**AIMS AND OBJECTIVES**

Develop and apply a holistic framework for tsunami vulnerability assessment of critical infrastructure

- Develop tsunami vulnerability functions for infrastructure which consider a range of:
  - Lifeline utility network components
  - Hazard intensity measures
  - Impact types

- Apply synthesised vulnerability functions to a New Zealand-based impact, outage and recovery assessment

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**BACKGROUND**

Impact assessment is important for proactive tsunami risk management. However, research on tsunami vulnerability of infrastructure lifelines is largely under-developed.

Tsunami vulnerability functions typically use depth as a proxy for direct damage. We aim to develop new functions which consider a range of construction standards (material etc.) hazard intensity measures (depth, speed, loading etc.) and impact types (direct damage, level of service etc.).

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**METHODOLOGY AND FRAMEWORK**

**2011 TOHOKU TSUNAMI, JAPAN**

**2015 ILLAPEL TSUNAMI, CHILE**

**2018 SULAWESI TSUNAMI, INDONESIA**

**APPLICATION: CHRISTCHURCH CASE-STUDY**

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**RESULTS**

**VULNERABILITY FUNCTIONS**

- Level standards: Construction type, material, dimensions etc.
- Hazard intensity measures: Wave velocity, inundation depth, hydrodynamic loading
- Impact: Direct damage, level of service

**IMPACT/RECOVERY ASSESSMENT**

- Impact: Intensity, source, sea level rise, hazard intensity measures.
- Recovery: Risk governance, outage times

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**ASSESSMENT**

- Median inundation depth, wave height
- Damage to infrastructure and lifelines
- Impact on utility poles and roads

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**ANALYSIS**

- Road and utility pole impacts
- Damage to critical infrastructure
- Impact on service delivery