

Jitendra Bothara

FENGZ, FNEA, FNZSEE, CPEng, IntPE (NZ)

Director, ResiPro International Engineering

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Special competence

- Seismic assessment and strengthening design of earthquake risk buildings
- Structural design and auditing
- Preparation of seismic codes and design guidelines
- Design and delivery of training/ mentoring programmes
- Design and delivery of Disaster Risk Reduction programmes
- Preparation of Post-earthquake response and recovery plan (PDNA)

Overview

Jitendra, a seismic engineer, is the Director of ResiPro International Engineering, a New Zealand based company. Originally from Nepal, in a career spanning three decades, he has been an engineering consultant to private building and portfolio owners, organisations such as the United Nations Development Programme (UNDP), World Bank, Asian Development Bank (ADB), and other multinational organisations and governments. He has advised and completed projects on earthquake risk reduction, preparedness, response, recovery, and reconstruction in 15 countries from Asia Pacific to Europe. He has led community-based disaster management approach for earthquake risk reduction of school buildings and communities in Nepal. Jitendra has worked intensively on the ground across nine earthquakes in different parts of the world, including New Zealand. He has also completed many volunteering assignments.

Jitendra draws upon a wide range of experience from New Zealand and overseas across the building safety, disaster risk management, post-earthquake response, and research sectors. His areas of technical specialty include seismic assessment and strengthening design of earthquake risk buildings, seismic design of new buildings, post-earthquake building evaluation and recovery strategy, capacity building for DRR and post-disaster recovery. Of note, Jitendra has assessed more than 5000 buildings before and after earthquakes across many countries. He has peer-reviewed seismic assessment and strengthening designs, and structural designs of many buildings in New Zealand and internationally. Most of his work involves co-ordination with private building owners on complex multi-agency projects, government, and non-government agencies.

Jitendra has contributed to the development and peer-review of seismic standards and guidelines internationally. He was one of the contributors to the Nepal Building Code. He was one of the key contributors in updating of New Zealand's Building Assessment Guideline on behalf of New Zealand's Ministry of Business, Innovation, and Employment. He has contributed to guidelines on seismic design for engineered and non-engineered buildings in Nepal, Afghanistan, Pakistan, and reviewed many such Standards and guidelines.

Jitendra has extensively contributed to pre-disaster preparedness, and post-earthquake building usability evaluation and recovery in various countries, including Albania, Indonesia, Iran, Nepal, and New Zealand. More recently, he contributed to the strategic financial and resource planning after the 2015 Nepal and 2019 Albania Earthquakes as an international expert. He has a strong interest in research and innovation for earthquake safety. Jitendra has authored and reviewed more than 150 papers, guidelines, and books on building safety, disaster risk reduction, and building design methodology. He has conducted one of the world's largest experimental research on stone and mud masonry buildings for rural Nepal. Jitendra has spoken at many conferences, universities, and professional societies as a keynote and expert speaker. Most recently, he was an invited speaker to the UN Habitat's 10th World Urban Forum in Abu Dhabi on bridging tradition and modernity for resilient communities.

Qualification

- Master of Engineering (Civil), University of Canterbury, New Zealand (2004)
- Post Graduate Diploma in Aseismic Design & Building Construction, Institute of Earthquake Engineering & Engineering Seismology, Macedonia (1999)
- Bachelor of Engineering (Civil), Institute of Engineering, Nepal (1989)

Professional and academic membership

- Chartered Professional Engineer (CPEng)
- Fellow - Engineers New Zealand (FENGNZ)
- Fellow - New Zealand Society for Earthquake Engineering (FNZSEE)
- Fellow - Nepal Engineers' Association (FNEA)
- International Professional Engineer (IntPE NZ)
- Life Member - National Society for Earthquake Technology-Nepal
- Life Member - Indian Society for Earthquake Engineering
- Member - Structural Engineering Society New Zealand

