

1976/20. Inspection of a farm dam site at Hagley

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The Rivers and Water Supply Commission requested an examination of a dam site on Mr R. Reed's property south of Hagley [DP882985] because of a possible risk of landslip. The dam site, which has been partly excavated, is located on top of a broad hill and has the form of a circular earth tank which will have a capacity of approximately 45 000 m<sup>3</sup>. It is proposed to use the dam for irrigation.

The land slopes gently to the north and east of the dam site, steeply to the south and at moderate angles to the west. The top of the hill is underlain by laterite overlying a clayey material which may either be Tertiary sediments or clay derived from the weathering of Tertiary basalt. Deeply weathered basalt crops out around the slopes and pockets of gravel, which may underlie the basalt, occur at some locations. Tertiary sediments, composed mainly of clay, occur on the lower slopes of the hill and surrounding flat areas.

Laterite has been encountered on the western side of the dam during excavation of the dam floor and represents rock which has formed sporadically or which has been partly eroded. The laterite is probably only in the order of one metre thick and is probably underlain by the clayey material which occurs on the eastern side of the excavation. Local undulations and thickening and thinning of the hard laterite may occur, but it is unlikely that large scale slopes have developed on its top surface. Laterite in other areas usually forms nearly horizontal sheets with often only the eroded remnants on the top of hills remaining.

From surface observations, the formation of a landslip slipping on the laterite and encompassing the dam wall does not appear likely with normal construction and compaction procedures. As an added precaution, the outside of the wall on the western side could be constructed at a lower angle than normal.

The permeability of the material directly underlying the hard laterite is not known, but a cut off through the rock to the clay underneath would prevent any excess seepage. Alternatively, a blanket of clay extending from the hard laterite to the areas on the eastern side of the dam where clay occurs would fulfill the same function. The laterite may be comparatively easy to break up using small explosive charges if difficulty is experienced in excavating sufficient depth for storage.

As the dam is sited on top of the hill well above the natural permanent water table, some alteration in groundwater conditions would be expected. Some seepages will occur, despite the low permeability of the material used in the construction. It is likely that seepages will develop around the side slopes and these could influence the stability in these areas. Some old slip-like features occur on the western slopes (200-300 m from the dam) and these could be reactivated. New slips could form in this area or on the steeper southern slopes. If such seepages do develop, drains should be installed to ensure rapid removal of the water from the soil.

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