# Built Environment: Horizontal Infrastructure

Monthly Meeting

11/05/2020

QuakeCoRE
NZ Centre for Earthquake Resilience
Te Hiranga Rū

National Science Challenges
RESILIENCE TO NATURE'S CHALLENGES
Kia manawaroa – Ngā Ākina o Te Ao Tūroa

# Summary

- Introductions
- Presentation 1: “Simulation of post eruption time variant land use and economic impacts of the Mangere Bridge volcanic eruption scenario” Rob Cardwell
- Presentation 2: "Modelling the seismic response of New Zealand wharves: Case history application" Bilel Ragued
- Highlights and Discussion
- Other items

# Highlights

# Te Hiranga Rū QuakeCoRE

- Te Hiranga Rū QuakeCoRE proposal shortlisted for site visit
  - 15 proposals have been short-listed
  - 31 submitted proposals in total
  - 10 proposals will ultimately be funded

# NZSOLD Poster Competition Winner – Thomas Wallace

## DETERMING FLOOD EFFECTS DUE TO UNDOCUMENTED STOPBANKS ON THE WAIMEA FLOODPLAIN

**Thomas Wallace[1], Kaley Crawford-Flett[1,2], Matthew Wilson[1,3]**

([1]University of Canterbury, [2]Quake Centre [3]Geospatial Research Institute)

**Contact:** tmw100@uclive.ac.nz

### PURPOSE

This study aimed to address a knowledge gap regarding the impact of undocumented stopbanks on flood routing. The method developed during the project can be adapted and applied to assess other undocumented stopbanks around the country. Outputs from the flood assessments were used to determine effects of the undocumented stopbanks on flood extent and the impacts to buildings. This knowledge can inform councils of the impacts and help councils to develop and implement more informed management strategies to minimise the flood risk.

### BACKGROUND

Floods are the most frequent natural disaster in New Zealand. On average a major freshwater flood occurs every eight months with the intensity and frequency likely to increase due to climate change.

To address flood risk, stopbanks after often constructed. The maintenance of these structures is generally governed by the Local Government Act (2002) while the activities on the stopbanks are fall within the Resource Management Act (1991).

There is no nationwide standard for stopbank construction. This, coupled with other reasons such as the risk and resources available in each area, has led to the **quality of stopbanks across New Zealand to vary greatly** (MfE, 2008). An absence of a standardised approach has contributed to the lack of a nationwide inventory of stopbanks and there are many **unknowns associated the stopbank structures such as their design capacity or intended purpose** (Blake et al., 2018).


*Key features within the Waimea floodplain study area*

In some parts of New Zealand there are stopbanks that are not catalogued by councils for which maintenance is not council responsibility. For this study, these structures are considered *undocumented stopbanks* with respect to formal council management records.

Tasman District Council acknowledges it has several undocumented stopbanks within its jurisdiction. The council has previously carried out hydraulic modelling in the Waimea floodplain and has a good understanding of the effect of the current council and non-council stopbanks. They do not, however, carry complete documentation of the performance and characteristics of the undocumented stopbanks.

It follows that the **impact of modifications to the undocumented stopbanks on flood routing is currently unknown**. Because of this uncertainty, the Tasman District Council aims to better understand the impacts of undocumented stopbanks within its region.

The overarching aim of the project was to **determine the flood effects of the undocumented stopbanks within the Waimea floodplain**

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# CIGRE NZNC WEBINAR SERIES 2020

https://bit.ly/Panelcnz20

**Resilience in a Pandemic**
**NZNC Special Edition: Panel & Podcast**

15th April 2020
1200-1300 hrs NZST

**COVID-19**
**Power Systems**
**Resilience Response**
**CIGRE NZ Conversations**

**Doug Ray, NZNC Chair with Nirmal Nair, André Cuppen & Thahirah Jalal**
Collective Members of CIGRE NZNC
University of Auckland, Unison, ETEL

**2020 WEBINAR 2**

3rd June 2020
1200-1300 hrs NZST

**Transmission Protection With Increased Penetration of Renewables and Distributed Generation**

**Sheila Matthews**
Protection & Automation (Operations) Manager, Transpower

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NEW ZEALAND
Society on Large Dams

2020 Engineering New Zealand Webinar
Dams and Embankments in NZ Society
7th May 2020

# That Dam Research Programme

Dr. Kaley Crawford-Flett, University of Canterbury Quake Centre
kaley.crawford-flett@canterbury.ac.nz

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# Papers

ELSEVIER

International Journal of Disaster Risk Reduction

Volume 47, August 2020, 101553

# Assessing operational performance of New Zealand's South Island road network after the 2016 Kaikoura Earthquake

Mohammad T. Aghababaei, Seosamh B. Costello, Prakash Ranjitkar

Show more

https://doi.org/10.1016/j.ijdrr.2020.101553

Nat. Hazards Earth Syst. Sci., 20, 451–470, 2020
https://doi.org/10.5194/nhess-20-451-2020


Natural Hazards and Earth System Sciences
Open Access
EGU

# Assessing transportation vulnerability to tsunamis: utilising post-event field data from the 2011 Tōhoku tsunami, Japan, and the 2015 Illapel tsunami, Chile

**James H. Williams[1], Thomas M. Wilson[1], Nick Horspool[2], Ryan Paulik[3], Liam Wotherspoon[4], Emily M. Lane[5], and Matthew W. Hughes[6]**

