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From the President



Welcome from my desk at home here in locked down Auckland! I am really hoping we will all be able to connect more with each other in person shortly once more across NZ are vaxxed. In the meantime, I hope you and your loved ones are coping ok in this strange Covid impacted world we are currently all living in.

I am delighted to announce the latest publication in the EERI oral history series Connections which celebrates one of our own; NZSEE life member Professor Nigel Priestley. This follows on from the twelfth volume in the series which featured Professors Park and Paulay.

This delight for me is personally very special as I was one of those lucky enough to attend Canterbury University as an undergraduate when all three "Ps" were professors there. Nigel and his colleagues introduced us to what we later learned was a new way of thinking about structural design – displacement based design.

This oral history is the result of another life member's hard work over many months along with Nigel's daughter Rebecca Priestley. Thank you, Richard Sharpe! I am also delighted as this simultaneous joint publication once again reinforces our joint and ongoing relationship with our sister organisation in the USA, EERI.

Notwithstanding the lockdowns much has been going on within the earthquake engineering community over recent months. A particular area of focus at present of course, is the work currently underway updating the National Seismic Hazard Model. MBIE has been continuing planning how this information will be incorporated into the verification methods with an initial particular focus on B1/VM1. We, together with Sesoc and Engineering NZ, recently issued an advisory about hollow core flooring and NZGS have been working on finalising the Geotechnical modules.

All these various activities and developments have led me to consider where policy fits, and its role in relation to new science, engineering practice and regulatory requirements. It is easy (and perhaps understandable) for us scientists and engineers to forget and ignore what some call the wider considerations for seismic risk in our focus of incorporating new science

into engineering practice (and as quickly as possible). These wider considerations include, for example, economic and social impacts and societal expectations, which are at the heart of the policy settings. These policy settings are often expressed as required minimums in the building standards, but often with little explanation. However, we ignore these wider considerations and the minimum standards at our peril. They are not optional requirements and they constitute our social licence for professional engineering practice.

Looking forward, the NZSEE Resilient Buildings Project was set up with a view of contributing to the debate about future policy settings for seismic resilience for buildings. The project is exploring societal risk tolerance for the seismic performance of buildings in New Zealand in order to understand if this has changed over time. Analysis of the results of the research is currently underway, look out for an update in this newsletter and for the results of the work which we are planning on publishing by year's end.

I am delighted that given these developments and the planned work ahead that MBIE, together with EQC, have very recently appointed a new MBIE/EQC Chief Engineer (Building Resilience) and am especially delighted it is a NZSEE member; Professor Ken Elwood. He is being seconded into the role (50% until the end of this year, then 80% in the new year) which will allow him to also maintain some research activity at the University of Auckland. Congratulations Ken!

Planning work is underway for the next NZSEE conference which we aim to hold in person (covid willing) in Wellington 27 – 29 April 2022 with the title Te Aorurihuri, ngā piki me ngā heke Designing for Uncertainty: Challenges and Opportunities. And yes, for all those younger members we are planning holding the design competition again at the upcoming conference. Watch out for updates and information as it becomes available and I look forward to seeing you then if not before.

Take care and stay safe

Helen



UPCOMING EVENTS

2nd Aotearoa New Zealand Symposium on Disaster Risk Reduction: Managing Risk, Accelerating Resilience

