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1986/21. House cracking at 11 Sandown Road, Launceston

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Abstract

Numerous vertical mortar joints have been re-pointed on the south-facing wall and on the southern end of the west-facing wall at 11 Sandown Road, Launceston. It is considered that the original cracks arose from differential movement of the foundations. The foundation movements are attributed to varying moisture conditions in expansive clay which presumably underlies the site, and not to landslide movement.

INTRODUCTION

An examination of 11 Sandown Road has been undertaken at the request of Ms C. Smith. Sandown Road has a history of house cracking which, by local reputation, was thought to be caused by landslide movements. Recent work by Moore (1984, 1985) concluded that although two landslides occur in the vicinity of Sandown Road, slope failure appears only to be likely under very adverse and rare combinations of conditions. Moore proposed that the recently reported house cracking in Sandown Road is the result of shrinkage in the underlying clay resulting from the prolonged drought of 1982-84.

TOPOGRAPHY

From Sandown Road, the property slopes to the west at about 7° down to the concrete brick dwelling. At the rear of the dwelling the backyard is divided by a mortared field stone (dolerite) retaining wall, about one metre high, into an upper rolling slope segment of about 12° and a lower moderately steep slope segment of about 23° . The lower slope segment flattens to about 10° before the boundary of the property.

GEOLOGY

The underlying geology is not exposed but is considered to be the Tertiary age Launceston Beds of dominantly clay and sandy clay.

INVESTIGATION

An external examination of the dwelling revealed repairs to the mortar joints of the brickwork in the west and south-facing walls. The cracks commence at or near foundation or footpath level in the middle of these walls and rise in a stepped manner to the uppermost course of the brickwork at the south-west corner of the dwelling. The south-facing wall also has repairs to the mortar joints in the lower half of the north-east corner of the dwelling. The south-facing wall appears to have bowed outwards at the south-west corner. The stormwater drainage collection system enters the ground near this corner at a point below the ramp leading to the back door.

Evidence of distressed ground is not apparent in the backyard. A concrete block barbeque set into the southern end of the field stone retaining wall is intact. Gaps in the mortar at the base of the wall appear to serve as weep holes. Only one crack was observed within the mortar binding the field stones. The re-entrants about the chimney stack on the north-facing wall of the dwelling are intact.

An examination of the rooms along the south-facing wall of the dwelling did not reveal any cracks in the plaster ceiling. The walls are papered and no cracking was evident.

It is difficult to determine the sense of the movement which has resulted in the cracking along the mortar joints, as most have been re-pointed. A gap between the bricks of the window sills on the west-facing wall and the bricks of that wall is widest at its upper limit.

DISCUSSION

The movement is considered to be due to changes in the moisture condition of expansive clay and not due to landslide movements. Cracking in houses elsewhere in Sandown Road has been investigated by Moore (1984, 1985) who considered that the movements were due to expansive clay. Such clay shrinks upon drying and swells upon wetting. If the moisture condition of the expansive clay does not change uniformly beneath the entire foundation, areas will shrink or swell at different rates. The consequence of this is differential movement in the foundations. A similar result will arise if the expansive clay is discontinuous beneath the entire foundation or if it occurs at varying depths (as may easily occur on sloping sites).

Interestingly the cracked mortar joints are concentrated on the south-facing wall and the southern end of the west-facing wall of the residence. Several situations may have led to the cracking:

- (1) The south-facing wall and the southern end of the west-facing wall are largely protected from solar radiation by aspect, shadows from the neighbouring residence upslope, garden plantings, and a concrete path. By comparison with the remainder of the residence, these areas are likely to have retained soil moisture as solar radiation dried out the soil elsewhere, thus providing the potential for differential movement.
- (2) The soil beneath the south and south-west portions of the residence may have dried out sufficiently during a prolonged dry period to allow soil shrinkage in this area for the first time since the residence was constructed. It was claimed that the cracking became evident following such a prolonged dry period in 1982-84.
- (3) The stormwater collection system enters the ground at the south-west corner of the residence beneath the concrete ramp leading to the back door. Should the subsurface drainage system be faulty, the soil will have the opportunity to take up additional moisture which could lead to swelling in this area but not elsewhere.

HOUSE AND SITE MAINTENANCE

Even significant masonry cracking with crack widths greater than 5 mm often has no influence on the function of a wall and only presents aesthetic problems. The foundations seem adequate for the load imposed. A more suitably qualified person could be engaged to comment on the structural integrity of the residence if desired. However, just as it is difficult to design an immovable footing system, it is difficult to provide remedial measures that will prevent further movements if distress does occur. Expansive clay moves because of moisture changes and even relatively stable clay will move appreciably

if subject to extreme moisture changes. The owner is the only person who can maintain reasonable moisture conditions at the site and if this is achieved, future movements will be minimal.

Leaking plumbing or blocked drains should be repaired promptly. Garden watering should be controlled carefully to avoid over-watering. On the other hand, proper garden maintenance should produce year round uniform moisture conditions.

Trees and some shrubs can cause a substantial drying of the soil and associated shrinking of the clay. This effect is most likely to result in damage when added to the drying from a drought or a long dry spell. During droughts, problems can be minimised by extensive pruning or by providing trees with adequate water. Frequent moderate watering during dry periods should ensure that trees do not extract moisture from the foundation of the house.

The soil near structures on expansive clay can be protected from moisture changes by paths or carefully planned gardens. Such gardens should include large portions of areas sealed with sheeting and covered by gravel or similar material. Small shrubs can be planted at reasonable spacing.

CONCLUSIONS

The repaired mortar joints at 11 Sandown Road are attributed to differential movement of the foundations caused by changes in the moisture condition of underlying expansive clay and not to landslide activity. The dwelling appears to be structurally sound. An appropriate house and site maintenance programme should be implemented to minimise future movements.

REFERENCES

MOORE, W.R. 1984. Subsurface movement in expansive clay. An alternative explanation for house cracking at Sandown Road, Launceston. *Unpubl. Rep. Dep. Mines Tasm. 1984/59.*

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