

Natural Hazards Inc. Continuing to Create a More Resilient Tomorrow.

Natural Hazards Inc. Business Cluster is a New Zealand based partnership of industry leaders delivering innovative solutions for earthquake and other natural hazards risk management internationally. www.naturalhazards.co.nz.

Currently Covid-19 is the major global issue, now recognized as a world pandemic, causing major effects for communities all around the world including for business, travel, education, and just about every area of our lives. Along with a range of recent natural hazard events occurring in various parts of the world, such as the recent devastating bushfires in Australia, flooding in Jakarta, eruptions of the Taal volcano in the Philippines and Whakaari White Island in New Zealand, along with recent earthquakes in Puerto Rica and Turkey.

Natural Hazards Inc. helps to promote and facilitate the application of New Zealand based innovation and specialist expertise that can be applied offshore to provide benefits for the safety and well being of people in many parts of the world. Though it is not a natural hazard, we also now have the global Coronavirus that has affected many, becoming a world pandemic. Many of our members and associates are involved in one way or another including with emergency measures and planning for recovery as the devastating effects are widely felt with the spread of Covid-19.

Recovery Support for Central Sulawesi Project

Parts of Central Sulawesi province in Indonesia were impacted by a magnitude M7.5 earthquake and tsunamis on the 28 September 2018. The earthquake resulted in 4400 deaths and approximately USD\$910 M of damage. Nearly 70,000 houses, along with hundreds of government and commercial buildings, were damaged by the earthquake shaking, tsunamis and liquefaction-induced, low angle earthflows, that buried whole communities.

March 2020

The provincial capital of Palu City, of approximately 350,000 inhabitants, suffered the most significant human and economic losses. The large loss of life makes this earthquake the deadliest natural disaster worldwide in 2018, and the deadliest earthquake to affect Indonesia since the 2006 Yogyakarta earthquake.

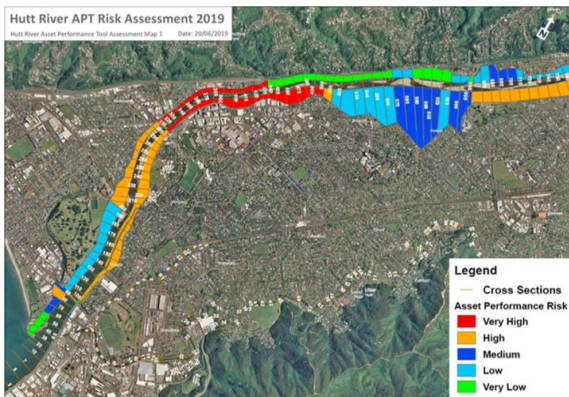
GNS Science and UGM have been working in Palu City since 2010 and specifically the [StIRRRD](#) programme worked in Palu City and Donggala and Morowali districts in Central Sulawesi between 2014 and 2019. Hence, when the M7.5 earthquake struck on 28 September 2018, the StIRRRD team (GNS Science and UGM) in collaboration with New Zealand consultants approached MFAT New Zealand for funding to provide assistance, utilising existing relationships and also the earthquake engineering expertise and experience of UGM and New Zealand. As a result, MFAT New Zealand has funded the Recovery Support for Central Sulawesi project implemented by GNS Science, in collaboration with the Universitas Gadjah Mada (UGM), Beca, Miyamoto and University of Tadulako (UNTAD) and others.



Members of the team assessing a damaged building at Tadulako University. From left: Alejandro Amaris (Miyamoto) Fatmawati Amir (Tadulako University), Prof Iman Satyarno (UGM), Matt Fox, Tony Pettigrew (Beca) Ketut Selandura (Tadulako University) and Andrew Baird (Beca). Rebecca Sanders (Miyamoto) is taking the photo.

Hazards Inc.. Greater Wellington Regional Council Flood Manager Graeme Campbell is the Convenor of the River Managers' SIG which has developed and is now implementing a 5 Year Sector Improvement Plan.