Te Papa Tongarewa, Wellington

28th Feb-1st March 2022

<https://www.resilience.nz/>

The Concrete Conference

Energy Events Center, Rotorua

17-19th February 2022

<https://www.theconcreteconference.co.nz>

2022 Annual NZSEE Conference

Wellington, New Zealand

27-29th April

<http://confer.eventsair.com/nzsee-2022/>

Advancing Women in Engineering and Construction Symposium

10th June 2022

3 ECEES

Bucharest, Romania

4-9 September 2022

<https://3eceeds.ro/>



Nigel Priestley Oral History

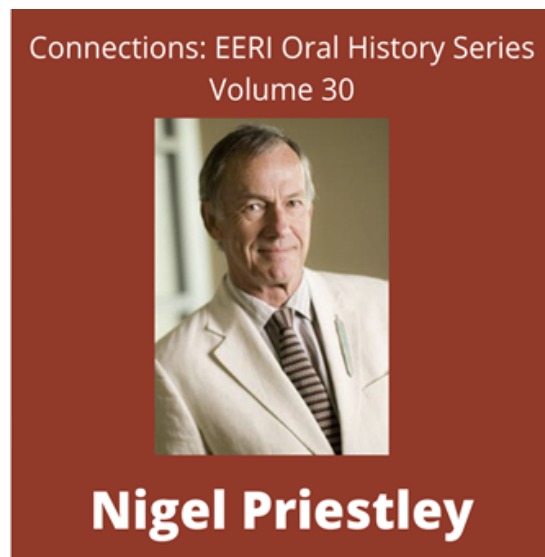


NZSEE are very pleased and excited to announce together with the Earthquake Engineering Research Institute (EERI) the 30th volume of *Connections: The EERI Oral History Series*, featuring the late Professor Nigel Priestley—a significant figure in the field of earthquake engineering here in New Zealand, the United States, and globally.

NZSEE is delighted that a third NZSEE member now features in the Connections Oral History Series. This follows on from Volume 12 which celebrated both Tom Paulay and Bob Park. This new volume adds the third P to the 3 P's (Park- Paulay- Priestley) and as such is extremely fitting.

The interviews for this volume were conducted in the final year of his life, by NZSEE life member Richard Sharpe, and Nigel's daughter Rebecca Priestley, a historian of science with the Centre for Science in Society at Victoria University of Wellington.

The EERI Oral History series is available free of charge in PDF format [here](#). It will also be available for purchase in a printed version. The price will be finalised once the order numbers are determined. If you want to order a print copy(s) please indicate in the attached link below <https://forms.gle/f44riezDRooGABX37>



And for those who would like to learn a little more about Nigel before delving into the oral history itself:

Nigel Priestley

During his career, Professor Priestley had a lasting impact on three institutions of higher education: the University of Canterbury, the University of California, San Diego, and the ROSE School in Pavia, Italy. After earning his PhD in 1966, he spent a decade with the NZ Ministry of Works, leading extensive studies on bridges and buildings.

As a faculty member at the University of Canterbury, he conducted research on the seismic behaviour of masonry structures in collaboration with Professor Tom Paulay, and served as the president of NZSEE from 1985-1986. He then spent over a decade on the faculty at the University of



California, San Diego, before becoming Co-Director of the ROSE School, where he continued until 2007.

Professor Priestley published more than 450 papers, mainly on earthquake engineering, and received numerous awards for his research. He was the co-author of three seismic design books: *Seismic Design of Concrete and Masonry Buildings*, *Seismic Design and Retrofit of Bridges*, and *Displacement-Based Seismic Design of Structures*.

Professor Priestley served on the engineering advisory group and the Royal Commission established by the New Zealand Government to investigate building collapse in the 2010–2011 Canterbury earthquakes, just one of the many episodes in his long career discussed in this volume. As his daughter Rebecca, co-interviewer for this volume observes, he “also read and wrote poetry, played classical guitar and was an accomplished carpenter. I think it was this mixture of precision and creativity that led to his best work, which was marked by a fresh way of looking at engineering problems and demonstrated in his accounts of how to apply these new ideas to the design of structures, particularly buildings and bridges.”

NZSEE webinars 2021

A webinar is planned to be held on 30 November titled “Introduction to seismic hazard analysis and PSHA.”

Watch out for notices to the webinar link which will be issued to members shortly.

QuakeCore/NZSEE Women leaders in Earthquake Engineering award

Established in 2019, this award is to recognise younger academic and professional women for ingenuity and entrepreneurial spirit in the field of earthquake engineering. It is awarded to recognise and honour an individual who has been involved in industry-leading, innovative solutions to problems in earthquake engineering. **This year our winners are Kaley Crawford-Flett and Charlotte Toma.**

Charlotte Toma has contributed to the structural earthquake engineering community through research, earthquake reconnaissance, teaching and advocating for continued learning opportunities. As an academic, her research is centred on seismic and community resilience, with a particular interest in sustainable design. Her research aims to support the shift to a low carbon economy, and focuses on the transect of seismic resilience and net zero carbon objectives for the built environment. She endeavours to continually challenge herself technically and professionally, whilst also advocating for greater equity for, and inclusion of, female engineers in earthquake



engineering. The award money will go towards an initiative Charlotte has led addressing the gender disparity challenge within engineering. The “Advancing Women in Engineering & Construction 2022 Symposium - Reshaping the industry through the collective voice of women” will be a collaborative look at what the work environment is like for women at



different career stages, what needs to change, and what might help to keep women progressing in their careers.

