01-19-02 Widening of Cuts, Assignment D1-3-18

1.4.4 WIDENING OF CUTS (2019)

1.4.4.1 Rock Cuts

a. Before excavation is planned, rock mapping should be performed to determine the engineering characteristics of the exposed rock. Details of dip, joints, stratification, general competence, and zones of weakness should be noted, along with the depth and type of overburden.

b. The new slope should be suited to the characteristics of the rock, in which it is made, to prevent toppling, wedge and sliding failures, so that minimum maintenance is required in the future. For example, the slope could be cut at the angle of dip, benches cut into the rock face, and/or the slope varied with the weathering resistance of the various rock layers. Drainage should be provided to reduce erosion and weathering. (See Article 1.2.2.1, General for design procedure).

c. Methods of treatment to stabilize the slope or protect the track from falling rocks may be considered as an alternative to widening an unsafe rock cut or applied in conjunction with excavation of the new slope.

d. Blasting should be used only with approval of the Engineer. The method of blasting chosen is most important in reducing future rock scaling and other maintenance work required. Blasting programs should be designed by qualified personnel. Control of flyrock is important. The use of presplitting for producing a clean finished rock face should be considered.

1.4.4.2 Earth Cuts

a. Cuts are widened in railway maintenance work to improve drainage, increase the stability of slopes, reduce difficulties in maintaining track or clearing snow, or sometimes to obtain borrow materials. Regardless, it is important that good drainage be provided to maintain stable cut backslopes.

b. Article 1.2.2.5, Cuts in Soil provides general recommendations for use when choosing slopes that are safe for cuts in various soils. The reduction of seepage pressures within the slope by means of horizontal drains may be critical in cuts that have water-bearing soil layers. The selection of a safe cut slope may be derived from an inspection of nearby stable cuts or natural slopes in similar soils. Existing conditions that need to be taken into consideration include differences in the level of the groundwater table, vegetation, and other factors that influence stability.

c. In making the cut, even temporary over-steepening (or undercutting) of potentially unstable slopes should be avoided, especially if the work is done during a wet season. Temporary shoring can be used to support the back slope of the ditch cut if there is restricted right-of-way that doesn't allow for the entire backslope to be laid back to a stable slope. Drainage through the shoring should always be provided.

d. In sidehill cuts, material excavated from the upper slope should not be placed on the outer downhill shoulder and/or above the downhill slope, if avoidable. This practice adds weight on the downhill shoulder and slope and can cause failure of the downhill slope. Such excavated material should be wasted in an approved area.

e. Vegetative root systems can help to bind a slope together while removing subsurface water that can also improve slope stability. The vegetation should be preserved to the

maximum extent possible on stable slopes. Vegetative cover should be promptly reestablished on newly excavated cut slopes to minimize surface erosion and slope instability. Surface drainage in a widened cut should be planned according to Article 1.2.4.2, Surface Drainage. A drainage system that is sufficient to handle surface runoff from both the cut slope and the roadbed is essential. Drainage of water from the top of the slope should be intercepted and brought around or down the slope without causing surface erosion.