

## **RISK MANAGEMENT FOR ROADS IN NEW ZEALAND**

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### Abstract

Many parts of the world are at significant risk of natural and technological (man-made) disaster. New Zealand is a country of approximately 269,000 sq/km set in the Pacific Ocean and as such is vulnerable to a wide range of natural disasters, which are a major source of risk.

The country has a range of weather extremes and a topography ranging from sea level to mountains of over 3,500 metres. The coastline is extensive with deep fiords and glaciers in the south to protected bays in the north. For a country so beautiful to visit and live in, it has many natural hazards such as extreme wet weather events, earthquakes and volcanic eruptions.

Transit New Zealand is a Crown Entity roading authority managing the state highway network of New Zealand. Transit's approach to risk management is to provide and encourage the use of a set of risk management tools with the purpose of minimising unplanned occurrences and maximising chances of success through greater risk awareness and proactive management. Risk management has become part of the organisation's culture.

The paper discusses Transit's approach to reducing risks and examines in detail specific areas of risk to the transportation system from natural hazards:

In particular the paper shows mitigation effects put in place for the following.

#### a) Lahar Management Risk Process

Mt Ruapehu is an active volcano situated in the centre of the North Island. On Christmas Eve 1953 the crater lake breached creating a lahar of water, mud, rock and debris to flow down the mountainside. The lahar struck a railway bridge causing collapse. 151 people died as the majority of the carriages were swept downstream in the lahar. In 1995/96 the mountain erupted again with ash spread over a wide sector of the North Island. The crater's lake refilling from rain and snow created a situation where water was retained by a relatively unstable dam, creating the probability of a lahar. The paper discusses the mitigation that has been put in associated with this risk

b) Seismic Risk to Bridges

The paper describes a systematic assessment of the seismic security of approximately 2,500 state highway bridges. The paper highlights the many variables that influence the results of a structural analysis and the significant amount of judgement required both in deciding the input parameters for the analysis and in interpreting the results.

c) Avalanches

An example of best practice gained from visits to Canada and Europe is highlighted in the paper as an example of mitigation measures taken to protect one of New Zealand's most scenic routes from avalanche damage.

The paper also details the application of Risk Management to vulnerable parts of the network, both in terms of the asset and the operation. It discusses the responsibility placed on the road authority in providing a roading system that builds a better New Zealand within a sustained funding environment.