Initiatives designed and used in New Zealand provide opportunities for application in projects offshore. Almost every country globally faces river flooding, with New Zealand initiatives offering benefits elsewhere. An example of an initiative being developed in NZ is the new Flood Risk Assessment tool now being used by the Greater Wellington Regional Council and being implemented around New Zealand.



This River Managers' SIG 5 Year Sector Improvement Plan consists of four different work streams, each with key tasks in order to improve river management flood protection. This strategy is crucial to the adaptation to climate change, and will create a greater biodiversity and increase freshwater quality.

This 5 year river management improvement plan is being designed and tested in New Zealand, with the opportunity to take the gained knowledge and skills for use elsewhere facing similar issues. Almost every country globally deals with river flooding, so this new strategy could be beneficial to a great number of people, and increase both safety and productivity of any given nation.

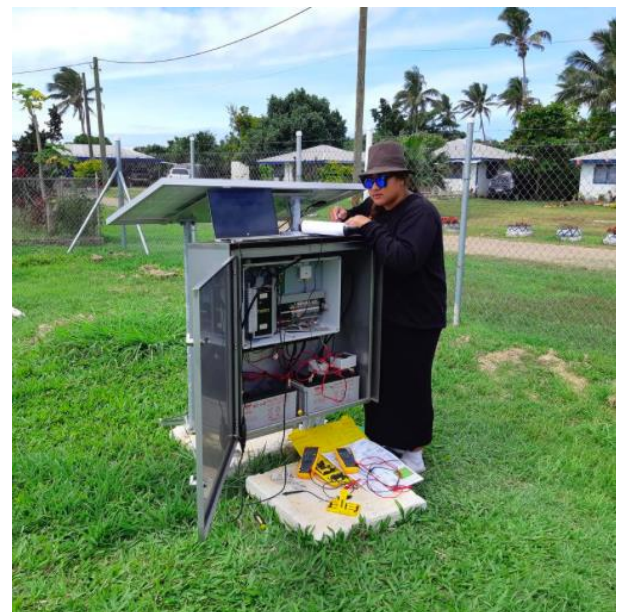
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NIWA Continues Building Pacific Island Weather Stations



NIWA has a lengthy history of working in the Pacific, and has provided aid in more than 240 installations of weather stations. These stations are incredibly beneficial when needing to prepare for extreme weather events and climate change, and can offer helpful insight for airlines and ferry operators.

Tonga, a pacific nation consisting of about 170 islands, is NIWA's most recent project, and has been set up with 21 weather stations as well as two sea level monitoring devices. Since this Island is so sparsely populated, these stations can be really beneficial to the health and safety of those who reside there. Tonga is known for having dangerous cyclones and droughts, but with the new technology installed, its people can now feel more prepared when a natural disaster hits.

One employee of NIWA in particular felt really connected to this project, Technician Aleki Taumoepeau was born and raised in Tonga, but had departed from his homeland when he was only 11 years old. Being a part of this project gave him a great chance to make a difference for his people, and also to return to the land he came from. In NIWA's article he states, "There are so many people who will benefit from this – shipping, ferries, airlines. It's been one of the most satisfying projects I've been involved in – and once everything was planned out it was smooth sailing. And knowing you're going to be actually helping your people was a real positive for me."



From left, NIWA technicians Rod Budd and Dave Bremner at work at Hunga Wharf with Selusale Vite from the Tonga Meteorological Service. The trio are using local tide boards to verify instrument records. [Aleki Taumoepeau].

For more information, please view the project page at <https://niwa.co.nz/news/weathering-new-technology-in-tonga> or contact:

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Tokelau Wharf and Passage Upgrade



The tiny country of Tokelau with around 1500 inhabitants is located about 500km north of Samoa and is one of the most isolated nations in the world. Tokelau has no airport or port and the only way to reach this destination is by boat from Apia, either a 26 hour journey on the NZ aid funded Mataliki or a 43 hour journey on the Kalapoga cargo vessel. The only way to reach the islands is by transfer from an ocean-going ferry into small lighters that traverse the surf zone through narrow channels cut into the coral reefs on each of the atolls. This transfer is only possible in good weather because in poor weather the currents in the channels are quite strong and the waves are too rough for lighters to safely move through the surf zone for passengers to transfer to shore.

