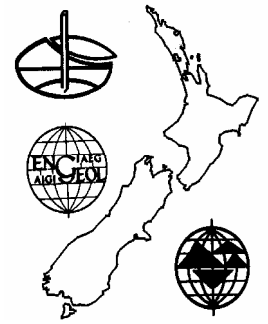


NZ GEOTECHNICAL SOCIETY INC.



Auckland Branch Meeting

Tuesday 29 September 2009

Auckland University, Room 1.401

Light Refreshments, Compliments of Boart Longyear NZ Ltd from 5:30pm near Rm1.401, School of Engineering

Lecture begins at 6:00pm

Kawakawa Bay Landslide - Investigation & Stabilization

Dr Sjoerd van Ballegooy

The July 2008 high intensity rainfall events triggered landslips across the North Island. One such slip occurred at Kawakawa Bay in early August 2008. Initially approximately 500m³ of slip debris fell from the top of a cliff face and blocked the Clevedon to Kawakawa Bay Road, with the debris sliding over and exposing the underlying local greywacke basement rock. Tension cracks and a head scarp feature were identified enveloping a house platform 100m back from the cliff face and it very quickly became apparent that a major deep landslide was affecting the whole of the hillside and cliff face. Daily survey of surface monitoring points confirmed that the landslide was active in the then prevailing wet weather conditions with accelerating movement of the order of up to 30mm per day (total displacements of the order of 500mm). Assessments of the potential run-out distances from the very large mass of the landslide (estimated at 400,000m³) indicated that at least five occupied dwellings at the foot of the hillside were potentially at risk of inundation with debris.

Measures to expedite the re-opening of the road included using helicopters and monsoon buckets to try to locally dislodge some of the imminent risk slip debris from the top of the cliff face. This was only partially successful, but the overall risk of a major landslide failure remained. Subsequently weather patterns improved and monitoring showed that the rate of movement had significantly slowed down.

The remedial works to increase the hill stability comprised 100,000m³ of earthworks to unload the top of the landslide to remove some of the driving force, building a buttress at the base of the landslide, drainage to lower the ground water pressures beneath landslide and ground anchors to restrain movement of the landslide. Since January 2009 earthworks and drainage have been undertaken under the emergency provisions of the RMA. The drainage has yielded significant volumes of water with a measureable effect on reducing and limiting the pore pressures in the rock. No further movement of the landslide has been detected as a result of rainfall events in 2009.

Sjoerd van Ballegooy is a geotechnical engineer at Tonkin & Taylor. He has been with T&T since the start of 2005 and has worked extensively on various Auckland City basement projects, mining, roading and landfill projects and land stabilisation projects in New Zealand and Malaysia. He is experienced in non linear numerical modelling in particular related to ground water modelling and dynamic seismic modelling and has specialist skills in geotechnical seismic engineering including liquefaction. Sjoerd has been involved in a number of design teams for infrastructure developments including award winning projects such as the Mangakotukutuku Stream diversion for the Awaroa 4 open cast mine development at Huntley - IPENZ Arthur Mead and ACENZ awards. Currently he is involved in the design and construction supervision of the Kawakawa Bay landslide project.

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