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# Proceedings of the 2024 New Zealand Society for Earthquake Engineering Annual Technical Conference

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## Keynote Presentations

At the Intersection of Research, Practice, and Standards in Performance-Based Earthquake Engineering: Seismic Hazard, Ground Motions, and Numerical Simulation - *Silvia Mazzoni*

Disaster Reconstruction; Turkey, Afganistan, Ukraine and Gaza - *Kit Miyamoto*

Earth and Water: Research and Insights into Building Response to Earthquakes and Tsunami - *Tiziana Rossetto*

California's Journey in Seismic Policy Development - *Daniel Zepeda*

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## Invited Speaker Presentations

NZSEE Learning from Earthquakes Workshop - *Gregory MacRae, Jonathan Stewart*

Integrated Design - What it Takes to Deliver a Successful Project - *Michael Newcombe, Claire Stevens, Matt Pattinson, Rosalind Luxford, Colin Russell*

Designing Retaining Walls for Resilience and Sustainability - *Brabha Pathmanathan*

Seismic Earth Pressures of Retaining Walls Based on SSI Principles - *Jonathan Stewart*

Earthquake Pressures from Soil Interaction on Building Basement Walls - *John Wood*

Introducing the new EQC Website "Beyond the Minimum" - *Caleb Dunne*

Industry Working Group Updates - *Ken Elwood, Stuart Oliver, Jared Keen, Andrew Thompson, Jan Stanway, Caleb Dunne,*

Health Engineering Advisory Group (HEAG) - *Jared Keen, Andrew Thompson*

Low Damage Seismic Design Guidance - *Stuart Holmes*

Building Industry Partnership - *Jan Stanway*

Updating New Zealand's Guidance for Seismic Assessment of Existing Concrete Buildings - *N.J Brooke*

Seismic assessment of existing buildings. Update of section C4: Geotechnical Considerations - *S.J Palmer, P.J Clayton, L.A Whitehurst, G.E McDougall*

Developing Seismic Retrofit Guidelines for Existing Buildings - *A.Thompson, D. Shearer, C. Brown*

Joint Committee for Seismic Assessment and Retrofit Updates - *Stuart Palmer, Henry Tatham, Andrew Thompson, Alistair Cattanach, Nicholas Brooke*

NZSEE Resilient Buildings Project - *Helen Ferner, Derek Gill, Charlotte brown, Mark Willard, John Hare, Rob Dury, Hugh Cowan*

The Climate Crisis is Now - *John Hare, Phoebe Moses, Annie Scott.*

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## Oral Presentations

[Quantification of economic benefits of functional recovery-based design: a stepwise review of the methodology](#)

Habibi, Kasra; Cardwell, Robert; Chang-Richards, Alice; Filippova, Olga

[Post-Earthquake Response: Update on the Improvements to the Rapid Building Assessment Process and Building Management In Emergencies](#)

Campbell, Paul; Brunsdon, Dave; Farrell, Jeff; Macauley, Amanda; Herbert, Eddie; Green, Rori

[Evaluating the Effect of Initial Gravity Forces in Buckling-Restrained Brace Frame Braces](#)

Saxey, Brandt; Li, Chao-Hsien; Sabelli, Rafael

[Improving the Post-Earthquake Response of Hospitals: The Implementation of Priority Response Agreements](#)

Brunsdon, Dave; Keen, Jared; Campbell, Paul; Stevenson, Craig; Moon, Lisa

[Improving Post-Earthquake Emergency Management of Heritage Buildings](#)

Caponi, Clara; Ohs, Amanda

[Tsunami resilience: Aotearoa New Zealand's path to integrated risk management and engineering design](#)

Johnston, David; Tan, Marion; Tapuke, Kelvin; Toma, Charlotte; Stephens, Max; Wotherspoon, Liam; Leonard, Graham; Power, William; Adikari, Kasuni

[Indicators for quantifying post-disaster functionality: a neighbourhood scale](#)

Boston, Megan; Jones, Samantha; Bertram, Danielle

Panel Zone Strength in Moment Frames with Slabs

MacRae, Gregory; Macalister, Ed; Henderson, Cameron

[Insights into the Response of Multi-Storey Eccentrically Braced Frame Steel Structures to Earthquake Ground Motion](#)

Hyland, Clark; Thang, John

Multistage Friction Connection Optimisation

MacRae, Gregory; Brosnan, Ruaidhri; El-Mashalgi, Bader; Luo, Zheng; Chanchí Golondrino, Jose; Coral Potosí, Hugo Anderson

[Moment Curvature Analysis of wide-flange steel columns with local buckling dominant mode of failure](#)