The Tokelau Government reached out to the New Zealand Government for assistance to improve the safe transfer of passengers and goods in and out of the atolls. The Ministry of Foreign Affairs and Trade (MFAT) engaged Calibre Consulting Ltd (Calibre) to consult with the local Tokelauan community on options to improve the existing reef channels and wharves on each of the three atolls.

Staff from both Calibre and the National Institute of Water and Atmospheric Research (NIWA) travelled to Tokelau to consult with the Taupulega (island councils) and to examine the environmental and social impact assessment (ESIA) of the possible upgrade options. The ESIA report addressed options to upgrade the reef channels and wharves on each of the three atolls taking into account the local safety needs as well as climate and weather impacts on the channel operation.

An Australian contractor, Hall Contracting Pty Ltd was engaged in early 2018 to carry out the upgrade work and completed the last of the four upgrades in November 2019. Calibre has just completed a final visit to the atolls to review the completed construction works and to engage with the Taupulega in a “lessons-learned” exercise to inform future development projects.

Of note is that this NZ aid-funded project is the largest contract ever carried out in Tokelau and the improvements have already shown benefits for the local communities in terms of ease of operation, safer passenger and cargo transfer and has also provided an improved community facility for swimming and fishing when not used for transport.



New Zealand's Prime Minister Jacinda Ardern opens the new facility on 31 July, 2019

For more information regarding Tokelau, please go to the project page,
<http://www.calibregroup.com/projects/project/tokelau-wharfs-and-reef-channels>, or contact:

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Global Seismic Data - Preserving Lives - Impacting Economies

Global Seismic Data (GSD) is a global full-service Structural Health Monitoring software as a service company.

“We are disrupting the status quo, integrating innovation, technology and structural engineering into a single professional solution with our industry partners,” says the team at GSD.

Earthquakes are recognised as a workplace hazard which could jeopardize your safety causing significant and social upheaval instantly. With our systems and by working together we can save lives and lessen the impact on the economy.

GSD delivers Structural Health Monitoring of building movement and behaviour while collecting data that allows informed decisions to be made in real-time. This system, service and solution promotes:

- human safety · building structural health · reductions in business interruption · prevents unnecessary evacuations;
- engineers use data for rapid post event assessment of buildings · coordination of emergency response;
- reduction of costly downtime and distress.

The priority is to ensure a business receives the vital data required to determine their building status and improve decision makings affecting life safety outcomes before an event.

Structural Health Monitoring System (SHMS) provides continuous monitoring of a building or infrastructure frequency, ambient noise, movement and behaviour essentially giving the building a measurable pulse, with Seismic Data Sensors tuned to a building via-engineers.

Sensors measure any changes in its orientation and capacity to ensure everyone's safety. Data from Structural Health Monitoring is a building's ECG, providing quantified information which allows multiple stakeholders to improve their role in making people and buildings safer.

"The continuous real-time monitoring of your building or infrastructure allows you to identify and respond to defects before they have a serious impact on your operation or finances."

An early adopter has been prominent Wellington property investor Ian Cassels who has been rolling out the installation of the Global Seismic Data system across the portfolio of his The Wellington Company commercial sector buildings. This is being done with Global Seismic Data industry partner consulting engineers Silvester Clark.

"Our Structural Health Monitoring System a leading solution in today's Prop Tech sector globally it's fast, reliable, and with a range of capabilities that positions Global Seismic Data ahead of others in the marketplace," says the GSD team.



Graphic design from Global Seismic Data, the Structural Health Monitoring System (SHMS) allows for continuous monitoring of building health.

