

Examination of a property, Parklands landslip area, Burnie

by I. B. Jennings

At the request of the Burnie Council the property owned by Mr P. T. Tanner at 44 Main Road, Parklands, was inspected on 30 November.

Mr Tanner's property is situated immediately to the south, and adjacent to, the landslip which partly blocked the Bass Highway in 1962. This slip was brought under control by means of a concrete retaining wall erected in 1964. Mr Tanner claims that, in spite of this wall, damage to his house is still occurring and that the position can only be rectified by extending this retaining wall to the west by 100 feet.

Previous reports

A number of geological examinations have been made in this area. A tentative history of the landslides in the Parklands district was prepared by Burns and Gee (1962). They stated that:

"A landslide occurred in this area in 1920. Between 1927 and 1930 the railway was shifted inland, and the Bass Highway moved south to provide room for the railway. The southern side of the highway was trimmed, and a loose stone retaining wall was built. A landslide in 1932 crossed the highway. The part of the retaining wall affected was rebuilt, with a bay about 5 feet deep on the site of the slide. In 1955 the area was subdivided, with footpaths and a roadway constructed on the bank. From 1955 to the present time, the slope has slowly shifted, pulling services away from the mains, and necessitating the insertion of loops in the main water pipe to accommodate movements. The rate of movement has accelerated in recent years. The possibility of sliding was anticipated, and the water main shifted uphill to avoid the danger zone. However, the rate of movement accelerated, culminating in the present rapid rate of 3 feet in 10 days. The extreme heel of the slip caught about three pipes in the water main."

A report on the 1962 landslide in this area was prepared for the Council (Jennings, 1963a) and this outlined the general geological background to the problem. It suggested various remedial measures including the erection of a concrete retaining wall 150 feet long to contain the landslide but it also stated that "it would be wise to construct the wall over the entire length of the embankment". In a further report in 1963 (Jennings, 1963a) it was again pointed out that the existing rock wall showed signs of incipient collapse and that the landslide in 1962 may be only the first of a series of small impending failures.

General

At the time of the 1962 movements the property was owned by a Dr Pearson. Upon completion of the present concrete retaining wall the house was renovated, internal damage repaired and the internal walls and ceilings redecorated. Dr Pearson sold the house in 1965. Its present owner acquired the property in 1966 and took up occupation in November that year. Some of the damage to the house which is now evident has clearly occurred since the redecoration was carried out in 1964 or 1965, and according to Mr Tanner occurred mainly between February and May of this year. Cracks in the external walls which were repaired in 1955 have reopened since that date.

The following evidence of damage due to earth movements was observed during the recent visit to the property.

1. Mr Tanner's property

- (a) Wall plates have pulled away from the brick foundation walls by up to 1½". The age of this damage is indeterminable.
- (b) The foundation slab of an internal wall on the NW corner of the house has fractured, leaving an open gap some ½" wide. The date of this damage is also indeterminable.

- (c) Construction joints in the concrete driveway have opened up by as much as 1". As these joints were filled with bitumen in 1962 the movement must have occurred since that date.
- (d) Cracks in the external brick walls are evident in several places. These were repaired in 1955 and have occurred since that date. Some of these cracks may post-date the 1962 movements.
- (e) Internal walls have cracked, architraves have been pulled away from walls and other similar internal damage is evident. This has happened since the house was redecorated in 1964 (?) and according to Mr Tanner most of the damage occurred between February and May this year.

2. Between Mr Tanner's property and the highway

- (a) A small longitudinal depression some 10 feet long, with a crack along the centre of it 3 feet long by about $\frac{3}{8}$ " wide, is evident in the centre of Button Street, outside Mr Tanner's house. It is stated that two months ago this crack was open to at least an inch in width but has subsequently closed.
- (b) On the footpath immediately above the retaining wall small cracks parallel to the highway may be seen. From the eastern end of the retaining wall they extend discontinuously for about 50 feet and from the western end similar features are also evident. Immediately behind the retaining wall no such cracks could be seen. A similar series of cracks was noted in the 1963 report to the Council.
- (c) The open rock wall about 25 feet to the west of the concrete retaining wall has bulged out at the highway level and appears to be locally on the verge of collapse.

From the foregoing account it is clear that some movement is still going on in this area and that Mr Tanner's house has suffered some damage since the erection of the retaining wall.

Three possible causes are suggested for this continued movement.

1. Dehydration of clay

The improvements to the drainage system should have resulted in the lowering of the moisture content in this area and may have resulted in dehydration cracking in the underlying clay. Two factors could be considered in this context.

- (a) No such cracks were seen on Mr Tanner's property, whilst his neighbours, who may be expected to be similarly affected, have not reported any earth movements subsequent to the 1962 landslide.
- (b) Mr Tanner has maintained a hose around the NW corner of his house during the past couple of months. Elsewhere on his property watering has been severely restricted. The neighbouring gardens on the other hand seem to have received the normal amount of garden watering. Soil moisture could therefore be unbalanced around the property.

2. Relaxation movements subsequent of the 1962 slip

At the time of the last major movement a tensional zone was created between the heel of that slip and the house now occupied by Mr Tanner. The retaining wall has prevented further movement but soil creep could have occurred, taking up the uneven stresses remaining in the tensional zone of the original landslide. If this is so one would expect that such movements would eventually cease and the area return to a stable condition.

3. Renewed or continuing earth movements

Mr Tanner's proposal to extend the retaining wall infers that this wall has arrested the earth movements locally but that continuing movement is taking place in a NW direction from his house around the west end of the existing wall. This appears to be a feasible proposition. The general direction of movement indicated by the damage to his house suggests movement in this direction. The incipient damage to the stone wall west of the concrete retaining wall is also in accord with this view. The cracks in Button Street and on the pathway below that street could also be interpreted as earth movements flowing around either end of the existing wall.

Conclusions

There is no reason to doubt that continued earth movements post-dating the 1962 landslip are causing damage to Mr Tanner's property and three possible causes have been suggested for this movement. The evidence available is not sufficient to indicate which might be the prime factor causing these continuing movements.

The earlier reports in 1962 and 1963 recommended that it would be wise to extend the retaining wall along the full length of the embankment. This is still considered to be a valid and important recommendation. The existing stone wall is not in good condition and in its present state small movements which could still be taking place are difficult or impossible to detect. A check should be made to ensure that the drainage systems which were installed subsequent to the 1962 landslide are effective and that they have not been disrupted by subsequent small-scale movements.

References

- BURNS, K. L.; GEE, R. D 1962. Preliminary report on the Parklands landslide. *Unpublished Report Department of Mines Tasmania* 1962/02.
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