Niroomandi, Arsalan; Najafgholipour, Mohammad Amir; Hatef, Ghader

Seismic Ratcheting Considerations

MacRae, Gregory; Hussain, Mereen

[Informing Clients on the Business Case for Seismic Resiliency](#)

Stanway, Jan; Stenecker, Paul; Parker, Will; Le Heux, Mitchel; Mery, Magno; Arnold, David; Campbell, Paul; Ghodsi, Tony; Jacques, Chris; Johnston, William; Mastschuch, Richard; Morales, Yanko

[Earthquake Protection Technologies for Structural and Non-Structural Applications: Case Studies Worldwide](#)

Lopez Gimenez, Javier; Drouin, Thomas; Coria, Camila B.; Ozcanli, Karim Efe; Taboada, Diego

[Enhancing Structural Resilience: Three-Dimensional Seismic Isolation \(3DSI\) in Practice](#)

Pourmasoud, Masoud

[Performance of Seismically Isolated High-Speed Railway Bridges against Near-Fault Ground Motions](#)

Jangid, Ravi; Kumar, Manish

[Exploring resiliency between different steel lateral systems for new construction](#)

Welch, David P.; Canney, Nathan; DeBock, D. Jared

[Seismic Performance of Prefabricated Modular Mass Timber Structures with Inter-Story Isolation.](#)

Lal, Rajnil; Hashemi, Ashkan; Quenneville, Pierre

[Pres-Lam: An innovative and collaborative timber solution](#)

Higgins, Peter; Gin, John; Keen, Jared; Coulthard, Amber; Smith, Tobias

[A Case for Resilience in New Zealand](#)

Beetham, Tessa; Zimmerman, Reid; Stratford, Cain

[From Research to Practice: Case Study on Mixed Angle Screws Hold Down Connections for a 6-Storey CLT Shear Wall Building](#)

Wright, Tom; Stankowitz, Bjorn

[Te Living Pā: Kaitiakitanga; Whanaungatanga; Akoranga](#)

Ballagh, Rowan; Maclean, James; Chin, Eng Liang

[Standardised timber moment-resisting frames for multistorey buildings](#)

Tombleson, Jack; Newcombe, Michael; Leslie, Sam; Hewitt, Andrew

[Low-Rise Buildings Guideline – Stage 1 Review](#)

Tatham, Henry; Whitla, Georgia

[Impact of base conditions on the bracing performance of LTF walls](#)

Liu, Angela; Carradine, David

[A risk-based framework to account for step-change behaviour in seismic assessment](#)

Zaidi, Faraz; Elwood, Ken; Hulse, Anne

[New Zealand National Seismic Hazard Model Revision 2022: Hazard changes with respect to NZ NSHM 2010](#)

Bora, Sanjay; Bradley, Brendon; Di Caprio, Chris; Gerstenberger, Matt; Howell, Andy; Nicol, Andy; Van Dissen, Russ

[Performance-based Assessment and Seismic Strengthening of the Christ Church Cathedral](#)

Smith, Joel; Oliver, Stuart; Carney, Peter

[Experimental Testing of Brittle RC frames Strengthened by RSFJ-toggle bracing system](#)

Veismoradi, Sajad; Watson, Tom; Baylis, Alex; Zarnani, Pouyan; Quenneville, Pierre

[Improving structural performance of an existing EBF and moment frame structure using fluid viscous dampers](#)

Canney, Nathan; Burkett, Lawrence; Camajani, Joseph

[Application of Low Damage Tension Braces in Top Extensions of Existing Buildings: A Case Study for Seismic Upgrade](#)

Hashemi, Ashkan; Sayadi, Ali; Prionas, Ioannis; Zarnani, Pouyan; Quenneville, Pierre

[Shallow Shear Wave Reflection Surveys in the Wellington CBD](#)

Thorpe-Loversuch, Sam; Stern, Tim; Stratford, Wanda

[Comparing alternative methods to account for shallow site effects in hybrid broadband ground-motion simulations](#)

Kuncar, Felipe; Bradley, Brendon; de la Torre, Christopher; Rodriguez-Marek, Adrian; Zhu, Chuanbin; Lee, Robin

[Earthquake scaling relations and testing and evaluation of the New Zealand National Seismic Hazard Model 2022.](#)

Stirling, Mark; Bora, Sanjay; Fitzgerald, Michelle; Gerstenberger, Matt; Manea, Elena; Ross, Clarissa; Shaw, Bruce

[Impacts of ground motion and scaling method selection on the performance of rocking wall systems with friction connections](#)

