BRAKE FRICTION CONTACT TEMPERATURE CONTROL FOR INCREASED SAFETY AND BRAKING PERFORMANCE

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The effectiveness of braking the rolling stock depends on the coefficient of friction, which is influenced by temperature changes in tribo contact. Consequently, the main tendency of the concept of brake systems of vehicles is to increase the power dissipation capacity of friction pairs, stabilization of temperature regimes in the zone of interaction of friction elements of the braking system.

On the basis of the complex analysis of experimental and theoretical studies, highlighted in [1, 2], it is determined that one of the most important problems of brake devices is maintaining the surface temperatures of their frictional pairs in certain limits. Exceeding the permissible temperatures of the friction surfaces leads to the loss of their wear and friction properties, there is a destabilization of the operating parameters (dynamic coefficient of friction, brake torque, mechanical and thermal deformations, wear, etc.) of brake devices.

According to the outlined strategic principles of the development of the world rail system, the analysis of an expert survey of specialists of research organizations in the field of rail transport, increasing the efficiency of the operation of brake equipment is one of the most important factors for increasing the speed of traffic, safety and energy efficiency of rail transport [3]. The methodology of the proposed innovative methods for controlling the temperature of the brake friction surfaces will contribute to the further development of high-speed locomotive movement. These methods are distinguished by the novelty of the developed solutions, represent the theoretical and practical value in the direction of improving the performance of the brakes, which will be of great importance in the strategic devel-?pment of rail transport in general.

The proposed method of studying the influence of the factors of supplying compressed air to the friction contact on the operation of the brake equipment [4, 5] allows to determine and recommend the value of compressed air pressure and the diameters of the inlet holes of the brake lining so that the force of counteraction from the compressed air does not lead to deterioration of the basic performance of the braking system.

The method of calculating the speed of air movement on the surface of the brake disk with the account of parameters of air flow is proposed. The resulting coefficient of equivalent velocity of air expresses the

dependence of the relative speed of air movement on the surface of the brake disk on the speed of the railway vehicle. The obtained results allow taking into account the parameters of air flow when calculating the coefficient of heat transfer by convection.

The application of the theory of risks of technical systems for analyzing the process of braking the railway vehicle in order to determine the probability of the occurrence of a junction and deciding on the need to use anti-friction protection based on the analysis of factors that affect the implementation of the non-union braking provides an opportunity for qualitative analysis and quantification of the investigated processes , has a comparative simplicity of construction, visibility, ease of further forma-?ization and algorithmization.

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