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# Proceedings of the 2022 New Zealand Society for Earthquake Engineering Annual Technical Conference

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## Keynote Presentations

Ken Elwood – From Ductility to Repairability

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## Invited Speaker Presentations

Shannon Abeling, Charlotte Brown, Hugh Cowan, Helen Ferner, – The Resilient Buildings Project

Pathmanathan Brabhakaran, Didier Pettinga, Max Stephens, Charlotte Toma – Looking to the future for Seismic Design - Considerations to improve NZ resilience

Alistair Cattanach, Matt Gersetenburger – From new seismic hazard models to new design practise – Challenges and opportunities

Michelle Grant, Tim Sullivan, Andrew Thompson – Designing for uncertainty

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## Oral Presentations

### 01A.1 Retaining Wall Design – SESOC

G Bird, A McPherson,

### 01A.2 Modelling uncertainty induced by plastic hinge length in lumped – plasticity analysis of RC columns

J. Mou, M Tripathi, R Chandramohan and R.P Dhakal

01A.3 A preliminary investigation of validity of conventional single-mode pushover analysis in multi-mode systems

S.N.R Orchard, R. Zhang, A.M Puthanpurayil

01A.4 Investigation of influential factors on yield strength of lead rubber bearings

M Pourmasoud, A. Park, I. Hajirasouliha, J.B.P Lim

01A.5 Dealing with uncertainty in prediction of lateral spread.

S.J Palmer, V.S Smith, K Elwood

01B.1 Sustainability in enhancing the resilience of major route in Wellington

S Arumugam, P Brabhaharan

01B.2 Seismic isolation of bridges: Case studies

M.S Mohammed, S.C Darling, A.F Ibrahim, L.P DeBisschop,

01B.3 Reclamation resilience improvement at CentrePort, Wellington, New Zealand

J. Munro, C. Keepa, A Delaney

01B.4 Shake Table Tests of a Six-Span Steel Bridger Model for Nonlinearity identification

N.Navabian, S.Beskhyroun

01B.5 Earthquake design loads on retaining walls

J.H Wood

01C.1 Effect of Energy Dissipation on Seismic Response

M.Farshbaf, A.S Moghadam, G.A. Macrae, C-L.Lee, H. Soleimankhani, T.L. Chang

01C.2 Application of resilient rocking cores in low damage mass timber structures: A case study

A.Hashemi, P Zarnani, R Malczyk, P.Quenneville, S.Varier, H.Mpidi Bitu

01C.3 Prediction of Demands on Non-Structural Components in Base-Isolated Structures

K. Haymes, T.J. Sullivan, R. Chandramohan, L.Wiebe,

01C.4 BRB System Out-of-Plane Considerations

G. A. MacRae, C-L. Lee, S.Y. Vazquez-Colunga, J Cui

01C.5 Seismic response of a base-isolated building under pulse-like near-fault ground motions

A.A.Rad, T. Holden, N.K.Hazaveh

01D.1 Seismic structural monitoring in Wellington using advanced seismological techniques

C. Francois-Holden

01D.2 The damaging power of Earthquakes and the role of duration

David C Hopkins, Quincy T Ma, Charlotte L Toma

01D.2 Interim results from empirical ground motion model evaluation for the NZ National Seismic Hazard Model Update

R.L.Lee, B.A.Bradley. J.A.Hutchinson, E.F Manea

01D.3 Depth and shape of the Basement Surface Beneath Wellington City, Based on Gravity and Seismic Constraints

A.I Stronach, T.A Stern

01D.4 Dynamic site characterisation of the Hawke’s Bay sedimentary basin using H/V and surface wave methods

A.C.Stolte, L.M.Wotherspoon, P. Girgis

01E.1 Seismic retrofit of historic timber structures: Uncertainties and adaption on site

M.E Davies, G.W. Alley, A.G Cattanach

01E.2 Ductility factor validation for CLT walls with bolted hold-downs: preliminary analyses and observations

B. Moerman, M.Li, A.Palermo, T.Smith, A.Liu

01E.3 Ductile timber connections: Understanding the factors contributing to their ductility

P. Quenneville, A.Hashemi, P.Zarnani,

01E.4 Repair and Reinstatement of Douglas-fir CLT Hold-down Connections using Mixed Angle Self Tapping Screws

T.D.W. Wright, M.Li, M. Gedyrna, T.Lim, D. Moroder, D. Carradine

02A.1 Sustainability Aspects of Geotechnical Earthquake Engineering in New Zealand

A.K. Murashev

02A.2 New revision of the national design guidelines for ground improvement (MBIE Module 5)

A.K.Murashev,C. Keepa

02A.3 Liquefaction-Induced Parabolic Subsidence Method:

F.Parodi, D.Cook, A.Liu, E.A. Mortola

02A.4 Liquefaction potential of sand-gravel mixtures: experimental observations

A.Pokhrel, G Chiaro, M.Cubrinovski, T.Kiyota

[02B.1 Mechanical Anchor Supplementary Shear Reinforcing as a Retrofit Technique for Hollowcore Floors](#)

R.Hudson, A.Barolotti, F.Galvez, D.Shedde, D Giongo

[02B.2 Seismic Performance of Precast Hollow-core Units Seated Within the Plastic Hinge Region](#)

M. Mostafa, F. Buker, L.Hogan, K. Elwood, D.Bull, M. Parr

[02B.3 The role of in-plane strengthening within a proposed non-specific design approach to seismic improvement for URM buildings](#)

H. Tocher, M. Cutfield

[02B.4 Seismic strengthening of the Seatoun Tunnel](#)

