



Division of Mines and Mineral Resources — Report 1990/38

Investigation of house damage at Beach Road, Legana

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A house at 53 Beach Road, Legana, was visited to assess the likely cause of damage to the property. This Division has been monitoring house movements in Legana Beach Road for several years now. The movements have been attributed to volume instability in the clay underlying the area and are not considered to be caused by landslide movement.

Previous work

The following is a summary of previous work carried out on the property.

In 1982 an auger hole was drilled on each of numbers 47, 49, 51 and 53 Legana Beach Road. At 53 Legana Beach Road the hole was drilled to 7.0 m depth in a clay sequence. Samples were collected every metre. The moisture content was high (28–36%) to 4.0 m depth. The liquid limits were high (95–113%) and linear shrinkage was 19–24% in this depth range. Below 4.0 m depth the moisture content fell off sharply to 17%. X-ray testing of the clays showed kaolinite and montmorillonite as the clay minerals present with calcium montmorillonite dominant at 4.0 metres.

From these results it is apparent that movement is very likely to occur in these clays with varying moisture content. This expansion and contraction in the clays will produce movement in the house foundations producing cracking.

The Division has been monitoring several pegs placed about this property. The distance between these pegs is

monitored to determine if there is any downslope movement of the house. Movements of 10 to 20 mm have been reported. These are considered to be insignificant as they lie within the error range of the technique used (measuring tape).

The Division's surveyor also monitors several points about the house. The movements recorded are shown in Table 1. The recorded movements again lie within the error range of the technique used.

The resident reported that during road construction on 27 March 1990, the house shook three times when a heavy vibrating roller was used by the Council workforce, and new cracks were observed in the house at this time.

It is considered highly likely that the use of the vibrating roller may have triggered the release of stresses which had been building up in the house during the months prior to the incident. Tasmania in general is experiencing a relatively dry period and clays which exhibit volume instability are reducing in volume. This causes concrete slabs and footings of homes located on expansive soils (i.e. reactive clays which exhibit volume instability) to no longer bear directly on the ground. They are effectively suspended off the ground until such time as the slab or footing cracks and the foundation settles back onto the ground. Cracking is usually carried from the footing through to the brickwork of masonry homes. Weatherboard homes are generally much more

Table 1
Survey results, 53 Beach Road, Legana

LOCATION	26-1-1990	14-6-1990	Difference
Left front (sun deck)	37.289 m	37.291 m	+ 3 mm
Left rear	38.319 m	38.319 m	0
Right rear	39.412 m	39.414 m	+2 mm
Right front	38.990 m	38.991 m	+1 mm
Driveway	34.259 m	34.257 m	-2 mm

flexible and do not show the same degree of damage as masonry homes.

It is also considered highly likely that had the vibrating roller not been used and the relatively dry weather continued unchecked, the house footings would have eventually cracked on their own accord. This would be caused by the volume instability of the clays underlying the property.

In summary, damage to the house has not been caused by landslide activity, but is due to moisture content changes in the soils underlying the house footings.

As the moisture content of the clays change so will the volume of the clay. Where this occurs at different rates, differential movement of the footings arises.

Any remedial measures to the house should take into consideration the site classification of the area in accordance with Australian Standard AS 2870-1986. This standard on residential slabs and footings also outlines in Appendix A the responsibilities of the homeowner on a reactive clay site (i.e. one where the clays exhibit volume instability). This Division does not have the necessary equipment nor personnel to perform the site classification.

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