Kaley Crawford-Flett is a Geotechnical Water Resource Engineer, Programme Lead, and Senior Industry Research Fellow at the University of Canterbury. Kaley sits at the interface between industry and academia and is one of New Zealand's leading experts in earthquake engineering research for water-retaining dams. Kaley is leading research into seismic effects on critical components of large earth dams. These critical elements prevent



internal erosion that could otherwise result in catastrophic failure of the dam, with consequential risk of large loss of life due to dam breach. To date, engineering practice for design of these components of earth dams has been largely based on precedent, experience, and empirical analysis. Kaley is leading research using laboratory

testing and fundamental geotechnical-engineering concepts to determine seismic performance of these components. Kaley seeks to make pathways in engineering more accessible for women and others from non-traditional backgrounds. During her career, she has developed relationships with several impactful professional women mentors and hopes to see greater mentoring, encouragement and career opportunities for a diverse range of younger engineers as they undertake education and transition into the industry.

EQC/NZSEE Ivan Skinner award

The EQC/NZSEE Ivan Skinner Award aims to advance the common interest of the Earthquake Commission (EQC) and the New Zealand Society for Earthquake Engineering Incorporated (NZSEE) in promoting research to practice outcomes which reduce the impacts of earthquakes on New Zealand communities. This award aims to advance the common interests of the EQC and the NZSEE in promoting research to practice outcomes which reduce the impacts of earthquakes on New Zealand communities. It is awarded to an applicant in the early stages of their career, who has already demonstrated high promise with achievements or techniques that foster earthquake resilience.

This year's winner is **Dr Ashkan Hashemi**, who is a lecturer in structural and earthquake engineering at the University of Auckland and has had a key role in developing innovative solutions for the low damage design of structures, including the components providing the resilience and the design procedures to enable maximum benefit to be obtained from these components. He has an extensive journal and conference



publication record and in providing technical support to the profession on the use of these systems.

EERI and NZSEE

The NZSEE EERI relationship continues in good heart with the publication of the Nigel Priestley oral history a recent particular highlight.

Other recent activities include the support NZSEE provided to AEEES together with EERI to set up a virtual clearing house for information gained from the recent Woods Point earthquake in Victoria Australia as part of the ongoing learning from earthquakes programme.

NZSEE Executive Officer - departures and arrivals

We have had some recent changes in regards to the NZSEE executive officer.

It is with sadness we have to advise that Lisa Moon recently resigned as the NZSEE executive officer due to ill health. We thank her for her work supporting the society and wish her a rapid recovery and best wishes for the future.

We welcome Lauren Mulcahy into the role which she started a few weeks ago. Lauren has recently returned to New Zealand after four years working at an international school in Bangkok and where she had been living with her husband and NZSEE member Andrew Baird along with baby Charlie (Charlotte).

Please welcome Lauren, our new executive officer. She can be contacted through the NZSEE email address exec@nzsee.org.nz.

NZSEE Regional Groups

We are looking for members who would like to join the NZSEE regional groups organising team. The regional groups organise events and presentations and host New Zealand wide travelling lectures.

Any members who want to join please contact Tony Holden:
Tony.holden@arecongroup.com



NZSEE Conference 2022

Conference planning is well underway for 2022. The conference will be held in Wellington on 27 – 29 April 2022. We are also planning on a number of site visits and associated activities and these will likely be held the day before the conference on 26 April.

This year we have chosen the conference theme of Te Aohurihuri, ngā piki me ngā heke, Designing for Uncertainty: Challenges and Opportunities. There is currently a lot of progress occurring in the industry, with engineers questioning and challenging seismic design philosophies. With this challenge of uncertainty comes great opportunity.

The conference aims to address the need for a more resilient Aotearoa by highlighting the drivers for change, which are resulting in updates to policies, codes, and best practice designs. We seek to bring together a diverse range of thinking and experience, to discuss the uncertainties facing seismic engineering.

The technical programme will include keynote addresses and special sessions on the current and future challenges facing earthquake engineering. There will be sessions on emergency management, research developments in earthquake engineering, advances in the field of geotechnical engineering, social and policy impacts of disasters, and developments in resilience and low-damage design.

Beyond the technical programme, the conference provides a chance to reconnect face-to-face, after a disruptive two years. We are planning on holding the event in person; however, it does appear that the risk of disruption due to COVID-19 does remain. Plans are therefore being put in place for back up dates and, worst-case scenario contingencies.