P Wymer, B. Radosavljevic, D.A Latham, P. Brabhabaran, F. Tawfeek

[02C.1 A case study of Soil-Foundation-Structure-Interaction for aseismic design of wind turbines](#)

G. Adhikari, C. Keepa, D. Novakov

[02C.2 Geotechnical challenges and design solutions for Yarrow Stadium redevelopment](#)

A.K Murashev, P. Alves

[02C.3 Wellington region land transport resilience business case](#)

P. Brabhaharan, M. Siazon

[02C.4 A bespoke analytical methodology for seismic safety assessment of spillway gates: case study of Waipapa dam spillway gates on the Waikato River](#)

U A Siddiqui, R Davey, W Parker, C Keepa,

[02D.1 Integrating Māori Perspectives into Community Resilience Frameworks for the Built Environment](#)

M. Boston, E.J Flintoft, D.V Bertram

02D.2 The Shaky south (or not): towards improving communities understanding of earthquake risk in Otago and Southland

D.Johnston, J.Becker, L.Vinnell, L.Kaiser, K.Tapuke, C.Orchiston, M. Akther, M. Stirling, J.Stewart, A. Lake-Hammond

02D.3 Social influences on behavioral response to earthquake shaking

L.J.Vinnell, P.Inch, D.M.Johnston, N. Horspool

03A.1 Method for incorporating seismic hazard into the traditional Life Cycle Assessment for evaluating seismic performance

R. E Gonzalez, M.T. Stephens, C.L Toma, D. Dowdell

03A.2 Fast & Furious? Drive your analysis carefully

A.M Puthanpurayil, R. D. Sharpe

03A.3 Effects of explicit representation of buildings on tsunami inundation and loss modelling

V.K.Sadashiva, X. Wang, S-L. Lin, B.Lukovic, D.W. Heron, A. Suppasri

03A.4 A review of international guidance for tsunami loading on buildings

H.S. Till, M.T. Stephens, C.L.Toma

03A.4 Experimental and analytical evaluation of different failure modes of self-centring braces

S.M.M. Yousef-Beik, M.Seifi, A Hashemi, P. Zarnani, Q Mehrdad, S. Veismoradi

03B.1 Code requirements for column confinement with a view on drift

M.S.Dawson, J.W.Rodgers, S.Pujol, K.C Skillen

03B.2 Study on floor-slab out-of-plane effect of a 2-storey low-damage concrete wall building

A.Gu, G.W. Rodgers, Q. Yang, R.S. Henry, Y. Lu, Y. Zhou

03B.3 A novel solution for retrofitting concrete structures with resilient connections: a case study

A.Hashemi, S. Agarwal, P.Quenneville, T. Dawson, P. Boardman, R. Poole, P Zarnani,

03B.4 Seismic upgrade of an existing building with un-topped, pre-cast concrete floor units using fluid viscous dampers

A.Moshref, E. Bigsby

03B.5 Experimental response of earthquake damaged reinforced concrete walls

G.Muñoz-Arriagada, R.S.Henry, K.J.Elwood

03C.1 Accounting for uncertainties related to performance, modelling and design methods for structures with dampers

S. Agarwal, A. Hashemi, P. Quenneville, P. Zarnani,

03C.2 Heke Rua—Resilient seismic design for a building of national significance

T. Beetham, J.F. Finnegan, T.Holden,

03C.3 Elastic Design ( $\mu=1.0$ ) of Damage Avoidance Structures

F Darani, P Zarnani, P Quenneville

03C.4 Modelling the out-of-plane buckling behaviour of BRBFs

S Sistla, R.Chandramohan, T.J. Sullivan

03C.5 Assessing the impact of acceleration-sensitive components on the seismic losses of multi-storey office buildings

M.B.Williamson, L. John, T.J Sullivan



03D.1 Rating Houses for Strength and Damage: A simple App for owners and insurers -  
D. C Hopkins

03D.2 Risk-targeted framework for seismic design: Maintaining serviceability

A.M Hulsey, K. Elwood, N. Horspool, M.C Gerstenberger

03D.3 Advancing NZ hospital seismic readiness: creating a post-earthquake functionality dashboard

B.J Mayer, M. Boston

03D.4 Mainstreaming building code practice and risk management principles towards disaster risk reduction

A.N. Nwadike, S. Wilkinson, I.E Aigwi

03D.5 Monitoring technologies to manage landslide risk to transportation routes in the Lower North Island

D.L Stewart

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# Poster Sessions

Insights from the 2021 New Zealand Strong Ground Motion Database

J.A.Hutchinson, B Bradley, R Lee, C Schill, M Dupuis, J Motha, C Van Houtte, A Kaiser, E Manea, L Wotherspoon

Enhancing earthquake and tsunami preparedness and response in Kura Kaupapa Māori/Schools Aotearoa New Zealand: learnings from the 5 March 2021 East Cape earthquake sequence

L.Kaiser, K.Tapuke, D.Johnston, J.Becker

Seismic resilience vs. Functional recovery of buildings: A critical review

L.Y. Li, A. Chang-Richards, K. Elwood, M. Boston,

Pulse Effects in Earthquake Records

G.A MacRae, B.E Lindbom, T.C.E Smith, Lei Zhang

Post-earthquake functional recovery: A critical review

S.Zhan, A.Chang-Richards, K.Elwood, M. Boston

Moment frame column seismic shear demand estimation

J Sherboune, G.A MacRae, T.L Chang

Dynamic site characterisation of the Hawke's Bay sedimentary basin using H/V and surface wave methods

A.C Stolte, L.M Wotherspoon, P. Girgis,