1985/61. Examination of land stability of proposed logging areas, Triabunna district

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Abstract

Several proposed logging areas in the Triabunna district were examined for potential slope stability problems because of unusual ground features observed. The areas all show signs of past landslide activity, which may require sensitive treatment during logging.

INTRODUCTION

Forestry Commission officers from the Triabunna District and the T.P.F.H. road locator have observed unusual ground features in several proposed logging areas. The configuration of the ground contours suggested potential slope stability problems and the opinion of the Department of Mines was sought. The areas were visited by the author, Forestry Commission officers, and the road locator.

GREENWOOD ROAD

An active landslide about 40 m across and of similar length is present on a rolling slope of about 14° at Greenwood Road. Large boulders of sandstone occur in the failed mass and behind the two metre high head-scarp of the slide. Sliding appears to have occurred on a layer of clay and was probably initiated by undercutting toe support during construction of the logging road across the slope. The slide is being fed by surface and subsurface water.

The landslide is a problem in that the toe bulge has impinged onto the road surface, effectively narrowing the road. Further movements can be expected as the failed mass seeks an equilibrium. Vibrations from passing log traffic may liquefy portions of the failed mass and instigate further movements.

A variety of methods was discussed in the field to overcome the problem. In summary these are:

(1) provide an alternative access.

(2) provide drainage to intercept the surface and subsurface waters. After the failed mass has had an opportunity to drain and dry out, the toe could be excavated to below existing road level. The trench so formed should be provided with a drainage outlet and back-filled with large boulders and other free-draining materials. This back-fill will act as toe support to resist future movements.

(3) provide drainage facilities as above and widen the existing road by filling on the downslope side.

(4) provide drainage facilities as above and sheet pile the toe of the slide along the alignment of the original catch drain.

Several mature trees within the failed mass appear to be in danger of falling and should be removed. It would be prudent otherwise not to log the slope upon which the landslide has occurred. In particular trees should not be removed upslope of the failed mass.

WIELANGTA (571552730)

The proposed logging area north of Jacob Hill lies between the Sandspit River and Pony Bottom Creek at elevations of 100-300 m. Dolerite occurs at Jacob Hill and sandstone at Wielangta. Logging is proposed on the overall slope between these two features where the ground contours are distorted and irregular. Terraces or benches, backslopes, areas of internal drainage and ponding occur on the overall slope. Masses of jointed dolerite were observed on the higher portions of the slope and a sheet of sandstone on the lower portions. It is considered that the slope comprises slope debris derived from both the dolerite and sandstone.

The area undoubtedly has been affected by past landslide activity on a relatively large scale. A cautious approach to logging is warranted.

Access roads could be made through the area provided they were located so as not to disrupt the natural drainage lines, to avoid undercutting the toe bulges of past landslides, and were located as centrally as possible along the width of the individual terraces or benches. Clear-felling would appear to be unwise but selective logging of the relatively flat terraces and areas away from drainage lines might be considered. It would be prudent to cease logging short of the edge of terraces and any slope segment which exceeds 15°. An inspection of drainage lines after any logging may indicate areas where the natural drainage should be improved.

APSLAWN (598053575)

The proposed logging area between Kazies and Stingles Creeks lies on a rolling slope between the 100 m and 250 m contours. A ridge of jointed dolerite occurs to the north. The surface materials consist of dolerite slope debris with silty clay soils containing minor lateritic gravels. These are expected to be underlain at an unknown depth by the Upper Parmeener Super-Group sediments which contain the coal measures of the Llandaff Coalfield.

The ground contours are irregular. Terraces exist, often with a minor backslope, and areas of internal drainage and ponded water were observed. Deep gully erosion has occurred. Trash racks up to 15 m wide, sometimes on minor crests, were noted during the site inspection. Past landslide movement is evident. In places the ground is severely distressed with open tension cracks indicating active landslides.

A delicate state of equilibrium exists between slope stability and failure in the proposed Apslawn logging area. Minor disturbances to the slope could be expected to initiate landslides. The current vegetation cover of this area plays a significant role in resisting slope movements by intercepting precipitation, binding the slope materials together, and evapotranspiration. The effect of providing access roads, clear-felling, or even selective falling of timber would appear to be at the risk of destabilising the slope.

Given the delicate state of equilibrium of the ground in the proposed Apslawn logging area, it is considered unwise to log this area.

DOUGLAS RIVER (599053755)

This proposed logging area is between the Mayson River and Possum Creek, on a rolling slope between the 300 m and 500 m contours. A ridge of dolerite occurs to the west and relatively steep slopes leading down

to the Douglas River occur to the east. The proposed logging area forms part of the proposed recreation priority zone in the Douglas/Apsley area. There is speculation that the proposed logging sites will be visible from the prominent scenic feature of Nichols Cap.

The surface materials consist of dolerite slope debris, clayey soils and lateritic gravelly silty clay. The Upper Parmeener Super-Group sediments, which contain the coal measures of the Douglas River Coalfield, are expected to occur at an unknown depth below the slope debris deposits.

The ground contours are irregular. Gentle slopes abruptly give way to steeper slopes which are succeeded upslope by gentle backslopes. Hollows and areas of internal drainage exist. This succession, in whole or part, is repeated across the width and length of the slope. The general landscape is indicative of past landslide activity. Currently active landslides were not observed during the brief inspection of this area.

It would appear that some logging operations could be conducted on the slope if meticulously managed. The slope is relatively wide. Its outer edge should not be logged but a buffer zone at least 100 m wide should remain unlogged upslope of the convex break or change of slope where the slope steepens down to the Douglas River. This zone could serve two purposes. Firstly, it might act to screen the logging operations from Nichols Cap and other points within the recreational zone. Secondly, if sufficiently wide, it would act as a buttress should landslides occur further upslope.

DISCUSSION

The proposed logging areas examined *i.e.* Wielangta, Apslawn and Douglas River, have each been affected by past landslide activities. The overall slopes are generally stepped, with relatively undulating benches of various widths being flanked behind and in front by relatively steeper slopes. These steeper slopes may be the headscarp or toe bulge of landslides or incised valley slopes of rivers and streams. During logging operations access roads are made into these areas which are then criss-crossed by snig trails and skid tracks. The vegetation is removed and the soils disturbed. Each of these activities can contribute to a decrease in the stability of the slopes.

Access roads should avoid cutting into the steeper slopes which delineate individual benches. In the areas examined, these steeper slopes usually mark the limits of past landslides. In particular road cuts into the toe bulges of landslides removes support and increases the risk of movement (as at Greenwood Road). Cuttings into the lateral edges of past landslides run less risk of contributing to movement, particularly if the cuts are short and made relatively flat.

The skid trails and snig tracks can concentrate surface waters into depressions if drainage outlets are not provided. In the areas examined such depressions are usually associated with the backslopes of past landslides and may allow water to concentrate into a previously failed mass near old headscarps. This water could serve to lubricate planes of weakness and contribute to future mass movements. The locating of log landings in depressions is to be avoided.

CONCLUSIONS

(1) The areas examined all exhibit signs of past landslide activity and as such are sensitive to disturbance.

(2) At Apslawn, portions of the ground are obviously distressed and any disturbance to the ground is considered unwise.

(3) At Wielangta, it should be possible to construct access roads across the old landslides by locating the roads carefully on the mid-sections of terraces or benches. Some selective logging, if carefully managed, should be possible on the benches.

(4) At Douglas River, similar precautions to the Wielangta area should be adopted, but here the overall slope segment is broader and the provision of a buffer zone before the steepening of the slope down to the Douglas River may allow more intensive logging.

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