Key position held

- Consultant to United Nations "Experts Roster for Rapid Response (ExpRes)" Crisis Response Unit (CRU) – pre-vetted consultant for disaster response across the world
- Team Leader, Infrastructure Sector, Post Disaster Needs Assessment, 2019 Albania Earthquake, UNDP (2019-2020)
- International Expert to the United Nations Development Programme, World Bank, the Asian Development Bank, and various governments (2003 - present)
- Co-Team Leader of the NZ Capacity Building of Engineers Team, post-2015 Nepal earthquake, NZAID (2016)
- Board of Editors, World Housing Encyclopaedia (2006-2015)
- Board of Editors, Bulletin of New Zealand Society for Earthquake Engineering (2014 - present)
- Management Committee, New Zealand Society for Earthquake Engineering (2009-2011)
- Lead of Task Group on URM buildings and Member of Task Group on Initial Seismic Assessment of existing buildings; Ministry of Business, Innovation and Employment, New Zealand.
- Co-chairman of Earthquake Engineering New Zealand Business Cluster (2009-2010)
- Co-team Leader of the NZ Earthquake Assistance Team that undertook building safety evaluation following the Padang, West Sumatra Earthquake for NZAID and UNDP (2009)
- Team Leader, Capacity Building Programme, 2005 Kashmir Earthquake, UNDP (2005-2006) and 2003 Bam Earthquake, UNDP (2004)

Awards

- Letter of Appreciation for Outstanding Contribution during the 2015 Nepal earthquake, by Non-Resident Nepalese Association (2016)
- Letter of Appreciation for Exemplary Contribution and Support to "Engineers with People Campaign" during the Aftermath of the Gorkha Earthquake, 2015 by Nepal Engineers Association (2015)
- Fulton-Downer Gold Medal (2011)
- The 2006 Farzad Naeim Prize EERI/IAEE World Housing Encyclopaedia (Second Prize)
- NZAID Postgraduate Scholarship (2001-2004)

Career summary

May 2020 – present	Director, ResiPro Intl. Engineering Ltd.
Apr 2013 – May 2020	Technical Director - Seismic Engineering, Miyamoto International NZ Ltd.
Oct 2012 – Apr 2013	Principal Seismic Engineer, AECOM NZ Ltd.
Oct 2008 – Oct 2012	Senior Seismic Engineer, Beca Carter Hollings & Ferner Ltd.
Sep 2006 – Oct 2008	Seismic Engineer, Beca Carter Hollings & Ferner Ltd.
Apr 2004 – Sep 2006	Senior Earthquake Engineer, National Society for Earthquake Technology-Nepal
1995 – 2004	District Engineer, Ministry of Local Development, Government of Nepal
1992 – 1995	Structural Engineer TAEC Consult P. Ltd., Kathmandu
1989 – 1992	Water Supply and Irrigation Engineer, TAEC Consult P. Ltd., Kathmandu

Global experience

New Zealand, Albania, Afghanistan, Australia, Bhutan, China, India, Indonesia, Iran, Myanmar, Nepal, Pakistan, Tajikistan, UAE

Key Experiences - New Zealand

Seismic assessment, strengthening designs and construction monitoring

Field visits, completed and reviewed DSAs, strengthening designs and construction monitoring approximately 150 residential houses and more than 200 buildings of different sizes, occupancies and structural systems/ materials (up to 27 storey building) for various building and portfolio owners including Victoria University at Wellington, Otago University (2006-Present).

Undertook field visits, completed and reviewed initial seismic assessments following Initial Evaluation Procedure (approximately 2,500) including for Wellington City Council, Northland Hospital, (2006-Present).

Peer review

Structural Peer review of building structures completed by others:

- Seismic assessments of building structures
- Seismic strengthening design of earthquake risk buildings
- New design including multi-storey buildings

Advisory services

- Technical advisor to IAG to provide technical advice on remediation and claim resolution on earthquake-damaged properties in Christchurch, New Zealand (2016).
- Senior Engineering Advisor to Christchurch City Council to provide services on auditing and provision of comments on submitted structural documents for consent; provide structural advice, interpretation, and clarification on design standards, guidance on structural issues to building consent officers and Engineering Services (2014).

Development of seismic assessment standards/guidelines

- Member of Project Technical Group updating "The Seismic Assessment of Existing Buildings", Lead of Task Group on C8: Unreinforced Masonry buildings, Member of Task Group on Initial Seismic Assessment. Ministry of Business, Innovation and Employment, New Zealand Government (2014-2017).
- Team member for the development of Guidelines for the Seismic Evaluation of Timber Framed School Buildings, Ministry of Education, New Zealand Government (2012-2013).

Assessments, remediation and strengthening design of earthquake-damaged houses in Christchurch

Support engineers and review their work for damage and detailed assessment, condition evaluation, rehabilitation and strengthening design of earthquake-damaged buildings (more than 400) including construction monitoring in Christchurch for house owners and insurance companies including EQC, IAG, and MAS (2013-2020).

Damage and seismic assessments, remediation and strengthening design of earthquake-damaged commercial/ industrial buildings in Christchurch

Field work, support engineers and review their work on assessment, remediation plans, strengthening of earthquake-damaged buildings (more than 50), etc. for insurance companies, building owners (2011-).

