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# The effect of plant root system on the stability of road cutting slope in seasonal frozen regions

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When highway is built in seasonally frozen regions of Northeast China, it is inevitable to excavate the mountain slope in order to meet the route requirement. During highway construction, a mass of extraction damage the surface vegetation and cut off the runoff passage of groundwater, cause the outcrop of underground water on the cutting slope and affect the intrinsic ground stress equilibrium of the slope body, lead to the redistribution of ground stress and the heat balance change in near-surface of the cutting slope. Under influence of rainfall in autumn and the cold climate in winter, the moisture transfer to frozen zone of cutting slope and lead to the frost heave in shallow depth of the slope. During the thawing period in spring, with effect of integrated factors including rainfall and increasing temperature, ice kernels both on the surface and near the surface of cut slope thaw quickly. The water melting from frozen soil, will hampered by frozen layer in process of infiltration. As a result, the water content of the intersection between the freezing and melting layer is high enough to be saturation or even over-saturation, and accordingly cause the intrinsic effective stress on the slope body decreased. Under the function of gravity, near-surface slope collapses partially or entirely. Adopted the method combined field test and lab test, this article analyzed the mechanism of slope landslide, studied quantitatively the effect of root system of slope plant on the slope stability. The results showed that the mechanical indicators of the soil changed obviously after the first freeze-thaw cycle, but changed little in later freeze-thaw cycles. The shear strength of root-soil systems is 2 times of soil system. Compared with masonry body, protecting the slope by the plant, such as Amorpha, Lespedeza could reduce the slope load and was more stability.

Key words: road slope, seasonal frozen regions, plant protection, stability, landslide