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EXPERIMENTAL RESEARCHES ON STRENGTHENING THE SLOPES OF THE ROADBED WITH GEOMATERIALS ON THE EXPERIMENTAL SECTION OF THE BUKHARA MISKEN RAILWAY LINE

LESOV KUVANDIK SAGINOVICH,

TADJIBAEV SHERZOD AMIRKULOVICH,

KENJALIEV MUHAMEDALI KAZBEK O'G'LI
Tashkent State Transport University, Tashkent, Uzbekistan

ABSTARCT:

The article describes the main areas of application of volumetric geogrids in the construction, reconstruction and repair of the roadbed of railways and highways. The process of conducting and the results of experimental researches on strengthening the slopes of the roadbed on the Bukhara – Misken railway line are presented.

KEYWORDS: methodology, experiment, technology, slope, geogrid, roadbed, soil.

INTRODUCTION:

In order to increase the economic efficiency of the project "Construction of the railway line Bukhara–Misken" as well as the practical involvement of the tourism potential of Khorezm region through the development of tourist routes, uniting in a single transport direction of the cities of Tashkent, Samarkand, Bukhara and Khiva, as well as further development of the transport infrastructure of the Republic of Karakalpakstan, Bukhara and Khorezm regions in December 2017 launched a new railway line Bukhara – Misken length of 355 km. With the launch of the new line, the distance between Tashkent and Urgench was reduced by 75 km. The new railway line runs through the desert regions of Uzbekistan. 80-90% of the railway's roadbed is constructed from local soils, i.e. sandy soils.

When building on different soils, their physical properties change, which may require changes not only in technology, but also in the design of structures. The quality of the roadbed determines the level of comfort of using railways. Based on this increase in stability and increase in the service life of the railway trackbed, as well as for the further launch of high –speed and high-speed train traffic on the Bukhara-Misken railway section, the use of modern innovative technologies and materials is purposeful [2].

To achieve the required reliability of the roadbed, it is necessary to develop methods for choosing the type of anti-deflation and anti-deformation (ADAD), ensuring both general and local stability of the slope with ADAD reinforcement. The developed design and technology of its creation will be especially appropriate for the construction of new and widening of the existing railways, where there is no undeveloped soil. It should be noted that it is for such conditions that several types of new promising geosynthetic materials become competitive [3].

At the same time, the final decision, obviously, should be made on the basis of a technical and economic comparison of the new structures with each other, taking into account the available local materials. Recommendations on the choice of parameters of technological schemes are the results of the experimental stage. When developing the technology for

strengthening the slopes of the railway roadbed from sandy soils with the use of geosynthetic materials, the requirements of regulatory documents are taken into account [4, 5].

When strengthening the slopes of the roadbed, three-dimensional geogrids are used. The main areas of application of volumetric geogrids in the construction, reconstruction and repair of the roadbed of roads and railways:

- Strengthening of flooded and non-flooded slopes, slopes instead of traditional types of reinforcement or in combination with them;
- Formation of reinforced structural layers;
- Construction of the roadbed in difficult construction conditions and strengthening of the working layer of the roadbed [6].

At the meeting, the acting Chairman of the Board of JSC " O'zbekiston temir yo'llari " from March 12, 2019 "On additional measures to accelerate the design and construction investment projects of JSC "O'zbekiston temir yo'llari " [7] discussed the urgent tasks for the "the Removal of an existing railway station, Tunguluk-Bulutli-Miskin with the flood zone Shurbulak reservoir " [8].

Employees of the Tashkent State Transport University (TSTU) are conducting research on the topic "Resource-saving structures and organizational and technological solutions for strengthening the roadbed of high-speed and high-speed railways" on the basis of an economic agreement with the Strategic development Department of JSC "UTY".

It is known that theoretical and experimental researches are conducted in any field before applying new innovative technologies in practice. Experimental researches on the use of modern energy-saving and resource-saving materials for the railway trackbed were carried out on the Kiyikli – Khizirbobo stage of km 4199 PK 1 of the Bukhara – Misken railway line.