Assadi, Soheil; Chan, Nicholas; Hashemi, Ashkan; Quenneville, Pierre

[Urban Geophysics and Seismic Hazard Assessment in the Wellington CBD](#)

Stern, Tim; Thorpe-Loversuch, Sam; Stratford, Wanda; Stronach, Alistair

[Testing the cyclic strain softening behaviour of an ageing puddled clay core dam](#)

Walsh, Ian

[Analysis of Site-Response Residuals from Empirical Ground-Motion Models to Account for Observed Sedimentary Basin Effects in Wellington, New Zealand](#)

de la Torre, Chris; Bradley, Brendon; Lee, Robin; Tiwari, Ayushi; Wotherspoon, Liam; Kaiser, Anna

[Highbank Power Station Redevelopment – Design Process for a Concrete Encased Turbine and Generator Plinth Replacement](#)

Osborne, Scott; Therkleson, Simon; Bourzouie, Jama; Davidson, Andrew

[Dynamic Shaking Layer models for large New Zealand earthquakes \(M6.5+\): from rapid source characterization to landslide and impact forecasting](#)

Kaiser, Anna; Andrews, Jen; Fry, Bill; Horspool, Nick; Lukovic, Biljana; Massey, Chris; Warren-Smith, Emily; Chamberlain, C.; Goded, Tatiana

[Multi-scenario approach for the assessment of liquefaction exposure and impact across New Zealand State Highways](#)

Lin, Amelia; Wotherspoon, Liam; Zorn, Conrad

[Non-contact Structural Damage Detection by Natural Frequency Measurement using Microphone](#)

Huang, Yuxin; Mochida, Yusuke

[Estimation of electricity supply restoration time with interdependencies under cascading hazard risk approach](#)

Uma, S R; Syed, Yasir; Moratalla, Jose

[Omāroro Reservoir: A Case Study. It's Cheaper to Work with Nature](#)

Moniz, Safia; Gaby, Phil; Schmidt, Lars

[Applicability of existing CPT-Vs correlations to direct-push crosshole and cone penetration test data for shallow Holocene-aged New Zealand soil deposits](#)

Zhou, Hui; Wotherspoon, Liam; Stolte, Andrew; McGann, Christopher

[Resin Injection ground improvement for liquefaction mitigation at Poverty Bay Rugby Club, Gisborne](#)

Gunchenko, Daniel; Giannakogiorgos, Andreas; Hnat, Theo

[Geotechnical design for severe liquefiable ground improvement with SCRR technique: Waikato case study](#)

Du, Zhaodong; Zhou, Hong; Mortola, Liam; Brightwell, Robin

[Liquefaction-Induced Parabolic Subsidence Method for analysis of shallow foundations](#)

Parodi, Fabio; Panzano, Marco; Mortola, Emanuele Aldo

[Out-of-plane capacity of low-damage partition wall systems: the balance between maintaining robustness and allowing relative movement](#)

Menegon, Scott

[Coordinating for Success - Enhancing Seismic Restraint Through Early Design Involvement](#)

Westeneng, Benjamin; Keen, Jared; Mai, Peter; Chapman, Steve; Riordan, Todd

[Recommended practice for seismic restraint design of suspended ceilings](#)

Browne, Mark; Stanway, Jan; Long, Jasin

[Seismic response of frames with building cladding elements](#)

Edwards, William; Robertson, Jesse; Luo, Zheng; MacRae, Gregory

[Evaluating and Communicating Seismic Risk for Low Rating Buildings](#)

Brunsdon, Dave

[Residential Reconstruction of Christchurch City Centre: Is sustainability the key to promoting inner-city living?](#)

Fatourehchishabestari, Akram; Filippova, Olga; Rehm, Michael; Levy, Deborah



[Impact of seismic demand on construction costs](#)

Del Rey Castillo, Enrique

[The role of risk perception, risk communication, and comparative risk principles in resilience building](#)

Vinnell, Lauren

[Rapid Earthquake Rupture Characterisation for New Zealand Using the FinDer Algorithm](#)

Andrews, Jen; Behr, Yannik; Böse, Maren; Massin, Frédéric; Kaiser, Anna; Fry, Bill; Horspool, Nick

[Implications for Design of Parts and Components from Updates to New Zealand Seismic Loading Standard and National Seismic Hazard Model](#)

Haymes, Kieran; Sullivan, Tim

[Assessing the Impact of Drilling Techniques on the Tensile Strength of Mechanical Screw Anchors in Masonry](#)

Dizhur, Dmytro; Galvez, Francisco; Noori, Kia; Orquillo, Pauline; Ingham, Jason M.; Hudson, Robert