Assessments, remediation and strengthening design of earthquake-damaged school buildings in Christchurch

Damage and seismic assessment and development of remediation/ strengthening plans for various types of school buildings.

Post-earthquake usability evaluation of buildings after the Darfield and Christchurch earthquakes (2010 - 2012)

Building triaging, critical building evaluation, damage mapping for Civil Defence, Lion Nathan Breweries and others.

Site Specific Seismic Hazard Assessment,

Site specific seismic hazard assessment of Whakamaru, Woolston, Rotokawa Geothermal Plant, LDS Temple in Hamilton, Kopu Bridge along SH25, Whakamaru, Brownhill, Kawerau, Macays to Peca Peca

Design of special structures

Design of Gin Pole and wharf structures in Wellington.

Expert Witness to Court

Expert witness for resolutions of court cases on remediation of earthquake-damaged houses on behalf of EQC and IAG (2014-2017).

Delivery of seminars

- Design and delivery of one-day seminars (7 in 2013 and 8 in 2014) on "Understanding and Improving Seismic Performance of Buildings and Seismic Assessment of Building Structures" (delivered seminars to approx. 250 engineers) for IPENZ (2013-2014).
- Design and delivery of seminars/ workshops to approximately 900 engineers on initial seismic assessments for Ministry of Business, Innovation and Employment, New Zealand Government (2014-2015)

Key Experiences– International

International Expert to United Nations (UNDP, UN-Habitat), World Bank, Asian Development Bank, and various governments and agencies

Post Disaster Needs Assessment (PDNA)

- Lead for the Infrastructure Sector Team, PDNA (an actionable and sustainable Recovery Strategy plan for mobilizing financial and technological resources), 2019 Albanian Earthquake
UNDP, Albania (Dec 2019 - Jan 2020)
- Member, Housing Sector, PDNA, 2015 Nepal Earthquake
UNDP, Nepal (May - June 2015)

Advisory

- Reconstruction of residential houses, corrective measures, repair and seismic strengthening of existing buildings, alternative construction technologies and materials; help develop IEC materials, mentor UNDP engineers
UNDP, Nepal (2018 – Present)
- Safety of school buildings, corrective measures, peer-review of the standards structural design of school buildings prepared by local consultants, construction review, technology transfer, preparation of ICE materials, The Central Level Project Implementation Unit (Education)
Nepal Reconstruction Authority, Government of Nepal (March 2018 – June 2019)
- Preparation of detailed damage assessment inventory forms for grant eligibility survey, guidelines, minimum criteria for reconstruction, coordination with the Government agencies and other institutions working on post-earthquake reconstruction
The World Bank, Nepal (Aug-Sep 2015)
- Preparation of Disaster Plan for Thimphu, Bhutan
Government of Bhutan, 2005
- Seismic construction of mud, unreinforced masonry, and RC framed building to local engineers/architects
Shelter for Life, Afghanistan and Tajikistan (2004)

Post-earthquake Capacity Building for Reconstruction of Earthquake-Affected Areas

- Management and planning; coordination with UNDP, government agencies, technical departments, and communities; gap analysis, design and develop training programmes and materials, construction manuals, delivery of training to building stakeholders, construction of demonstration buildings, shaking table demonstration.
- 2005 Kashmir earthquake, Pakistan, Team Leader, UNDP (2005-2006)
- 2003 Bam earthquake, Iran (2004), Team Leader, UNDP (2004)

Development, peer review of Standards/ Guidelines

- Development of standard on seismic assessment and retrofitting of existing buildings, training and mentoring of Nepalese engineers; and review of the seismic retrofitting design of selected hospital facilities in Nepal
Department for International Development, United Kingdom (DFID-UK) (June 2017 - present)
- Peer review of multiple guidelines on new construction and remediation and seismic strengthening of earthquake damaged stone masonry buildings
UNDP, Nepal (2018 – present)

Seismic assessment and strengthening design of earthquake risk buildings

- Development and seismic strengthening of schools and residential building in mud mortar (1998-Present)
- Field visits, seismic assessment, risk analysis, development of strengthening schemes and prioritization for future intervention for improving seismic safety of school buildings in Aceh, Indonesia
The World Bank, Indonesia (March 2017 – Sep 2017)
- Co-ordination with the embassy management, conduct a seismic assessment and develop seismic strengthening options for mud, unreinforced masonry, and RC framed buildings (25 building) located in the British Embassy complex in Tehran, Iran
Seismic Assessment for British Embassy, Iran (2004-2005)

