

TE ANAU GLOWWORM CAVES UP DATE

- Neil Collison

The contractor standing on largest piece of scaled rock. Photo: OPUS International



As some of you will know, the lower part of the South Island was jolted by a magnitude 7.1 earthquake in late August 2003. The quake was centred only 60kms to the west of Te Anau at a depth of 12km and certainly gave the region a good shake up. Fortunately there were no injuries, very little damage to buildings and no interruptions to services. This is largely because of the remote nature of the region (a National Park covering 1.2 million hectares).

The mountains of Fiordland were modified with numerous slips and landslides (over 180 major slips and landslides). Many of the walking tracks were damaged and several Department of Conservation (DOC) structures remained closed for some time after the quake to enable repairs to be carried out.

At Te Anau Cave our engineers immediately inspected the structures (walkways etc.), which were all found to be sound. We also conducted checks of a number of “tell tale” microscope slides mounted on several features in the cave. This technique, which was suggested by none other than Andy Spate, has proved to be an effective monitoring technique. No movement has been detected at any of the sites with slides mounted on them.

It was decided to expand the scope of the monitoring to include new features. During this process we arranged for a consultant geologist from OPUS International to inspect a roof feature, which showed signs of relaxation along the

bedding plain. OPUS were engaged to assess the potential risk and if necessary, design remedial measures to make the site safe.

OPUS are well used to working in the Fiordland National Park, being contracted by *Transit New Zealand* to provide engineering solutions on the mountain highway to Milford Sound, including the Homer Tunnel.

The cave is in lower tertiary age Limestone known as the Tunnel Burn formation. There are no active faults in the area.

The geologist's report concluded that due to the occurrence of significant weathering inside the crack that it was unlikely that the earthquake was responsible for opening the crack to the full width of 30mm.

It was recommended remedial rock bolting be undertaken. Both Department of Conservation and Local Iwi were consulted. OPUS engaged Geovert, a specialist civil works company based in Christchurch, to complete the works. Geovert specialise in providing effective solutions in natural hazard mitigation. They have an impressive portfolio and have successfully completed several significant international commissions.

They are also a regular visitor to Fiordland, carrying out specialised works in the National Park for DOC, and the Power Station at Lake Manapouri. We found their crew totally committed to working within our guidelines associated with the code of ethics for works in our caves.



Other pieces of rock in stream bed following scaling. End of the punt in the foreground.
Photo: OPUS International

Fortunately the section of rock to be bolted was well clear of any formations and Glowworm colonies. Yes Kent, Percy did survive. (Ed Note: For the uninitiated, 'Percy' is the cave's only stalactite. It is quite small, and is reminiscent of a male baby's appendage...).

Site set up was extensive, with both special boat trips and helicopter used to get equipment to the caves, which are situated on the Western shore of Lake Te Anau, 16kms from the township. Contractors worked during the night to complete the works.

During drilling of the first hole the rock slab to be bolted began to crack. Drilling was stopped and the team set about using their scaling bars to drop the slab clear into the stream. The slab dropped cleanly from the ceiling. Total volume of the rock removed was estimated at 0.7 to 1m³. OPUS geologist completed an inspection of the scaling and signed off the works completed.

Extra telltale slides have now been installed on possible release plains close to the area scaled back to ensure any future movement in this area of the caves is well monitored. These slides are inspected weekly or following any seismic events.

In this era of "safety first" and following on from this initial work, we have commissioned OPUS to complete a full geotechnical inspection of the tourist section of the caves. OPUS have arranged for Geover to rig high ropes and provide access for this inspection. Photographs, measuring pins and "tell tales" will all form the basis for ongoing

monitoring. It is proposed that following this initial inspection a qualified geotechnical engineer will carry out an annual inspection of the key features.

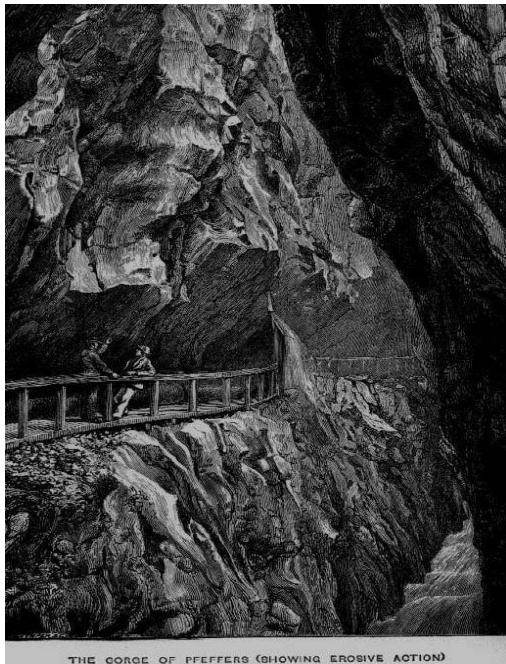
Other News

Real Journeys¹ has again been involved with the Department of Conservation Summer Nature Program. Three trips into Aurora Cave² were run during January. This is the only opportunity the public has to access the caves during the year and each trip of ten was well supported by local residents.

News of a new cave discovery near Manapouri has recently been relayed to us. Cavers did not find the reported entrance and details thus far suggest it is still unexplored. The cave is in an area close to another cave (St Peters) that was only discovered in 1989. A trip is planned into the area during February, to assess the entrance and scope of the find. Visits to both Aurora Caves and St Peters will hopefully be incorporated into the itinerary for time in Te Anau during the 16th ACKMA Conference Post Conference Tour to Te Anau in May 2005.

Ed. Notes: 1. Real Journeys Te Anau Visitor Centre is owned by Fiordland Travel Ltd. Neil Collison is Branch Manager, and thus effective overall manager of Te Anau Caves. 2. Aurora is a huge, complex phreatic cave above the Te Anau Show Cave, which is itself the efflux of the Aurora system.

A REFLECTION ON GEOLOGIC TIME – AND ON SCIENTIFIC IDEAS...



These deep gorges occur, I believe, for the most part in limestone strata; and the effects which the merest dribble of water can produce on limestone are quite astonishing. It is not uncommon to meet chasms of considerable depth produced by small streams the beds of which are dry for the large portion of the year. Right and left of the larger

gorges such secondary chasms are often found. The idea of time must, I think, be more and more included in our reasonings on these phenomena.

Happily, the marks that the rivers have, in most cases, left behind them, and which refer, geologically considered, to the actions of yesterday, give us ground and courage to conceive what may be effected in geologic periods. Thus the modern portion of the Via Mala throws light upon the whole. Near Bergün, in the Valley of the Albula, there is also a little Via Mala, which is not less significant than the great one.

The river flows here through a profound limestone gorge, and to the very edge of the gorge we have the evidences of erosion. But the most striking illustration of water-action on limestone rock which I have ever seen is furnished by the gorge at Pfäfers, Switzerland. Here the traveler passes along the side of the chasm midway between top and bottom. Whichever way he looks, backwards or forwards, upwards or downwards, towards the sky or towards the river, he meets everywhere the irresistible and impressive evidence that this wonderful fissure has been sawn through by the waters of the Tamina.

Tyndall, J., 1871 *Hours of Exercise in the Alps*. Longmans, Green, and Co., London and Bombay, pp 228-229

