

**TASMANIA DEPARTMENT OF MINES
UNPUBLISHED REPORT 1975/81**

**HOUSE CRACKING AT
ELLISON STREET, PUNCHBOWL**

C. J. Knights

A house at 1 Ellison Street, Punchbowl (513600 mE, 5410820 mN), is situated in a clay area, on shallow sloping ground. The house is suffering from damp, there is severe cracking in the garage floor, and there has been cracking in the west corner of the house.

When the foundations of the house were originally dug in February 1974, there was no sign of water, but by the time the house was first occupied in June, damp was already evident. A channel which was dug across the foundation area soon filled with water, and small trickles of water can be seen running into it. Bacterial analysis of the water showed it to be free of sewage.

Existing remedial measures have entailed underpinning the cracked corner of the house with concrete, and digging a very deep french drain upslope from the house.

Whilst the house was being underpinned it was noted that although the top metre of clay was fairly stiff and dry, it became softer and wetter with depth, to the maximum depth of the hole at 1.75 metres.

A water sample was taken, and a partial chemical analysis gave the following results:

Total dissolved solids = 4800 ppm.

pH = 9.2

Cl = 2450 ppm.

A total dissolved solids value of 4800 ppm is a moderately high salt content to find in groundwater from Tamar clays. This indicates that the water has travelled for some distance underground, leaching the clays as it travelled. The water must therefore be of quite deep-seated origin, and not just from near-surface drainage, or a broken pipe. The pH of 9.2 is very high and the reason for this has not been explained. It is possible that such high alkalinity could cause unusual effects to take place in the clay.

It appears that this house is underlain at some depth by an area of soft clay, and possibly some sand. Water is percolating through fissures in the clay, or through sandy partings. After a period of rain the water level rises, but there is a delay time; similarly it may take several weeks for the water level to fall again after a time of dry weather. Conditions similar to this have been observed in trial pits a few hundred metres away below McKellar Road.

There are two main problems caused by the water. Because the clays are soft and wet there is always a possibility of failure, and the house foundations are under strain from this. The other problem is the result of the clay expansion and contraction. Tamar clays often have a linear shrinkage of 15–20%, and last winter the water level rose, causing the clays to expand and crack the garage floor. Because of the wet summer the water levels have not yet gone down. After a period of dry weather the water level should go down, and the clays will shrink.

Recommendation

Because of the deep-seated nature of this problem it is not likely to be helped by further interception of near-surface run off. The difficulties are complicated to deal with, but could be helped by digging a network of drains through the foundations which would provide an easy drainage path for any seepages. If this were done great care would be needed to ensure that the drainage escape holes did not weaken the foundation walls.

The garage floor could be relayed with reinforced concrete over the drains, and possibly with a cushioning layer of sand. Alternatively the garage floor could be left covered by sand and gravel.

At present our understanding of the problem is far from complete. Further information could be obtained by digging one or two test pits by back-hoe, and a geologist from this Department would be available to inspect them.

The problem may be substantially an engineering one and advice from a competent foundation engineer would be a worthwhile step.

[29 January 1975]