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Seismic Risks in ASEAN?

What are the seismic risks in ASEAN?

As a structural engineer from New Zealand, earthquakes have been at the centre of both my education and time working as a consulting engineer. New Zealand is often referred to as the Shaky Isles due to the regularity of earthquakes. As I write this, a M5.1 earthquake occurred on New Zealand's east coast.

In Southeast Asia, while earthquakes are rare, the consequences can be severe when they do occur. It is estimated that 37% of the total ASEAN population are exposed to the risk of an earthquake of Modified Mercalli Intensity (MMI) 7 and above. This is a measure of shaking that corresponds to slight to moderate damage in well-built structures and considerable damage in poorly built or badly designed structures. Compounding the impact, ASEAN countries have on average 146 people per sq km, eight times more than New Zealand, and this increases sharply in the capital cities. In Bangkok, the population density is 5,300 people per sq km and in Jakarta a whopping 14,500 people per sq km.

With a combination of high-density, high-risk and many high-rises, it is unsurprising that earthquakes and tsunami rank as the number one natural disaster threat to ASEAN residents. The most effective way to reduce seismic risk is to design for it.

These design requirements mean the newest generation of skyscrapers being built in many other ASEAN cities. While the probability of a large earthquake occurring is low, the one thing we know for certain is that it's not a question of 'if' but 'when' it will occur.

Summary taken from Senior Structural Engineer, Andrew Baird's, recent article online at <https://www.beca.com/ignite-your-thinking/ignite-your-thinking/december-2019/seismic-risks-in-asean>

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Massey University Disaster Research and Washington State Continue Their Work Together to Solve Issues on Mt Rainier



Massey University Joint Centre for Disaster Research and Washington State Emergency Management Office are celebrating their 20 years of partnership this year. In 2019, the team worked together to send out a survey to residents in the area in order to assess their knowledge of lahar hazard systems, and to better prepare citizens for warning signs of a natural disaster and how to react in such a situation. The primary goal of this survey is to **help the State and local emergency management agencies** to create and implement a systematic plan for Mt Rainier's citizens to put forth when such a disaster occurs. Washington's geological setting can be compared to New Zealand's North Island because they're hazards are quite similar, so the JCDR and Washington State EM were able to exchange information about their social media outreach, community initiatives, and past events that helped both teams gain knowledge to bring into their own community. This information was also collected into a collaborative database of existing reports. A lot of change and initiative is being made in Washington. Schools and communities are being better prepared for natural hazards such as a lahar, and learning safety tools such as proper evacuation procedures so that when a disaster does strike, the risk will not be as high.

For more information, please contact:
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or visit the project page at:
<https://www.massey.ac.nz/massey/learning/departments/school-of-psychology/research/disaster-research/events-and-news/fellowship-of-the-ring-of-fire.cfm>

Tonkin + Taylor – Bushfire Relief Donation

The Australian bushfires have become global news, sweeping the nation with heat and flames due to months of drought and accelerating temperatures. Many foundations are raising money in order to send aid to Australia, and we are seeing people all around the world come together to donate and benefit the lives of Australia's citizens and animals, as well as to protect the land from further damage. So far, at least 33 citizens have died from these treacherous fires, 4 of them being firefighters. Many volunteer firefighters have come forward, and we see many communities are joining together to do everything they can in order to put an end to these bushfires.



One foundation in particular, the Foundation for Rural & Regional Renewal (FRRR), are using their donations and resources to give aid to the wildlife and communities impacted by these fires. Tonkin + Taylor, Chadwick Geotechnics, and Geotechnics have shown their appreciation for the efforts being made in Australia by donating \$50,000 to FRRR with their best wishes being sent out to those who have been affected by the fires. Everyone is hoping for a quick recovery, and the renewal of the lost wildlife that has resulted from this tragedy.

