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25. A re-examination of Grooms Slip, near Penguin.

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This major landslide area was examined on 25 and 26 September 1972. A visual examination of the slipped area, in particular the portions of the railway and the coast road most seriously affected was made, but no subsurface or geophysical work was attempted.

The landslide lies between the coastal basalt escarpment and the shore, 3.2 km east of Penguin and is centred at map reference DQ251468 on Sheet 29, Devonport of the Geological atlas (Burns, 1963). It is one of a large number of slips along the north-west coast of Tasmania and has been in intermittent movement for at least 70 years.

DESCRIPTION

The landslide was described fully by Nye (1931a, b). Extensive movement at that time produced considerable exposures of the geology and his survey was aided by some drilling, so that no attempt has been made to re-describe the slip. This report is confined to comments on changes occurring in the slip over the last 41 years.

The whole area of the slip, about 240 m across the toe and about 500 m from heel to the toe at high tide mark, is a complex of slips of several ages. The western part of the slip is mostly stable and the toe has effectively been retained by a concrete retaining wall between the beach and the railway line. The eastern half of the slip is however, in active but slow movement and several directions of movement are apparent in the upper slip area. In the south-east area for example, back cutting of the heel has caused a rotational slip in sand, the axis of which is directed obliquely north-west across the main slip.

In the distal end of the slip, in the region of the main road and railway, movement is wholly translational and no evidence of tilting is evident. Whether this movement is of an extrusive nature or is a deep turbulent earth-flow is not clear from the exposed end on the shore. Again movement in this area appears to be in a north-west direction rather than directly north.

Movement of the slip is slow as evidenced by the almost undisturbed power lines and fences in the area. The road and particularly the railway would provide the best evidence for the speed and direction of movement if records of positions and levels are to be kept.

The cause of the slip appears to be quite natural, but is aggravated to some extent by human activities. A spring line below the basalt capping of the escarpment behind the slip provides a supply of water to feed a creek running across it. The groundwater issues from sands and in some places at least, with sufficient head to produce piping, which is visible in recent backcutting scars. Disturbance of ground levels has caused the creek to become choked and some slight ponding has occurred. The disturbance of the watercourse has been aggravated by the activity of cattle in the area.

Basalt blocks are seen in some places, but are merely being carried along passively by the slip.

Nye's description of a 'bay' in weathered dolerite, (now distinguished as the Motton Spilite), partly filled by a clay, sand and gravel sequence and capped by Tertiary basalts, is still perfectly valid. The spilite appears to form a hard floor to the slip and its weathered nature provides a slippery

and impermeable base. The sides of the 'bay' protrude above the surface on the east and west of the slip, but the oblique nature of the slipping may in part be caused by irregularities in the spilite basement.

RECOMMENDATIONS

A programme of investigation is necessary before detailed preventive solutions can be suggested. The depth, slope and continuity of the basement could be determined by a conventional refraction seismic survey, and the most active parts of the slip may be distinguished by seismic resonance methods. Recent low level aerial photographs, which are not available, would be of considerable assistance to a surface mapping programme.

Subsurface investigation based on Proline auger drilling is suggested, to determine the subsurface sequence, the strength parameters, the Atterberg limits of the materials, and the hydrological conditions. Piezometers and bore hole deformation gauges could be installed at the same time and would provide monitoring of future movement.

Looking to curative measures, some encouraging features are evident. The Motton Spilite basement is a solid material in depth and although piling has failed in the past, it gives some hope for its future success, or as a base for a retaining wall. The presence of sands in the slipped sequence offers scope for dewatering by means of drain wells or horizontally driven drains.

Other preventive measures include, control of the springs, and ditching and culverting of the creek.

Finally, tying of the slope by tree planting would contribute to the land stability, but would require purchase of at least some of the slipped land.

REFERENCES

- NYE, P.B. 1931a. Supplementary report on Groom's Slip. *Unpubl.Rep.Dep. Mines Tasm.* 1931:115-118.
- NYE, P.B. 1931b. Report on Groom's Slip near Penguin. *Unpubl.Rep.Dep.Mines Tasm.* 1931:122-126.