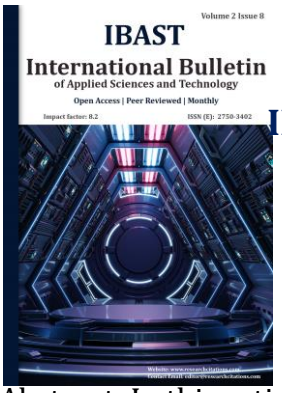

WORKS CONDUCTED IN FOREIGN COUNTRIES ON THE PROTECTION OF THE RAILWAY AND ITS INSTRUCTIONS IN EMERGENCIES OF NATURAL SITUATIONS

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Abstract: In this article, the natural disaster, the consequences of the flood and the methods of protection against it were highlighted. At the same time, this issue was approached with modern solutions and suggestions.

Key words: mountain areas, floods, railway lines and roads, natural disasters, flood areas.

Natural disasters cause great damage to public facilities. Earthquakes, floods, volcanic eruptions, epidemics, epizootics and epiphytotic diseases disrupt people's daily lives. Hydrogeological conditions play an important role in this. Floods and torrents that occur especially on the lines of railways passing through the mountainous regions of the Republic can slow down or even stop the movement. This will derail the railway schedule throughout the Republic. A flood is defined in hydrological science as a flood - a flood with a very high concentration of mineral particles, stones and rock fragments (up to 50-60% of the flow volume), which occurs in the basins of small mountain rivers and dry ravines, and is usually caused by heavy precipitation or rapid melting of snow. occurs as a result. Flood is a phenomenon between liquid and solid mass. This phenomenon is short-term (usually lasts 1-3 hours), is 25-30 km long, and the water basin is 30-50 square km. is typical of small streams. Picture 1.

Figure 1. The effect of a heavy flood on the railway

Flood is a terrible force. A mixture of water, mud and rock rushes down the river, uprooting trees, destroying bridges and dams, washing away valley slopes and destroying crops. When you are close to the flood, you can feel the earth shaking from the impact of rocks and stones, smell sulfur gas from the rubbing of stones against each other, and hear a loud noise like the noise of a stone crusher.

The danger of flood flows is not only in their destructive power, but also in their sudden appearance. After all, the rain that falls in the mountains often does not cover the foothills, and floods occur unexpectedly in populated areas. Due to the high speed of the flow, the time from the moment of flood in the mountains until it reaches the foothills is sometimes 20-30 minutes.

As mountains vary, so do flood flows in terms of frequency, solids content and size, and maximum flow. The decisive factor here is not the height of the mountains, but the steepness of the slopes, or, as they say, the energy of the relief. The minimum slope of the flood flow is 10-15%, the maximum is 60-80%.

According to the content of the transported solid material, flood flows are generally divided into:

- mud flows. -a mixture of water with fine soil with a small concentration of stones. Weight 1.5-2.0 t / m3; (In the mountainous regions of the republic in the direction of the Angren-Pop railway).
- mud-stone streams - water mixture, small soil, gravel, small stones; there are also large stones, but there are not many of them, they either fall out of the stream or start moving again with it. Volume weight 2.1-2.5 t/cubic m; (along the Guzor-Darband-Boisun railway route).
- water-rock flows - mainly a mixture of water with large stones, including stones and rock fragments. Volume weight 1.1-1.5 t/cubic m. (In Chimiyan, Humson mountain areas, along the Ugama river, Bildirsoy, Amirsoy).

According to the results of our scientists who studied flood flows, floods are also classified according to the volume of solid mass:

Flood layer	Flood volume
Small	0.1 - 1.0 thousand. m^3
Higher	1.0 - 10 thousand. m3
High	10 - 100 thousand. m^3
Very high	0.1 - 1.0 million m^3
At a great height	1 - 10 mln. m^3
Huge	10 - 100 mln. m^3

In the event of a flood, many cracks appear in the rock and cause it to crumble. The described process is facilitated by the periodic freezing and thawing of water filling the cracks. The frozen water increases in volume and presses with great force on the crack walls. In addition, rocks are damaged by chemical decomposition (dissolution and oxidation of mineral particles by underground and surface water), as well as by organic weathering under the action of micro- and macro-organisms. In most cases, floods are caused by heavy rainfall, frequent heavy snowmelt, as well as the formation of cracks in choked areas of dammed lakes, landslides and earthquakes. However, each mountainous region is characterized by certain statistical data of flood flow causes. Picture 2.

Figure 2. Impact of heavy landslides on the railway

In general, the process of formation of storm surges proceeds as follows. At first, water rushes down the slope, filling holes and cracks. In this case, the binding forces between the particles are sharply weakened, and the loose rock comes to an unstable equilibrium state. Then the water begins to flow from the surface. Small particles of soil move first, then stones and gravel, and finally stones and boulders (pieces of rock). The process escalates like an avalanche. All this mass enters the gully or channel and involves the movement of new masses of loose rock. If the flow of water is not enough, then the flood seems to be out of breath. Small particles and small stones are carried down by the water, and large stones form a river bed on their own in the channel.

The cessation of flood flow can also occur as a result of a decrease in the flow rate with a decrease in the slope of the river. Clear recurrence of flood flows is not observed. It is noted that the previous long dry weather contributed to the formation of mud and mud-stone flows. At the same time, masses of small clay and sand particles accumulate on the mountain slopes. They are washed away by rain. The pressure of water-rock streams is enhanced by previous rainy weather. After all, solid materials for these streams are mainly located at the foot of steep hills and in the channels of rivers and streams. If the previous moisture content is good, the bonding of the stones to each other and to the rock is weakened.

Storm floods are episodic. Dozens of significant floods can pass over several years, and only then does a flood occur in a very wet year. Floods are often observed in the river. After all, in any relatively large flood basin, there are many flood centers, and the rains first cover one center, then another.

A flood flow, unlike a water flow, can move not continuously, but separately continuously, then almost stop, and then speed up again. This is due to the delay of the flood mass in the narrowing of the channel, in sharp turns, in places of a sharp decrease in the slope. If usually the speed of the flood flow is 2.5-4.0 m/s, then when the blockage is broken, it sometimes reaches 8-10 m/s; water consumption increases 3-5 times. The movement of flood flow in successive shafts is not only associated with jamming, but also with the non-simultaneous flow of water and loose materials from different sources, rock fall from the slopes, and finally with the jamming of large stones and rock fragments in narrowed areas. The most important deformations of the channel occur during blockage.

Here are examples of the passage of destructive flood currents.

Breaking through the fortified ramparts on the right bank, an avalanche of stones and earth will pass into the quarters of the city, sweeping away and destroying everything in its path. Where buildings block the flow, it sweeps them away, or it enters the building from one side,

without changing its direction, and leaves from the opposite side, carrying all the contents of the houses. Figure 3.

Figure 3. Ways to protect railways from natural disasters

Washed down streets, trees, poles and cars, along with basalt blocks, it entered the yards and often remained in the basements of houses. The steel rails and girders of the ruined bridges twisted in the strangest way; the cobblestones and asphalt pavements of the roads are washed away by the current.

With a sudden and rising speed, the wave initially looks like a pile of water and sediment, including huge stones with a diameter of 1.0-1.5 m. As it moves through the streets, the wave breaks up and flattens, dumping rocks and fine sediment onto flooded streets and yards.

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