More information about the conference can be found here <https://confer.eventsair.com/nzsee-2022/>

NZSEE Design Competition 2022

Planning is also well underway for the Seismic Design Competition 2022 which will be held during the conference. Teams of undergraduate and postgraduate students and young professional members will design and build a small-scale earthquake resistant building that would be tested on a shake table during the conference.

Requirements for participants include (1) creating or joining a team, (2) designing and building a scale building model, and (3) testing your model at the conference.

Each team is to have 4 members with everyone under 30 years old. Multiple teams from the same office and university are encouraged.

PRELIMINARY BUILDING MODEL REQUIREMENTS

The approximate footprint of the building will be 200 mm x 200 mm. The building will be required to have a minimum of three stories with a typical story height of 200 mm. The model must be capable of supporting approximately 40 kg distributed between the floors. The buildings will be constructed primarily using wood material and hot glue.

Further information will be provided shortly.

INTERESTED?

If you would potentially be interested in participating in the competition, get in touch! Please forward this information to anyone you think might be interested.

Any queries please contact Max Stephens:
max.stephens@auckland.ac.nz

Advice on Hollow Core floors

NZSEE along with Sesoc with Engineering NZ recently issued an “Advice on Hollow – Core Floors”. This advice was prepared based on research carried out following the observed performance of hollow core units following the recent earthquakes particularly the Kaikoura earthquake



which had been the subject of a presentation at the recent Sesoc conference by Frank Bükler and Nic Brooke.

The advisory includes advice to structural engineers based on our current understanding of the behaviour of hollow-core floors for new buildings, for assessments and for retrofit and suggested messages to clients noting they should be factual and not alarmist. The advisory concludes with information on where to get further technical knowledge.

These are the suggested messages to clients included in the advisory:

- Our knowledge of structural engineering develops over time. We continue to learn from the Canterbury and Kaikōura Earthquakes.

Hollow-core

- Hollow-core units are known to be fragile and susceptible to brittle failure during earthquakes. Therefore, their use in new buildings is not considered to be good structural engineering practice and is not recommended.
- There is no known way to show that hollow-core beta units comply with NZS 3101.
- There is no known international standard consistent with the NZ application of hollow-core that mitigates its known failure mechanisms.

Retrofits

- Recent research [8] shows that hollow-core units with supplementary seating retrofits can still be susceptible to collapse. This is due to cracking occurring beyond the end of the angle retrofit and/or propagating at a shallow angle. This kind of damage can occur even where the maximum imposed drift (lateral displacement between a building's floors) is small.
- Recent testing indicates that a new form of retrofit, referred to as a strongback system, will provide effective support for all known failure modes. Strongback systems are also insensitive to the uncertainties in the failure modes, such as the location of the cracks.
- The earthquake score of hollow-core floors previously retrofitted with supplementary seating may be lower than previously understood.

The link to the full advice is here.

<https://www.sesoc.org.nz/precast-flooring-resources/>

The Resilient Buildings Project

The NZSEE Resilient Buildings Project was set up to explore societal risk tolerance for the seismic performance of buildings in New Zealand.

Much work has been done this year by the project team and the early results are starting to emerge from the research. Initial findings suggest that the New Zealand Building Code's seismic performance objectives generally agree with societal expectations regarding life safety but may fall short of societal expectations for mitigating societal and environmental impacts on a community following a major earthquake.

Ongoing analysis (and future research) is expected to identify core seismic performance outcome categories, the spectrum of risk tolerance with categories and the primary drivers of seismic risk preferences. Insights arising from this research will contribute to debate about the desired levels of seismic resilience in the future at both the building and community scales.

Look out for the report on the project which we are planning on publishing in a couple of months.

Seismic Risk Working Group update

As noted in the last newsletter following the release of the Seismic Risk Working Group (SRWG) report in late 2020 MBIE have been planning the next steps and in particular how the new National Seismic Hazard Model results (expected in August 2022) will be incorporated into B1/VM1.

We have been advised the SRWG team have developed a proposed Seismic Risk Work Programme. This proposes a programme of work with the initial deliverable a minimum viable revised Verification Method (B1/VM1) which aims to be available around the same time as the new NSHM to be followed by further development over the following 1-2 years.

The aim of this approach is, we understand, to avoid the situation where the hazard results are available but there is no consistent approach to implement them in structural and geotechnical design while also acknowledging time is very short for the number of issues that need to be addressed. We understand the work is likely to get underway very shortly.

It is pleasing to note the continued efforts MBIE are making to keep NZSEE briefed on developments for this important initiative.

