

TR17-122-123

26. Seismic survey, landslip area, Beauty Point.

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At the request of the Supervising Geologist, Engineering Section, a pilot seismic survey was undertaken on sections of the Beauty Point landslip area. In particular it was desired to examine the area bounded by Augustus, Robert and Flinders Streets and to compare the results with the currently active area. The area examined is excluded, at the time of writing, from the declared risk zone.

GEOLOGIC SETTING

Complete descriptions of the known geology are given elsewhere (Jennings, 1964). In the area there are large knolls, apparently of basalt, with large accumulations of basalt fragments. Some outcrops of clay were observed in the south-eastern portion of the area. The whole area is topographically ragged and is suggestive of a history of land failures.

SEISMIC SURVEY

A series of spreads was fired in a conventional manner across the area, and the results are summarised below:

South end of Robert Street

One to two metres of soil and debris with a velocity 350 m/s overlies more than 20 m of clay, talus or basalt, with an average velocity of about 1400 m/s. It is possible that the time distance curve is stepped and that there are sections with velocities up to 2400 m/s. This is not clearly established even though geophone spacings of 7.5 m were used. If the curves are stepped then a series of disrupted and fractured basalt blocks are indicated, each block being about 20 m across and dropped downslope 3-4 m from its neighbour.

Unmade north end of Robert Street (including knoll area towards Augustus Street)

About one metre of soil with a velocity 300 m/s, overlies up to 15 m of talus, with a velocity 600-700 m/s. The talus overlies material with an average velocity of 1500-1700 m/s. The travel time curves do not appear to be stepped in this case and the material is considered to be the ubiquitous Tertiary clay.

Southern portion of Flinders Street

About one metre of soil with a velocity 300 m/s overlies clay or talus with an average velocity of 1400-1525 m/s. The travel time curves are not continuous and it is inferred that an angular discontinuity is present.

Northern section of Flinders Street (to Augustus Street junction)

One to two metres of soil with a velocity 300 m/s, overlies clay with a velocity of 1525 m/s. There is no trace of any abnormality in this region.

Active failure zone, Beauty Point

Less than one metre of soil with a velocity 450 m/s overlies clay with an average velocity 1400-1800 m/s. The travel time curves are asymmetrical and discontinuous. Each section has a length of 15-20 m and an apparent

velocity of at least 1800 m/s.

CONCLUSIONS

The time disruptions observed in spreads in the southern half of the area examined are similar to those noted at the active failure, although not as well developed. It must be concluded that failure zones are present although active failure is not obvious at the present time. No massive basalt is present anywhere and any basalt present must either be very fractured or part of previously failed blocks.

It appears that the seismic method may be of value in problems of this kind and it is recommended that the entire Beauty Point landslip area be examined in order to give a clearer picture of the total geological environment.

REFERENCE

- JENNINGS, I.B. 1964. Slope stability at Beauty Point. *Tech. Rep. Dep. Mines Tasm.* 8:92-99.

DISCUSSION

The geology of the area has been mapped by Longman et al. (1964) and rock units in the immediate vicinity are Tertiary dolerite, Tertiary sediments of the Lamington Beds, Tertiary gravel (sub-basalt), Tertiary basalt and Tertiary (?) laterite.

Dolerite occurs on the north-west side of the Beauty Hill Road in one large and one small body. Tertiary sediments of the Lamington Beds occur along the side of the North Hill Valley to levels above the reservoir. Where the two exposures have been made, these sediments consist of clay, but sand beds could be present as they are in other localities within the Lamington area. Underlying the basalt which caps Beauty Hill, are rounded gravels which have at some locations, been covered with thin layers of sandstone or siltstone. No dolerite is present in the area. The only evidence of the Lamington Beds is the presence of rounded gravel and dolerite in the Beauty Hill area, and this is probably not very thick, as there are only small quantities of dolerite material from the hill. The gravel probably represents a valley floor covered later by basalt as it lies down from a north-east direction. Basalt is in maximum thickness, resting on the top of Beauty Hill. Small areas of laterite and, or basalt can be seen where the dolerite and Tertiary sediments are in contact.

DISCUSSION OF LAND STABILITY

The area where the reservoir was situated is fairly steep and the whole hillside has been subject to slight at some time in the past. The land surface has a very hummocky nature and there are several areas of internal erosion at the head of the old slip. No recent movement is visible on the old slip but the fact that they are still clearly recognizable, indicates that they were probably, at least in part, of a rotational nature. The land surface has been developed recently in the slow earth-flow type, the head of the slip being about 30 m from the reservoir and on a slope of 10-12°. The