[Communicating seismic risk with commercial building tenants: Preliminary results](#)

Miranda, Catalina; Eade, Cameron; Brown, Charlotte; Becker, Julia; Hudson-Doyle, Emma

[Time History Analysis is easy, and you should do it: Here's how.](#)

Ballagh, Rowan

[Building collapse due to P-delta – what is the risk?](#)

Sullivan, Tim

[Code Based Design vs. Performance Based Design](#)

M. Puthanpurayil, Arun; Jury, Rob; D. Hooper, John; Carr, Athol

[Seismic resilient structures using pre-cast pre-stressed concrete panels for modular construction](#)

Mohammadi Darani, Farhad

Seismic response of sustainable, resilient eccentrically braced frames

Hasanali, Maryam; Andished, Kaveh; Taheri, Hafez; Mago, Nandor; ShahMohammadi, Amir; Karpenko, Michail; Jarmai, Karoly; Dong, Pingsha; Clifton, G. Charles; MacRae, Gregory

[A Review on Nonlinear Time History Analysis of Structures](#)

Hashemi, Gholamreza; Ramhormozian, Shahab; Clifton, G Charles

[NZ Industry Nonlinear Response History Guidelines](#)

Oliver, Stuart; Giannakogiorgos, Andreas; Ballagh, Rowan; Holden, Tony; Morris, Gareth; Sullivan, Tim; Stuart, Tony J.

[Proposal of repair index and strategy for recovery of reinforced concrete buildings damaged by earthquakes](#)

Maeda, Masaki; Nagai, Tomoki; Miura, Kota; Shegay, Alex; Akiya, Riho; Seki, Matsutaro

[Prediction of crack widths in NZS 3101 and its significance in the seismic design of connections](#)

Borosnyoi-Crawley, Dorian

[Practical issues in time-history analysis of low-rise concrete wall buildings with subterranean levels](#)

Zhang, Tongyue; Seifi, Mehrdad; Brinkman, Stephen; Das, Sam

[QA/QC methods for grouted Drossbach duct connections in precast concrete shear wall panels – case study: new 12-storey building in Auckland](#)

Rowden, Henry; Patel, Vijay; Galvez, Francisco; Hudson, Robert; Dizhur, Dmytro

[The use of 3D LE methods to calculate slope stability during strong earthquake shaking](#)

Brown, Ian

[SESOC Retaining Wall Design Guide - Methodology and Validation](#)

Bird, Geoff

[Effect of Strengthening Techniques Applied to RC Walls with Post-installed Openings on Shear Resistance](#)

Monical, Jonathan; Lai, Hoa; Yoshida, Himari; Maeda, Masaki; Sugawara, Y.; Sato, M.; Aizawa, N.; Ogata, Y.; Seki, Matsutaro

[Towards 3D ground motion simulation-based site amplification: a Wellington case study considering multiple basin geometries](#)

Lee, Robin; Bradley, Brendon; Hill, Matthew; de la Torre, Christopher; Kaiser, Anna; Wotherspoon, Liam

[Geotechnical design of a secant piled underground pump station in liquefiable ground](#)

Ghanooni, Shahin; Milford, Jack

[Soil structure interaction in laterally displacing ground](#)

Rama, Bhavesh; Palmer, Stuart

[Seismic Resurrection of 13-storey Apartment Building at 66 Oxford Terrace, Christchurch](#)

Poole, Russell

[Innovative design methodology for secant pile walls](#)

Murashev, Alexei; Alves, Paulo

[Evaluating the benefits of rocking shallow foundations](#)

Millen, Maxim; Storie, Luke

[Turnbull Library: Strengthening for Heritage and Resilience](#)

Ballagh, Rowan; Inch, Rubie; Vance, Nicki

[Performance of RC buildings in the 2023 Turkey-Syria earthquakes](#)

Sheday, Alex; Tajiri, S.; Kusunoki, Koichi; Ilki, Alper; Atasever, Kurtulus; Aydogdu, Hussein; Demir, Cem; Cinar, Tolga; Unal, Goktug; Halici, Omer; Onishi, N.; Andirir, G.; Maeda, Masaki; Monical, Jonothan; Sugimoto, K.; Yoon, R.; Asai, T.; Lus, H.; Raouffard, M.; Dogan, F.; Demir, U.; Caglar, Akkaya; Yazgan, Ufuk; Liu, H.; Orakcal, Kutay; Yenidogan, C.; Gullu, M.; Nakamura, A.

