

METHOD OF DETERMINING THE SPEED OF SHEET WASHOUT FOR DESIGN OF STRUCTURES ON SLOPES

The authors present the study of sheet washout of soil relevant in the framework of the stability of structures, retaining walls and trays over them, pillars of stairs, power lines and other structures on the slopes.

Flushing speed can be approximately defined using phytoindicational way, determining the depth of erosion of the soil near perennial plants, the roots of which are naked. This approach to determining the rate of sheet erosion has been used by many scientists. The techniques offered in their works were created to improve the agricultural use of the lands for the territories of Central Asia. In order to protect the structures in natural areas of Moscow, the authors suggested their methods.

It is assumed that the beginning of the erosion process in the measuring point coincides with the beginning of tree growth. At this point its root neck was at the level of the earth. Thus, for the rate of erosion we accepted the height position of root neck of the tree. The measurement should be horizontal to the tree in connection with the retention of soil by the tree and "hill" formation on the top side of the tree and rich soil washout from the bottom side. The average annual rate of erosion can be calculated by determining the age of the tree and by measuring the excess of root neck above the surface of the slope. The age of the tree may be determined by the correlation of age with a diameter of a tree, measured at height of 1.3 m above the ground level. The average annual increase in the diameter of a tree can be defined on the stumps, available in the study area. When calculating the age of trees to clarify the diameters, it is recommended to make allowance for the thickness of the crust.

It was noted that the study of the process of sheet washout should be made in condition of stability of influencing factors: climate, topography, geology, soils, vegetation and human activities. In order to validate the approach, the slopes of ravines in the Neskuchny Garden in Moscow were chosen. The selected slopes have similar climatic, geological, geomorphological, soil and phytological signs. This allows the authors to gather material for statistical analysis of the investigated process. In their experiment, the authors used lime trees and maples. Single measurement was made on elms and oaks. As an example, the authors present the results of measurements on site 1, located on the right side of the ravine Neskuchny Garden. A fairly high correlation coefficient ($K=0.91$) indicates strong linear relationship of flushing depth and the tree diameter and proves the validity of this method for approximate calculation of the depth of sheet washout.

Key words: slope, sheet washout, dispersive soil, washout depth, washout velocity, tree diameter, root neck, soil, ground, bedrock, vegetative cover, Neskuchny Garden.

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