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MAINTAINING BALLAST AND PROVIDING IT OPTIMAL STATE

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Annotation: The development of railway transport in recent years has been characterized by an increase in passenger traffic speeds and the loading of freight cars, which leads to an increase in the impact of rolling stock on engineering infrastructure facilities. These trends increase the relevance of the development of engineering solutions aimed at strengthening the railway track.

***Keywords*:** transport, speed, machinery, way, railway, lining, composition.

When the ballast is heavily polluted, the path is usually called the "dead path". The contaminated ballast has little elasticity and loses draining properties. When the ballast is polluted, splashes form around the sleepers and especially at their ends and favorable conditions for vegetation growth are created. With this condition of the ballast prism, trains do not have smooth running, especially in rainy weather; the path, properly installed in the plan and profile, is quickly upset. When the ballast comes to such a state, there are only two ways to improve the path — either cleaning the ballast layer or replacing it. The ballast lying in transit has a high cost, so the roads consider it more economical to clean the ballast than to replace it. However, not all ballasts can be practically cleaned. When cleaning gravel ballast by passing it through a screen, all fine gravel material is filtered out together with the contaminant. It is most advisable to clean only crushed stone ballasts. Crushed stone of hard rocks (granites, blast furnace slag, etc.) lends itself well to cleaning. However, it is unclear whether it is possible to clean heavily polluted crushed stone from soft limestones due to the fact that the products of their weathering envelop the crushed stone with a dense crust, which practically cannot be removed. Currently, experimental work is being carried out to clean the washed gravel ballast.

The development of railway transport in recent years has been characterized by an increase in passenger traffic speeds and the loading of freight cars, which leads to an increase in the impact of rolling stock on engineering infrastructure facilities. These trends increase the relevance of the development of engineering solutions aimed at strengthening the railway track. Nevertheless, a structure including a rail-sleeper grid laid on a ballast layer interacting with the roadbed directly or through an artificial separation layer remains the most common type of railway track. In order to ensure safe and uninterrupted movement of trains with established speeds, the track must be in constant working order, i.e. comply with the requirements of regulatory and technical documentation. Therefore, maintaining the ballast and ensuring its optimal condition is an important task.

As is known, the prism of the ballast layer, made of any materials, from the point of view of its operation under the influence of the train load is divided into two layers – the upper and the underlying. The upper layer is active, active. It is most intensively subjected to changes in thickness, granulometric composition of the material, contamination and movement of particles in different directions. Contamination of the ballast layer is one of the main reasons for the deterioration of the geometry of the ballast prism in many countries.

Ballast contamination is the gradual penetration of various types of fine particles into the ballast layer, which eventually fills the ballast voids. This is the accumulation of material that is inside the ballast layer. Blockage and contamination of crushed stone occur as a result of its abrasion under the train

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load and when compacting the track with padding, as well as as a result of ingress of particles of transported goods and dust brought by wind and water into it. At the same time, pollutants most dramatically reduce the load-bearing capacity and resistance to shifting of the ballast prism, causing disruption of the path.

As they said, with the growth of traffic, the dynamic loads on the railway track increase, due to vertical and horizontal loads, the track gradually deforms and causes deviations from the required geometry, including the appearance of subsidence, secret shocks and gaps between the lower bed of sleepers and ballast in the way

Failure to eliminate these problems in a timely manner not only worsens the interaction of the track and rolling stock, but also causes the formation of splashes in the way.

Splashes of the path are a malfunction of the path, consisting in a strong dilution of the ballast under the sleepers. Splashes are formed due to the appearance of secret shocks (a gap between the lower bed of the sleepers and the ballast). When trains pass, the sleepers quickly settle and dirt is thrown out from under them onto the surface of the canvas. Splashes are obtained during rainy weather under each shaken and not timely shaken sleeper, under each shaken transfer beam lying in contaminated ballast.

As a rule, path splashes occur as a result of ballast contamination in the slopes of the ballast prism, where such contaminated ballast prevents water from escaping from the ballast layer. Pollutants from the ballast in the sleeper boxes are transferred by water to the ends of the sleepers and form dense bridges here that prevent water from escaping from the sleeper boxes. Under such conditions, the process of ballast contamination in sleeper boxes accelerates, the pumping action of sleepers increases with the formation of splashes, unfavorable conditions are created not only for the general condition of the track, but also for the operation of rails, sleepers and fasteners.

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