[1]School of Earth and Environment, University of Canterbury, Christchurch, 8041, New Zealand
[2]GNS Science, Lower Hutt, 5040, New Zealand
[3]National Institute of Water and Atmospheric Research, Wellington, 6021, New Zealand
[4]Department of Civil and Environmental Engineering, University of Auckland, Auckland, 1010, New Zealand
[5]National Institute of Water and Atmospheric Research, Christchurch, 8011, New Zealand
[6]Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch, 8041, New Zealand

# Stability of Composite Breakwaters under Tsunami Attack

Zhonghou Xu[1]; Bruce W. Melville, M.ASCE[2]; Liam Wotherspoon[3]; and N. A. K. Nandasena[4]

J. Waterway, Port, Coastal, Ocean Eng., 2020, 146(4): 04020011

STRUCTURE AND INFRASTRUCTURE ENGINEERING
https://doi.org/10.1080/15732479.2020.1734030

Taylor & Francis
Taylor & Francis Group



# Quantifying the seismic risk for electric power distribution systems

Yang Liu[a], Liam Wotherspoon[b], Nirmal-Kumar C. Nair[a] and Daniel Blake[c]

[a]Department of Electrical, Computer and Software Engineering, University of Auckland, Auckland, New Zealand; [b]Department of Civil and Environmental Engineering, University of Auckland, Auckland, New Zealand; [c]Department of Geological Sciences, University of Canterbury, Christchurch, New Zealand

RESEARCH-ARTICLE

# Evaluating the Magnitude and Spatial Extent of Disruptions Across Interdependent National Infrastructure Networks

Conrad Zorn, Raghav Pant, Scott Thacker, Asaad Y. Shamseldin





*ASME J. Risk Uncertainty Part B*. Jun 2020, 6(2): 020904 (13 pages)
**Paper No:** RISK-18-1123 https://doi.org/10.1115/1.4046327
**Published Online:** March 27, 2020 Article history

www.nature.com/scientificdata

SCIENTIFIC DATA

OPEN

DATA DESCRIPTOR

# Predictive mapping of the global power system using open data

C. Arderne[1*], C. Zorn[2,3], C. Nicolas[1] & E. E. Koks[2,4]

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# Papers & Highlights

- Send through recently published papers
- Highlight at end of monthly meetings

# Other Items

- Lifelines 2021
  - Feb 2021, LA
  - Special NZ Sessions
    - Infrastructure network impacts from a future Alpine Fault earthquake
    - Infrastructure planning, governance and rebuild in New Zealand

https://www.eea.co.nz/Site/publications/drafts-for-comment/resilience-guide.aspx



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# Resilience Guide - Consultation

Contents:



## Purpose of the Guide

The Resilience Guideline has been developed by the EEA Asset Management Group (AMG), recognising the importance of good Resilience planning in the electricity supply industry. Good resilience planning supports effective management of issues arising from major emergency events such as natural disasters large earthquakes, extreme weather events and other extreme events such as major supply interruptions which could be due to equipment failure, terrorism or cyber-attack.

Such events have recently severely disrupted power supply to customers during the Christchurch and Kaikoura earthquakes, and caused substantial economic impacts, as well as causing social disruption and raising public safety issues for whole communities.

New Zealand Lifelines Council

Draft for Stakeholder review

# New Zealand Critical Lifelines Infrastructure National Vulnerability Assessment

2020 Edition

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GRAVELROAD
thinking beyond consulting

## RISK & RESILIENCE SOLUTIONS FORUM

# NATIONAL DISASTER COST MEASUREMENT & ESTIMATION FRAMEWORK – PHASE 1 - ENVIRONMENTAL SCAN

| | | | |
|---|---|---|---|
| **To:** | Members – Risk & Resilience Solutions Forum | **Project:** | R&RSF – National Disaster Cost Measurement and Estimation Framework |
| **Author:** | David Skinner – Gravelroad<br>Ben Miliauskas - Aon<br>Kelvin Berryman - GNS | **Date:** | 05 Apr 2020 |

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SimCenter NHERI
Center for Computational Modeling and Simulation

Report No. 2019-01
DOI: 10.5281/zenodo.2579582

# State-of-Art in Computational Simulation for Natural Hazards Engineering

**February 2019**

Edited by:

Gregory G. Deierlein

Adam Zsarnóczay

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# Reporting

- Key deliverable:
  - Horizontal infrastructure data for all case study locations collated in collaboration with end user partners – 30 June 2020

- Built Environment Theme ToR & MoU

# Other Items

- Slack Channel
  - To join:
  - http://bit.ly/rnc-infrastructure

# PhD Funding

- **Residual Life of Pipes, Research Framework and Wastewater Pipe Asset Data Parsimony**
  - Department of Civil and Environmental Engineering at the University of Auckland.
  - The models used by the 3 waters industry to assess useful life, risk/criticality and whole-of-life costs of different pipe classes are largely based on professional judgement and limited datasets. These models have a large impact on long-term plans for pipe renewals and other investment decisions. Improving these models can reduce uncertainty and risk from both a financial and an engineering perspective.
  - The project is fully funded and is available immediately.
  - Kobus van Zyl k.vanZyl@auckland.ac.nz

# Any Other Items?

- Wiki:

https://wiki.canterbury.ac.nz/display/QuakeCore/Special+Project+1%3A+Spatially-distributed+Infrastructure