury sistem avtomaticheskogo upravleniya»: Uchebnoye posobiye. Chast' 1. Sozdaniye SAU 2018 g., ISBN: 978-5-9765-3527-5, 978-5-9765-3529-9, 978-5-7996-1554-3, 978-5-7996-1553-6. - 93 s.

[2] GOST 10791-2011. Kolesa tsel'nokatanyye. Tekhnicheskiye usloviya,