

Validation of ground motion simulations and probabilistic seismic hazard models with fragile geologic features in New Zealand

Mark Stirling¹, Elizabeth Abbott², Elliot Bowie², Chris Van Houtte³, David Rhoades², and Russ Van Dissen²

¹University of Otago, ²GNS Science, New Zealand and ³Harvard University, USA

We provide a precis of collaborative studies on the use of fragile geologic features to constrain ground motion simulations and probabilistic seismic hazard (PSH) models in New Zealand. The seismic hazard re-evaluation of the Clyde Dam in Central Otago has required an extensive program of paleoseismology on the local major fault (Dunstan Fault), and a subsequent analysis of the age and fragility of nearby precariously-balanced rocks (PBRs) to constrain near-field ground motions from the fault. Predicted ground motions from the PSH model are compared to the fragility of the PBRs, and ground motion simulations from large Dunstan Fault earthquakes are also compared to the PBR fragilities. Our preliminary results show that the upper bounds of the PSH-predicted ground motions and ground motion simulations exceed the PBR fragilities, and indicate that the PBR data will provide significant constraints on the final PSH estimates. The studies collectively represent the first application of fragile geologic features to a major “real-world” project.