To conduct the experimental research, the "Program and methodology of experimental research on strengthening the slopes of the earth bed of railways" was developed. The developed program and methodology were approved by the relevant services and approved by the Acting Chairman of the Management Board of "O'zbekiston temir yo'llari" JSC.

The main objectives of the program and methods of experimental research:

- Development of technology for strengthening the slopes of the roadbed with the use of advanced geosynthetic materials produced from local raw materials by representatives of the private sector;
- Determination of the effectiveness of the use of innovative materials and construction of roadbed objects;
- Selection of design and technological solutions for the implementation of the recommended methods;
- Development of practical recommendations for strengthening the slopes of the railway roadbed.

METHODS:

For experimental research, was selected the Bukhara – Misken railway line on the Kiyikli – Khizirbobo stage. The natural-climatic and soil characteristics of the selected site were studied and analyzed. Studies of the strength and filtration characteristics of geosynthetic materials were carried out to assess their suitability as geosote slotted structures. According to the results of the competitive selection, geosynthetic materials produced by "GEOTEXTILE" LLC were accepted for the experiment.

Comprehensive multivariate research and experiments to improve existing and develop

new designs subgrade and innovative technologies to strengthen its slopes, for the implementation of priority projects for the construction and reconstruction of Railways using the most promising energy-efficient and resursosberezheniya materials made on the basis of the order of the acting Chairman of the Board of JSC "O'zbekiston temir yo'llari " from October 29, 2020 №.729-N "On conducting experimental researches on strengthening slopes of roadbed on the section railway line Bukhara–Misken" [9].

Experimental researches were conducted in the period of November 7-12, 2020 by TSTU employees in accordance with the "Program and methodology of experimental researches on strengthening the slopes of the earth bed of railways".

The most complex processes in the technology of strengthening geosote structures are the processes of laying and compacting the soil. Depending on the scope of work on anti-erosion protection, the complexity of the design and the properties of the backfill material-you can use either manual or mechanized production technology. In our case, the manual technology of work production is adopted.

The technological sequence (stages) of conducting experiments on the Kiyikli – Khizirbobo stage km 4199 PK 1 are shown in the figures:

- The process of laying getextile on the slopes of the roadbed (fig. 1);
- The process of installing geogrids on the slopes of the roadbed (fig. 2);
- The process of filling the geogrid cells with local soil with parallel sowing of seeds of sand-loving grasses (fig. 3);
- The final view of strengthening the slopes of the roadbed with geosynthetic materials (fig. 4)

Figure-1. The process of laying geotextile on the slopes of the subgrade (Kiyikli – Khizirbobo stage km 4199 PK 1)

Figure-2. The process of installation of geogrids on the slopes of the subgrade (Kiyikli – Khizirbobo stage km 4199 PK 1)

Figure-3. The process of filling the geogrid cells with local soil with parallel sowing of sand-loving grass seeds (Kiyikli – Khizirbobo stage km 4199 PK 1)

Figure-4. Final view of strengthening the slopes of the roadbed with geosynthetic materials (Kiyikli–Khizirbobo stage km 4199 PK 1)

Based on the results of the conducted experimental researches, an act on conducting experimental researches and a protocol of experimental researches under item No. 3 of the Program and Methodology of Experimental researches on strengthening the slopes of the earth bed of railways were drawn up.

CONCLUSION:

The experimental researches conducted to strengthen the slopes of the roadbed on the Bukhara-Misken railway line allow us to draw the following conclusions:

- The "Program And Methodology Of Experimental Research On Strengthening The Slopes Of The Railway Roadbed" Has Been Developed To Ensure The Technical Condition Of The Railway Roadbed;
- Developed Technologies For Strengthening The Slopes Of The Roadbed With The Use Of Promising Geosynthetic Materials Produced From Local Raw Materials By Representatives Of The Private Sector;
- The Effectiveness Of The Use Of Innovative Materials And The Design Of Objects Of The Roadbed Is Determined;
- Proposed Design And Technological Solutions For The Implementation Of The Recommended Methods;
- Practical Recommendations For Strengthening The Slopes Of The Railway Roadbed Are Given.

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