UR1976_37

# 1976/37. Instability near the Bass Highway, Parklands, Burnie.

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This area [DQ062555] was examined during the week ending 28 May 1976 following reports of unstable soil conditions. A section of the cutting on the south side of the Bass Highway has been subject to movement in the past causing disruption to traffic. Reports have previously been written on the area *e.g.* Jennings, 1963. If remedial measures had not been taken following the 1962 movements houses would probably have eventually been seriously affected.

## TOPOGRAPHY AND GEOLOGY

The Bass Highway and the railway line have been built directly behind the shoreline. In constructing the road, the toe of a slope was removed and a steeper slope, 8 m high with narrow berms formed. Above this slope is a platform about 100 m wide, which slopes gently seaward and on which houses have been built. Behind this platform the land surface rises steeply to a dissected plateau about 100 m above sea level.

Precambrian dolerite crops out along the shoreline and slate and quartzite of Precambrian age occur at intervals on the steep slope behind the platform. The platform is underlain by clay, and boulders of basalt and Precambrian rocks. This deposit is probably debris from old slips that have formed on the steep slope below the plateau. This debris covers the contact between the dolerite and the slate and quartzite. Excavation of the toe area where the cutting slipped in 1962 showed that the debris near the cutting lies on a seaward sloping surface of weathered dolerite above road level. Whether this situation occurs along the whole length of the cutting is unknown.

## PAST AND PRESENT MOVEMENTS

A gravity retaining wall was built in front of the slip that occurred in 1962 and this part of the cutting has since been stable. The slip surface was probably the contact of the clay with rock debris and the weathered dolerite (*i.e.* a seaward sloping contact and possibly a zone in which water may percolate).

During the last few months a reinforced concrete wall about 0.8 m thick and extending about one metre into clay below road level has been constructed to retain the cutting east of the older wall. During excavation for the wall the face behind it slumped (in front of 79 Button Street) and a length of Button Street (an access road to houses near the seaward edge of the platform which is parallel to the Bass Highway) moved down about one metre. The movement affected about half the width of the roadway for a length of about 40 m. The slip surface of this slump could be seen about 1.5 m above the level of the Bass Highway (Mr Rapier, Burnie Council Engineer, pers. comm.). Gravel has been placed behind the wall to aid drainage and seep holes have been placed in the wall. These discharge into the table drain along the Bass Highway. The area behind the wall has still to be filled after which the surface will be levelled and Button Street reconstructed. This will involve loading the heel area of the slip. Directly in front of this slip, there are two small seepages on the shore-line showing that there is some underground drainage which is not collected by the drain behind the wall.

To the west of the area that slipped in 1962 and in front of 85 Button Street cracks and small depressions have developed in the road surface. One, which is said to be new, has developed in the driveway of the house at 85 Button Street. The table drain has been disrupted on the north side of the

street and this together with the small depressions in the road surface, has caused water to accumulate in places. The cracks extend for a distance of about 55 m along the street, usually along the middle of the roadway. The cutting face above the Bass Highway has been faced with rock. Recently, small slumps have developed causing part of the face to spill on to the Bass Highway. At present a bulge has formed at one place indicating that another such slump is likely to occur in the near future. These small slumps and the bulge are almost certainly related to the cracking and the formation of small depressions in the roadway above and it seems only a matter of time before a larger scale movement will occur. In this event, the access to the houses will probably be affected by a sinking of the roadway as has happened to the east. If corrective measures are not undertaken, the movement could eventually affect the houses themselves. When such a movement will take place is very difficult to predict but the first signs are now evident. The stability of the area will be adversely affected by heavy traffic using this access road, particularly during wet periods. Recently traffic has been directed along Button Street while maintenance has been undertaken along the Bass Highway. This may have been partly the cause of the cracks developing in the roadway.

## CONCLUSIONS

A recent slip in the eastern part of the cutting has formed due to removal of support from the toe of the slope during excavation for a retaining wall.

Small slumps, a bulge in the cutting and cracks and depressions in the roadway above the Bass Highway in the western part of the cutting are signs that this part of the cutting is also becoming unstable. Some retaining structure will almost certainly need to be built in the future to contain the movement. It may be possible to found such a structure in relatively unweathered rock providing this occurs at fairly shallow depth below the level of the Bass Highway, as was apparently the case following the 1962 slip.

A possible aid to stabilising the area may be the installation of horizontal drains to maintain a low water table in the area around the cutting. This would require investigation to determine water levels and zones that may carry water. It would be a less certain solution than a properly designed retaining structure.

Instability has occurred in this area because of the unconsolidated nature of the clay with boulders which underlie the area and the steep and fairly high cutting dug into this material to form the Bass Highway. Underground water not collected by drains already installed in the area probably softens the clay. A seaward sloping contact (with probable drainage along it) between the clay with basalt boulders and the dolerite, as in the case of the 1962 slip, will certainly aid in the formation of unstable conditions.

Heavy traffic should not be routed along Button Street as the unconsolidated material will be affected by both vibration and loading.

If the water main running along the north side of Button Street was disrupted by a small movement of a large mass of material, it could seriously aggravate the situation and cause a much more serious problem. A close watch should be kept for any further movements on the western end of the cutting.

## REFERENCE

JENNINGS, I.B. 1963. Landslips at Parkslands, Burnie. *Tech.Rep.Dep.Mines Tasm.* 7:93-98.

[3 June 1976]