UDK 66

STABILITY OF RETAINING WALLS IN KRASNOYARSK AND GEOHAZARDS LEADING TO THEIR DESTRUCTION

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A retaining wall is a structure designed to hold the weight of earth from caving. Usually retaining structures are located near houses, roads and other facilities when it is necessary to provide a sharp drop in the grade.

Failure of retaining wall can occur because of two reasons: loss of strength and loss of stability.

In the first case, the material strength of the wall strength, its elements, coupling parts and assemblies becomes insufficient. If actual strength properties of steel reinforcement, concrete, masonry are less than necessary, it can lead to the destruction of the whole wall structure.

In the second case, the wall itself is strong enough, it is not destroyed but there occurs wall displacement from the design position.

We would like to focus on the second case.

Why does a retaining wall become unstable? What are the accompanying geological processes?

We need to figure it out, because this is an urgent problem for Krasnoyarsk.

Unfortunately, there was already a collapse of the wall in Akademgorodok where a massive retaining wall fell and there were some victims.

Geohazards cause the destruction of retaining walls.

Exogenous processes are those processes that occur under the influence of external forces. As a rule, they are dangerous for people and constructions, so they are often called geohazards. They include frost heave, suffusion, and karst erosion.

Frost heave is an increase of freezing of moist soils and loose rocks due to the crystallization of contained water (forming ice layers, lens, etc.) and the decompression of the mineral particles.

It occurs in the areas of seasonal and permafrost rock. Frost heave causes uneven lifting of freezing rock. Unequal uplift is due to the differences in conditions of freezing of the rocks, their moisture, density, etc. Highly susceptible to frost heaving are clay rocks as their frost heave depends not only on the moisture, but also on the migration moisture coming in the ground freezes from adjacent unfrozen zones.

Stresses in soils with frost heaving , can cause rupture of the root system of plants, deformation and displacement of structures, etc. To avoid the adverse effects of frost heaving conduct reclamation work, the soil is treated with substances that alter its physical and chemical properties using special constructions.

Suffusion - the process is mechanical removal of fine particles of solid rock under the influence of groundwater flow. Suffusion leads to subsidence and overburden formation of sinkholes (suffusion funnels, saucers, basins) with a diameter of up to 10 and even 100 meters, as well as caves.

Suffusion is a major cause of failures on the road.

Karst is the process of leaching of soluble rocks groundwater and solute removal through underground channels and landforms resulting from this process.

There are several conditions necessary for the development of karst phenomena.

First, is the presence in natural water soluble rock permeable due to fracturing or porosity.

Secondly, the presence of a solvent, i.e. water to aggressive rock.

Third, the conditions for water exchange - outflow of saturated water and solute constant flow of fresh solvent.

If the first condition is determined by the geological structure of the area , the second and third part are closely related to the physiographic setting, and the second with land cover and climate, and the third with the geomorphological and hydrological conditions in addition to the geological structure and hydrogeological characteristics.

Erosion is the destruction of rocks and soil surface water currents and wind, including the separation and removal of debris material and accompanied by their

To prevent the destruction of retaining walls is necessary to consider the groundwater regime and to ensure good drainage. In addition, it is necessary to protect the walls from falling into their precipitation, and of course, you need to use quality concrete, this also applies to the cement and fillers used fittings and apply resistant to physical and chemical weathering facing materials. A more desirable profile walls do step - spire.