Technology of Work on the Replacement of Contaminated Ballast below the Sole of Sleepers

Samandarov Khushnudbek Odilbekovich, Mamurova Feruza Islomovna
Tashkent State Transport University

Annotation. Is main function is to evenly distribute the force from the sleepers to the main platform of the Earth's polotnos, to ensure the resistance of the sleepers to the effects of vertical and horizontal forces, to ensure the elasticity of the underground floor, as well as to adjust the rail-sleeper grid in profile and avoid overhead waters from it.

Key words: railway, element, soil, artificial structure, plot, train, speed, safe, movement, supply.

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.

Technological process of replacement of contaminated crushed stone ballast

The work is carried out by the 2nd track fitters of the 2nd category under the direction of the foreman of the track.

The ballast is cut out along the entire width of the prism of a single-track section or one track of a double-track section, including 20 cm behind the inter-track ends of the sleepers.

The ballast for replacement is located at the interstitial or roadside of the roadbed in sufficient quantity. Cutting out of sleeper boxes and along the slope of the prism to a depth of the sole of the sleepers with the release of contaminated ballast under the slope. Cutting and rumbling of crushed stone ballast. Cutting and rumbling of crushed stone ballast in the sleeper boxes and behind the ends of the sleepers to the eyebrows of the ballast prism are made to the sole of the sleepers before performing track work related to the violation of the ballast prism, and 10 cm below the sole of the sleepers when splashes appear. The wire sieve is installed on the side of the roadbed.

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 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.

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Splashes at the joints. Atmospheric water entering the contaminated ballast cannot leave it due to its low draining properties. In such ballast, under the influence of the pumping action of sleepers, splashes are formed during the passage of trains. Such splashes appear regardless of whether the ballast was polluted from below by the underlying soils of the roadbed or the contamination occurred in another way.

Therefore, splashes at the joints should not be completely dependent on the subsidence of the main platform of the roadbed with the formation of ballast troughs and beds. When opening ballast beds in them, the presence of water can be observed even in dry weather, and the ballast lying in them is in an uncompacted state. On the contrary, the ballast in the places of splashes under the joints is very dense.

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.

Ballast cleaning in tunnels has special features. The lifting of the track in tunnels to clean ballast is limited by the conditions of the tunnel size on top. In long tunnels, the ballast is usually not only dirty, but also wet; therefore, many roads do not try to clean it, since it is difficult to separate the sticky contaminant from the crushed stone mass. In such cases, the ballast is completely removed and replaced with a new one.

In short tunnels, the ballast is often dry and therefore well cleaned. On some roads, ballast is cleaned manually. In tunnels with good ventilation, special machines are used for cutting ballast from sleeper boxes and throwing it aside on the slopes of the ballast prism, where it is cleaned with crushed stone cleaning machines of the "Mole" type, or it is loaded with grappling cranes on a rail track into wagons and taken out of the tunnel. On one road, a crushed stone cleaning machine on a rail track is successfully used to clean ballast in tunnels, which cuts out crushed stone from under the sleepers and from the slopes of the ballast prism, cleans it and puts it back into the path, and the pollutant is loaded into gondola cars attached to the crushed stone cleaning machine with the help of conveyors. With this cleaning of crushed stone, the path is lowered by 1 cm, which allows you to further make three lifts of the path to a new ballast.

Literature

1. Лесов, Кувандик Сагинович, Игорь Иванович Кузнецов, Хушнудбек Одилбекович Самандаров, М.К. Кенжалиев. "ПРОБЛЕМЫ СОСТОЯНИЯ ПОВЕРХНОСТИ КАЧЕНИЯ ГОЛОВКИ НА СКОРОСТНЫХ И ВЫСОКОСКОРОСТНЫХ ЖЕЛЕЗНЫХ УЧАСТКАХ АО "УЗБЕКИСТАН ТЕМИР ЙОЛЛАРИ"." *Журнал Ташкентского института инженеров железнодорожного транспорта* 15, вып. 4 (2019): 3–9.
2. Mamurova, F. I. (2021). Factors for Forming the Professional Competence of Building Engineers in the Context of Information Education. *EFFLATOUNIA-Multidisciplinary Journal*, *5*(2).
3. Olimov, S. S., & Mamurova, D. I. (2021). Graphic Information Processing Technology and its Importance. *European Journal of Life Safety and Stability (2660-9630)*, *10*, 1-4.
4. Islomovna M. F. et al. DESIGNING THE METHODICAL SYSTEM OF THE TEACHING PROCESS OF COMPUTER GRAPHICS FOR THE SPECIALTY OF ENGINEER-BUILDER //Journal of Contemporary Issues in Business & Government. – 2021. – Т. 27. – №. 4
5. Makhmudov, A. A., and A. M. Khudayberganov. "Creative Lesson on the General Course of Physics on the Topic" Photoelectric Effect"." *Pioneer: Journal of Advanced Research and Scientific Progress* 1.6 (2022): 56-59.
6. Махмудов, А. А. "ОЛИЙ ЎҚУВ ЮРТЛАРИНИНГ АТОМ ФИЗИКА КУРСИДАГИ “ТАШҚИ ФОТОЭФФЕКТ” МАВЗУСИНИ ИННОВАЦИОН ТЕХНОЛОГИЯЛАРДАН ФОЙДАЛАНИБ ЎҚИТИШ МЕТОДИКАСИ." *Журнал Физико-математические науки* 2.1 (2021).
7. Makhmudov, A. A., & Khudayberganov, A. M. (2023). METHODS OF THEORETICAL TEACHING THE TOPIC" COMPTON EFFECT" OF THE SECTION" ATOMIC PHYSICS" OF THE COURSE OF GENERAL PHYSICS IN HIGHER EDUCATIONAL INSTITUTIONS. *Finland International Scientific Journal of Education, Social Science & Humanities*, *11*(1), 123-131.
8. Pirnazarov G. F., Mamurova F. I., Mamurova D. I. Calculation of Flat Ram by the Method of Displacement //EUROPEAN JOURNAL OF INNOVATION IN NONFORMAL EDUCATION. – 2022. – Т. 2. – №. 4. – С. 35-39.
9. Olimov, S. S., & Mamurova, D. I. (2021). Graphic Information Processing Technology and its Importance. *European Journal of Life Safety and Stability (2660-9630)*, *10*, 1-4.

10. Khodjayeva N. S., Mamurova D. I., Nafisa A. IMPORTANCE IN PEDAGOGICAL TECHNIQUES AND EDUCATIONAL ACTIVITY //International Engineering Journal For Research & Development. – 2020. – T. 5. – №. CONGRESS. – C. 5-5.
11. Pirnazarov, G. F. (2022). Symmetric Ram Migrations Style. *Procedia of Social Sciences and Humanities*, *2*, 9-11.
12. Pirnazarov G. F., ugli Azimjonov X. Q. Determine the Coefficients of the System of Canonical Equations of the Displacement Method and the Free Bounds, Solve the System //Kresna Social Science and Humanities Research. – 2022. – T. 4. – C. 9-13.