[Challenges associated with geotechnical design of Te Kaha – Canterbury’s Multi-Use Arena](#)

Baker, Sam; Murashev, Alexei; Fearnley, Jonathan

[Nationwide investigation of systematic site effects in New Zealand: Residual analysis of physics-based ground motion simulations](#)

Tiwari, Ayushi; Bradley, Brendon; de la Torre, Christopher; Lee, Robin

[Damage Level Prediction of RC Building for Future Earthquakes Based on Seismic Response Observation](#)

Yi, Zhuoran; Dono, Ayumi; Monical, Jonathan; Maeda, Masaki; Seki, Matsutaro

[Shake-Table Testing of the Resilient Slip Friction Joints](#)

Assadi, Soheil; Bagheri, Hamed; Yan, Zhenduo; Zarnani, Pouyan; Hashemi, Ashkan; MacCrae, Greg; Clifton, Charles; Jia, Liang-Jiu; Quenneville, Pierre

### The ROBUST Steel Building Response

MacRae, Gregory; JIA, Liang-Jiu; Yan, Zhenduo; Clifton, Charles; Ramhormozian, Shahab; Dhakal, Rajesh; Xiang, Ping; Rodgers, Geoff; Quenneville, Pierre; Zhao, Xianzhong

### [Effective and economic combination of seismic isolation and vibration insulation within one innovative device](#)

Gruber, Marcel; Huber, Peter; Weber, Felix

### [Shake-table test of flexural RC beams subjected to different levels of repair](#)

Miura, Kota; Hogan, Lucas; Henry, Rick; Elwood, Ken; Maeda, Masaki; Nagai, Tomoki; Akiya, Riho

### [Investigating the interaction between rocking amplitude and ground motion characteristics via artificial neural networks](#)

Giouvanidis, Anastasios; Karimzadeh, Shaghayegh; Banimahd, Amir; Lourenço, Paulo B

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## Poster Presentations

### [Finite Element Modelling \(FEM\) of the Asymmetric Friction Connection \(AFC\) with Belleville Springs \(BeSs\): challenges and ongoing developments](#)

Alizadeh, Fatemeh; Ramhormozian, Shahab; Clifton, G Charles

### [Analysis of Felt Detailed 'Final Comments' for the 2016 Kaikōura earthquake](#)

Neupane, Sajan; Inch, Piata; Becker, Julia; Vinnell, Lauren; Goded, Tatiana; Prasanna, Raj

### [Heritage Buildings and Community Sense of Place: Towards Addressing the Challenge of Earthquake Prone Heritage Buildings](#)

Perera, Shermi; Boston, Megan

### [Seismic Retrofitting Concrete Structures with Post-installed Connections in New Zealand](#)

Caloba Aguiar, Samuel; Narayan, Suman; Kundu, Kamalika; Muñoz Arriagada, Gonzalo

### [Bridging engineering and social perspectives of post-earthquake functional recovery of commercial buildings](#)

Nkrumah, Sally; Filippova, Olga; Ying, Fei

[An energy dissipation and seismic reduction design of a hospital inpatient building using viscous fluid dampers](#)

Li, Lei; Ge, Haoshuang; Zhang, Min; Zhang, Xiaomeng; Wang, Dayang

P-delta or P-theta analysis?

MacRae, Gregory; Dehghanian, Seifollah; Moghadam, Abdolreza

Simple Three-layer Pagoda Analysis

Liang, Haoyu; Chen, Jian; MacRae, Gregory; Jia, Liang-Jiu; Li, Minghao

Holistic Considerations for Low-Rise Building Design

Holland, William; Gray, Caleb; Loporcaro, Giuseppe; MacRae, Gregory

[Machine Learning Correction of Overpredicted Liquefaction Manifestation using Liquefaction Severity Number](#)

McDougall, Nathan; van Ballegooy, Sjoerd; Kennerley, Ben; Russell, James; Lacrosse, Virginie; Jacka, Mike

[Experimental and Analytical Study of Fillet Welds for Seismic Actions](#)

Ramhormozian, Shahab; Zhang, Mark; Clifton, Charles; Karpenko, Michail; Taheri, Hafez

[Comparison between weld sizing methods included in steel structure standards](#)

Taheri, Hafez; Karpenko, Michail; Clifton, G. Charles; Ramhormozian, Shahab; Dong, Pingsha; Lim, James B. P.; Roy, Krishanu; Fang, Zhiyuan

[Finite Element Method Analysis of Reinforced Concrete Exterior Beam-Column Joint Structures Subjected to High Varying Axial Forces](#)

Zhao, Neng; Suzuki, Yusuke; Shegay, Alex; Maeda, Masaki; Taniguchi, Yoshiya