

HIGHWAY CONSTRUCTION TECHNOLOGY TO ENSURE ROAD SAFETY

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Annotation: *This article discusses the significance of modern highway construction technology in ensuring road safety. Poor road conditions often lead to unexpected vehicle collisions, resulting in traffic accidents. The authors highlight key construction stages, such as geodetic surveys, drainage system installation, and road layer reinforcement, which are essential for improving road infrastructure quality and safety. Additionally, the article presents the characteristics of asphalt and cement-concrete pavements widely used in international highways.*

Keywords: *highway construction, road safety, asphalt pavement, cement-concrete, drainage system, geodetic survey, road infrastructure, traffic accidents.*

As is known, the main causes of traffic accidents on road sections with unsatisfactory condition of the road surface are collisions of cars moving at a short distance, when the car in front sharply brakes in front of an unevenness (or pothole), as well as collisions of cars when suddenly driving into oncoming traffic. when trying to avoid uneven surfaces. Traffic accidents are also possible at night due to drivers being blinded by the reflected light of headlights from the surface of the water filling the uneven surfaces. [1].

In this regard, current areas for ensuring road safety are:

improving the infrastructure of highways and improving their quality, creating reliable conditions for the safe movement of road users based on the principle of priority “pedestrian – public transport – bicycle – motor transport”;

raising the educational process of training, retraining drivers, improving their qualifications to a qualitatively new level with the introduction of innovative pedagogical technologies into the system;

improving the culture of compliance with traffic rules by drivers and pedestrians, ensuring the inevitability of punishment for any offense;

organizing the inculcation of the basics of traffic rules from childhood, introducing this practice in preschool education organizations and secondary schools;

complete digitalization of traffic management, the use of new management and control systems with the introduction of advanced information and communication technologies [2].

To ensure the safety of vehicles, of the above, improving the infrastructure of highways and improving their quality are one of the main priorities.

If the road construction technology is followed, the surface must be durable, smooth and even. It must comply with established standards and requirements and ensure the safe movement of all types of vehicles.

It is important that experienced specialists are responsible for the design and laying of the route. Then all possible risks will be minimized.

When building a highway, speaking about the features, it is necessary to list the main working stages, such as:

Geodetic survey, which is carried out to obtain original plans of the area. Performed by measuring heights, angles, distances using different tools.

Breakdown of the site, based on a previously drawn up plan, the territory is divided into zones. Schematically mark where the road will go. Special attention is paid to the depth of groundwater, soil type, and relief analysis.

The next stage is preparatory manipulations. The area where construction will take place is carefully cleared. If necessary, communications (power lines, pipelines) are moved. Remove all objects that could interfere with the construction project.

Preparation of documentation reflecting upcoming expenses. Experts carry out calculations that show how much it will cost to build a highway. All calculations are accurate. Based on them, materials and equipment are purchased.

When carrying out excavation work, they are aimed at obtaining the required terrain. Using construction equipment, workers level and evenly distribute the soil, remove unnecessary hills, and dig holes.

Construction of a drainage system. Installation of a water pipeline during the construction of a highway is a very important stage. Thanks to it, precipitation in the form of rain and melted snow does not accumulate on the asphalt surface. The most common and affordable option for a drainage system is ditches running on both sides of the route. In this case, the side surfaces of the road are made slightly beveled so that the liquid quickly and easily flows into the side recesses.

The formation of a road “cushion” is a shock-absorbing layer that reduces the impact of cars on the road. The “pillow” seems to be springy, due to which the layers forming the coating are not destroyed. It is formed by sand and gravel, laid according to a certain technology and compacted with road rollers [3].

The last stage of construction is the installation of the finishing coating. Most often this is asphalt or cement concrete pavement. The performance properties of the laid tracks directly depend on the choice of material.

If necessary, specialists will build a temporary bypass road before starting construction work. It consists of asphalt chips, brick or concrete scraps - cheap and accessible recyclable materials, which can be easily removed later. The bypass allows motorists to easily reach their final destination while construction is actively underway.

Before laying the finishing layer, the road is watered with bitumen. This is a viscous mixture that provides reliable adhesion to adjacent materials.

Then the construction company is faced with the question of what finishing coating to lay. The appearance and service life of the route directly depend on its thickness and characteristics. The better and more expensive the top layer, the longer the roadway will last.

The most popular are asphalt and cement concrete materials. The second one is chosen if we are talking about a coating with a high traffic load [4].

The technology of its installation is well developed. There are such methods: cold, hot, cast, colored, rubber and plastic.

Asphalt solution is the solution to most road problems. It is mixed with bitumen, sand, crushed stone or gravel, and mineral powder. The ratio of components and their fractions are determined individually. This takes into account the type of road and the expected volume of traffic.

A cement concrete material that is in high demand in Western countries. It is stronger and more durable than asphalt. It is used during the construction of highways with high traffic congestion.

The only disadvantage of this coating is its high price. But it should be noted, it pays for itself in full, because it lasts a very long time and does not require frequent expensive repairs.

Cement concrete sheets can withstand moisture and temperature changes very well. They break down very slowly. Resistant to mechanical abrasion and high external pressure. Do not change their performance characteristics under the influence of chemical reagents that utilities use in the cold season to prevent the formation of ice [5].

In the production of building mixtures, special cement is used. It is poured into formwork located on a prepared base. A reinforcing mesh is placed into the thickness of the cement concrete mass. It makes the road as durable as possible.

Another technological feature is the cutting of longitudinal and transverse seams. They are needed so that the road does not begin to deteriorate from heat and frost, and can easily withstand different temperature influences.

Thus, today the most common roads are with asphalt and cement concrete surfaces.

References:

1. Saprykin S.S., Saprykin V.V. Pask. Vliyaniye sostoyaniya proyezzhey chasti i dorozhnykh usloviy na bezopasnost' dorozhnogo dvizheniya // Vestnik magistratury, 2022. – № 3-1 (126). – S.6-8. (in russian).
2. Kak obespechat bezopasnost' dorozhnogo dvizheniya. – URL: https://www.norma.uz/novoe_v_zakonodatelstve/kak_obespechat_bezopasnost_d_orojnogo_dvijeniya (date of access: 27.10.2024).
3. Ruzibaev A.N., Shukurov N.R., Khuzhanazarov B.F. Ways to increase the durability of the teeth of the working body of engineering machines // European science, 2021. – № 3 (59). – P.9-12.
4. Abidjanov Z.H. Shukurov N.R., Kuchkarov B.T., Muhamadiev G.M. To the question of increasing efficiency of developing soils of higher strength //European Research, 2020. – № 5 (63). – P.25-28.
5. Khudaynazarov, F. (2020). Political and Dynastic Relations Of Kievan Rus. The American Journal of Interdisciplinary Innovations and Research, 2(08), 55-64.
6. Stroitel'stvo avtomobil'nykh dorog: ucheb. posobiye / V. N. Yaromko [i dr.]; pod obshch. red. V. N. Yaromko, YA. N. Kovaleva. – Minsk: Vysheyschaya shkola, 2016. – 471 s. (in russian).

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