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www.tonkintaylor.co.nz



Potential International Work for the Concrete Structure Investigations Team

Our partners at Concrete Structure Investigations have been keeping busy in recent months. The directors of CSI have been adventuring overseas to explore potential projects and partners. The opportunity for growth in this company is endless, and the team is taking advantage of that by searching for international assignments. In mid December a few crew members got the opportunity to visit Asia-Pacific to assist with non destructive testing work using their advanced technology.

As you can tell, the CSI team has been busy to say the least! Concrete Structure Investigations conducts building assessment and testing with the use of their innovative new technology.

Starting with a team of only two, CSI has grown to 13 staff members, and will continue their growth and knowledge through a continuous development of new sciences.



Thank you to everyone at Concrete Structure Investigations for hosting a fantastic meeting in February for Natural Hazards Inc. Business Cluster members and associates.



For more information, please contact:

Jane Roach, CSI Director

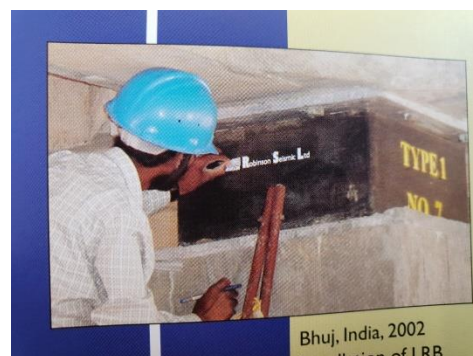
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<https://csiscan.nz>

Robinson Seismic Limited is back working in India.

The first ever commercial project for Robinson Seismic was in India – Bhuj Hospital in 2002.



A few more projects were completed over the following years then nothing further mostly due to the difficulties of doing business in India.

However, Robinson Seismic Limited has recently appointed a new agent in India and he has already secured his first project.

Robinson Seismic is proud to be supplying the base isolation system for the Nalanda Dental College and Hospital in the Bihar district of India. This is a 100-bed hospital and training centre for dental students.

The Bihar district is a high seismicity zone and our technology has been recognised as an essential part of this new building and training centre.

Robinson Seismic have just finished prototype testing for the project and are looking forward to completion of this new project and many more to come in India.

For more information, please contact:

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Intern NZ assistance with Natural Hazards Inc. Newsletter



Photo: US intern Emily Sezate who is associated with Arizona State University.

Natural Hazards Inc. appreciates the efforts of US Intern Sustainability Studies student Emily Sezate from Arizona State University in producing this newsletter.

If you're interested in having New Zealand or international student interns in the future spending some time on a remote working basis with your business or other organisation in New Zealand, please contact:

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Phone: +64 4 390 3549, Office Phone: +64 4 384 0117
www.internnzoz.com

Natural Hazards Inc. Members' Expertise

- Strategies for disaster risk reduction, readiness, response and recovery.
- Development of organisational frameworks for emergency management.
- Emergency management education.
- Community preparedness for natural disasters.
- Multi-hazard land use planning.
- Improvement of building controls, standards and codes.
- Seismic retrofit strengthening of buildings, including simple houses.
- Seismic isolation of important buildings such as hospitals, schools, emergency management centres, government buildings, apartment buildings and heritage buildings.
- Tsunami and flood risk assessment, modelling and mitigation strategies.
- Disaster risk insurance strategies and systems.

For More Information, please visit
www.naturalhazards.co.nz

Instagram: www.instagram.com/naturalhazardsnz
Facebook: www.facebook.com/naturalhazardsnz

New Members Always Welcome!

If you are interested in joining Natural Hazards Inc. we have a range of membership options available. For more information including more about Natural Hazards Inc. please visit our website www.naturalhazards.co.nz/join-us/

Next Natural Hazards Inc Business Cluster Meeting:

Thursday 21 May 4pm to 6pm
Calibre

Kordia House, Level 13
109-125 Willis Street,
Te Aro,
Wellington 6011, NZ

NOTE With Covid-19, this is now expected to be an online meeting. Further details closer to the time.

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