Preparation of Information Communication Education materials

- Technical and peer-review support for the preparation of ICE materials, KAP survey and preparation training package for volunteers
UNDP, Myanmar (Aug 2017 – 2018)
- Development of school building construction guidelines, videos and delivering of training for post-earthquake reconstruction of school buildings using vernacular materials
Asian Development Bank, Nepal (Sep 2016 – June 2019)

Special design methods

- Prepared standard designs of school buildings using vernacular construction materials for remote earthquake-affected areas of Nepal employing experimental verification methods (including static, quasi-dynamic and shake table tests)

Other assignments

Post-earthquake building usability evaluation

- 2015 Nepal Earthquake, Nepal
- 2009 Padang Earthquake, Indonesia, Ministry of Foreign Affairs and Trade, New Zealand Government
- 2005 Kashmir Earthquake, Pakistan
- 1999 Chamoli Earthquake, India

Design of special structures

- Design of a 20-ton payload capacity shock table for testing of building structures
UNDP, Nepal (2019 – present)
- Seismic assessment and strengthening design, including development of methodology, concepts and philosophy for AD5 Glass furnace for Adelaide,
O-I Australia, Australia (2009)
- Design of 80-metre-high television transmission tower,
Nepal Television, Nepal (1994)

Delivery of seminars/ workshops/ trainings

- Delivery of training to an international journalists' seminar on disaster risk reduction
The Asian Development Bank, Nepal (Nov 2019 – Dec 2019)
- Co-Team Leader to coordinate with Nepalese authorities and partners, preparation and delivery of training to engineers on seismic assessment, repair, and strengthening of buildings post-2015 Nepal Earthquake
Ministry of Foreign Affairs and Trade, New Zealand after 2015 Nepal Earthquake, Nepal (Aug - Nov 2015)
- Design and delivery of training to over 500 government and private engineers on post-earthquake building usability, post-2015 Nepal earthquake, Nepal
Nepal Engineers' Association (2015) and Ministry of Foreign Affairs and Trade (May 2015)

Development of Building Code

- Nationwide building typology survey, preparation of Guidelines, Rule of Thumb for cement and mud-based construction of new buildings, and seismic strengthening of existing buildings, contributed to the development of the Nepal Building Code Implementation Plan (including Draft Building Act and Engineer's Act), National Building Code Development Project
MHPP/UNDP/UNCHS, Nepal (1992-1994)

Capacity Building of Local Governments in Disaster Risk Management

- Gap and need analysis, develop measures to bridge the gaps, delivery of workshops, meeting policy/ decision-makers for developing disaster mitigation plan in Padang and Palu, Indonesia
Ministry of Foreign Affairs and Trade (2010-2012)

Peer review

- Peer-review of 450,000 sqm multi-tower (39 to 53 storey high) large spatial multi-storey building structure; verified structural analysis concepts, Etabs model and design, and conducted spot checks,
Ciputra World, Jakarta, Indonesia (2008)
- Peer-review of a 30-storey building in reinforced concrete, Dubai, UAE (2009)
- On-site investigation and seismic assessment of three large 14 storey high buildings in Chengdu, China (2012)
- Review of design methodology, and structural design of a 12 storey RC frame building in Kathmandu Valley for Dept of hydrology and Meteorology, Government of Nepal
The World Bank, Nepal (2016)

Outreach programmes for seismic safety

- Design and delivery of outreach programmes including shake table demonstration, earthquake exhibitions for seismic safety,
National Society for earthquake Technology - Nepal (1999-2001)
- Shake table demonstration for public awareness, design and fabrication of shaking table and building model (1:6), Bam, Iran and Dushanbe, Tajikistan
UNDP, Iran (2004-2005) and Shelter for Life, Tajikistan (2004)

