

Resilience to Nature's Challenges: Distributed Infrastructure

Stopbank/Levee Research: Summary as at April 2019

1. Background

Resilience to Nature's Challenges Kia manawaroa - Nga Akina o Te Ao Turoa (RNC) aims to partner researchers with stakeholders, including communities, to build shared understandings of natural hazards and risks, and to work together to develop practical risk reduction solutions. The RNC framework is intended to promote collaboration between infrastructure stakeholders and the New Zealand research community.

The resilience of lifeline networks like electricity, transportation and water is critical in enabling society to recover rapidly after a major disaster. The Distributed Infrastructure programme is developing tools to assess the performance of spatially-distributed infrastructure networks subject to extreme natural hazards. Working closely with relevant stakeholders, the programme is developing methodologies to quantify system-level performance of infrastructure networks when subject to natural hazards and cascading impacts, leading to improved resilience of communities through identification of multi-hazard related vulnerabilities in infrastructure critical for NZ society. More about this programme can be found here [link](#).

2. RNC-supported stopbank/levee research to date

Research title: New Zealand Inventory of Stopbanks (NZIS): a cross-compatible geospatial dataset (2017-2018).

Research partners: Council River Managers.

Principal outcomes: New Zealand's first modern and standardised inventory of stopbanks, presented as a cross-compatible geospatial dataset.

Status: Complete.

Outputs: Report and paper to River Managers, MSc thesis, NZIS v1.0 geospatial dataset - [link](#)

Research title: New Zealand Inventory of Stopbanks (NZIS): initial hazard exposure screening (2018-2019).

Research partners: Council River Managers.

Principal outcomes: Cross-compatible hazard exposure assessment (seismic, liquefaction, landslide) through use of the NZIS overlain with QuakeCoRE hazard research outputs.

Status: Complete.

Outputs: Report and paper to River Managers, geospatial dataset. Paper in preparation.

Research title: Assessing the impact of undocumented stopbanks on flood routing and catchment performance (2018-2019).

Research partners: Tasman District Council.

Principal outcomes: Catchment case-study including stopbank addition/modification/removal scenarios, inundation maps, HEC-RAS models.

Status: Complete.

Outputs: ME thesis under review, recommendations to partner council. Paper in preparation.

Research title: Stopbank incidents in New Zealand (2019-2020).

Research partners: Council River Managers.

Principal outcomes: New Zealand's first standardised inventory of stopbank incidents, aligned with ICOLD dam incident inventory format. Collation and aggregation of standardised data from past stopbank incidents. Use of incident dataset to determine factors associated with deterioration, damage, or failure.

Status: Underway.

Research title: Understanding engineering characteristics of New Zealand stopbank networks (2019-2020).

Research partners: Council River Managers.

Principal outcomes: Collation, aggregation and interpretation of the available geotechnical and hydrotechnical properties of stopbank embankments and their foundations. Information will form the basis for future work on engineering characterisation, hazard exposure and risk assessments.

Status: Underway.

Research title: Understanding failure modes of New Zealand stopbanks (2018-2021).

Research partners:

Principal outcomes: Development of laboratory based methods to characterise the failure mode of stopbanks due to overtopping. Assessment of effect of soil properties of failure mode and failure propagation.

Status: Underway.