Key papers

- Bothara, J. K., Ahmed, N., Dizhur, D., Ingham, J. M., (2019), Experimental Seismic Testing of Semi-Reinforced Stone Masonry Buildings in Mud Mortar, 11th Pacific Conference on Earthquake Engineering, 4-6 April 2019, Auckland, New Zealand
- PK Aninthaneni, RP Dhakal, J Marshall, J Bothara, 2018, Nonlinear Cyclic Behaviour of Precast Concrete Frame Sub-Assemblies With “Dry” End Plate Connection, Structures, <https://doi.org/10.1016/j.istruc.2018.03.003>.
- Aninthaneni, P.; Dhakal, R.; Marshall, M.; Bothara, J., (2017), Experimental, analytical and numerical investigation of demountable precast concrete frame sub-assemblies with end plate connections, Jr. of Construction & Building Materials (in pipeline).
- Bothara, J., Dhakal, R., Dizhur, D., Ingham, J. M., 2016, *The Challenges of Housing Reconstruction after the April 2015 Gorkha, Nepal Earthquake*, Journal of Nepal Engineers' Association, July 2016.
- Dmytro, D., Dhakal, R, Bothara, J. Ingham, J. M., 2016, Building Typologies and Failure Modes Observed in the 2015 Gorkha (Nepal) Earthquake, Bulletin of the New Zealand Society for Earthquake Engineering, Vol. 49, No. 2, pp 211-232, May 2016.
- Bothara, J. K, Dhakal, R., Mander, J., 2010, Seismic performance of an unreinforced masonry building: An experimental investigation, Earthquake Engineering and Structural Dynamics, Vol 39, Issue 1, pp 45–68.
- Brunsdon, D., Bothara, J.K., et al, 2010, Building Safety Evaluation Following the 30th September 2009 Padang Earthquake, Indonesia. Bulletin of the New Zealand Society for Earthquake Engineering, 43(3): 174-181.
- Bothara, J. K, Sharpe, R. D, 2009, Why do we still tolerate buildings that are unsafe in earthquakes? Paper# 52, Conference proceedings of 2009 NZ Society for Earthquake Engineering Inc., “Why do we still tolerate buildings that are unsafe in earthquakes?”, 3-5 April 2009, Christchurch.
- Mumtaz, H., Mughal, S. H., Stephenson, M., Bothara, J. K., 2008, The Challenges of Reconstruction after the October 2005 Kashmir Earthquake, Bulletin of the New Zealand Society for Earthquake Engineering, Vol 41, No 2, June 2008.

Key published books/ guidelines/ manuals

- Bothara, J. K., Dizhur, D., Ingham, J. M., (2018), Earthquake Risk Reduction Efforts in Nepal, Book Chapter for Integrating Disaster Science and Management, Elsevier.
- Bothara, J. K., Brzev, S., 2011, Improving the Seismic Performance of Stone Masonry Building, EERI Publication No.: WHE 2011-01. ISBN (print): 978-93-80903-02-6, ISBN (web): 978-1-932884-48-7.
- Bothara, J., 2010, A Shaking Table Investigation on the Seismic Resistance of a Brick Masonry House, Lambert Academic Publishing, ISBN: 978 8383 3564 3.
- Shrestha, S., Aacharya, S., Kandel, R., Upadhyay, B., Bothara, J, 2005, Earthquake Resistant Construction of Buildings, Curriculum for Mason Training: Guidelines for Mason Instructors, National Society for Earthquake Technology-Nepal, Kathmandu.
- Bothara, J. K., Guragain, R., Dixit, A., 2002, Protection of Educational Buildings against Earthquakes, National Society for Earthquake Technology-Nepal, Kathmandu.

Key invited lectures/ trainings/ presentations/ seminars

- Invited speaker to universities, professional societies and conferences, legal bodies, government departments, embassies, diplomatic missions, international organizations on earthquake protection, preparedness planning, seismic design, assessment and retrofitting, the post-earthquake response in Algeria, Bhutan, India, Indonesia, Iran, Nepal, Pakistan, New Zealand (more than 150).
- Invited Speaker, UN-Habitat World Urban Forum Dialogue on “Tradition and Modernity: A Creative Convergence for Sustainable Cities”, Abu Dhabi (February 2020)
- Keynote Speaker, 16th Symposium on Earthquake Engineering on “Understanding, Experience and Research on Seismic Safety of Low-Strength Loadbearing Masonry Buildings” (20-22 December 2018)
- Expert Speaker on Post-earthquake Building “Safety” Evaluation: Experience and Challenges, in International Conference on Learning from the Past organised by Building Department, Government of Algeria, Algiers, Algeria (Feb 2014)

Key research activities

- Developing an inventory on vernacular earthquake-resistant construction along the Himalayan arc (2015-present)
- Shake table testing of stone and cement stabilised earth brick buildings, funded by the ADB (2017-2019).
- Co-supervised a Ph.D. research scholar working on a new sustainable, demountable and low loss precast frame building system in seismic regions at the University of Canterbury (2014-2017)
- Co-supervised a Masters' research student working on earthquake safety of non-engineered construction in Nepal at the Delft University of Technology, Netherlands (2015-2016)