

Curriculum Vitae

DHIRAJ RAJ

Ph.D. (Earthquake Engineering)

AM IE (India), LM IGS, LM ISET, E-Aff. M EERI

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Area(s) of Interest: Seismic Vulnerability & Risk Assessment, Earthquake Engineering, Soil-Structure Interaction, Performance Based Seismic Design, Finite Element Analysis

TEACHING EXPERIENCE

1. *Assistant Professor in Department of Civil Engineering, MNIT Jaipur (March 02, 2020 onward)*

RESEARCH EXPERIENCE

1. *Research Associate at Department of Earthquake Engineering, IIT Roorkee in MHRD-DST funded IMPRINT-2 project (March 14, 2019 – February 26, 2020)*
2. *Project Fellow at Department of Earthquake Engineering, IIT Roorkee (December 3, 2018 – March 13, 2019)*
3. *Research Associate at Department of Earthquake Engineering, IIT Roorkee (August 1, 2017 – December 2, 2018)*
4. *Project Associate at Department of Earthquake Engineering, IIT Roorkee (June 1 – July 31, 2017)*

EDUCATIONAL BACKGROUND

Educational Qualifications	Year	Board/Institution
Ph.D. (Earthquake Engineering)	2019	Indian Institute of Technology Roorkee
M. Tech. (Earthquake Engineering)	2012	Indian Institute of Technology Roorkee
B. Tech. (Civil Engineering)	2010	Birsa Institute of Technology Sindri, Dhanbad

AWARDS

1. Received "IGS-Soiltech India Pvt. Ltd., Pune YGE Award" for the best paper on "Shallow Foundations" for the year 2021.
2. Received "IGS - Prof. G.A. Leonards' Prize" for the "Best Doctoral Dissertation in Geotechnical Engineering" awarded during IGC 2020.
3. Received "Excellence in Doctoral Research Award" for best Ph.D. Thesis during IIT Roorkee Convocation 2019 from the **Honourable President of India**.
4. Received "IGS-Soiltech India Pvt. Ltd., Pune YGE Award" for the best paper on "Shallow Foundations" for the year 2019.

Ph.D. Thesis, IIT Roorkee

Seismic Behaviour of Foundations and Buildings on Slopes

REVIEWER

1. International Journal of Geomechanics, ASCE (since December 2017).
2. International Journal of Geosynthetics and Ground Engineering, Springer (since January 2019).
3. Marine Georesources & Geotechnology, Taylor & Francis. (since December 2019)
4. Canadian Geotechnical Journal, NRC Research Press. (since January 2020)
5. Advances in Civil Engineering, Hindawi Publishing Corporation. (since April 2020)
6. International Journal of Structural Stability and Dynamics, World Scientific. (since June 2020)
7. Proceedings of the National Academy of Sciences, India Section A: Physical Sciences, Springer. (since August 2020)
8. European Journal of Environmental and Civil Engineering, Taylor & Francis. (since September 2020)
9. Environmental Geotechnics, ICE (since August 2023)

TRAINING AND CAPACITY BUILDING ACTIVITIES

1. Courses Facilitator for "Earthquake Risk Reduction (ERR)" - by NIDM, New Delhi (4 April to 16 May, 2023).
2. Courses Facilitator for "Earthquake Risk Reduction (ERR)" - by NIDM, New Delhi (2 August to 29 August, 2022).
3. Courses Co-ordinator for Training programs for WR Engineers of Government of Rajasthan on various topics of Water Resources Engineering (1000114035)
4. Courses Facilitator for "Risk Identification, Assessment and Analysis" - by NIDM, New Delhi (2 Feb to 2 March, 2022).
5. Courses Facilitator for "Earthquake Risk Reduction (ERR)" - by NIDM, New Delhi (21 Dec, 2021 to 18 Jan, 2022).
6. Courses Facilitator for "Earthquake Risk Reduction (ERR)" - by NIDM, New Delhi (6 July to 3 August, 2021).
7. Courses Facilitator for "Risk Identification, Assessment and Analysis" - by NIDM, New Delhi (20 April to 18 May, 2021).
8. Courses Facilitator for "Earthquake Risk Reduction (ERR)" - by NIDM, New Delhi (22 Feb to 19 March, 2021).

COLLABORATIONS, JOINT EXERCISES AND OTHER SIMILAR ACTIVITIES

1. Collaboration with IIT (ISM) Dhanbad and DTU in NDMA funded ongoing research project entitled "Development of Earthquake Disaster Risk Index for 60 Indian Cities", hosted by MNIT Jaipur.
2. Collaboration with IIT Roorkee and IIT Ropar in MHRD-DST research funded project IMPRINT-2 entitled "Next Generation Earthquake Loss Estimation Tool for Hilly Regions", hosted by IIT Roorkee.

RESEARCH AND DEVELOPMENT ACTIVITIES

1. Android App developed for Seismic Bearing Capacity Estimation for Strip Foundation on Slopes,
App Link: <https://play.google.com/store/apps/details?id=com.mnit.project>
2. GUI based Software Developed for Dynamic Response of Bridge under Moving Loads
Version 2021.1

PUBLICATIONS

(151 Citation- Google Scholar)

INTERNATIONAL JOURNALS

1. **Raj, D.**, Singh, Y. and Kaynia, A.M. (2018) "Behaviour of Slopes under Multiple Adjacent Footings and Buildings", **International Journal of Geomechanics, ASCE**, 18(7), 04018062/1-14. (*Listed in Top Downloaded Articles in Geotechnical Engineering, July 2018*)
2. **Raj, D.**, Singh, Y. and Shukla, S.K. (2018) "Seismic Bearing Capacity of Strip Foundation Embedded in $c-\phi$ Soil Slope", **International Journal of Geomechanics, ASCE**, 18(7), 04018076/1-16.
3. **Raj, D.**, Singh, Y. and Kaynia, A.M. (2019) "V-H-M Seismic Capacity Envelopes of Strip Foundations on Slopes for Capacity Design of Structure-Foundation System", **Bulletin of Earthquake Engineering, Springer**, 17(6), 2963–2987.
4. **Raj, D.**, Singh, Y. and Kaynia, A.M. (2019) "Behaviour and Critical Failure Modes of Strip Foundations on Slopes under Seismic and Structural Loading", **International Journal of Geomechanics, ASCE**, 19(6), 04019047/1-18. (*Listed in Top Downloaded Articles in Geotechnical Engineering, June 2019*)

ASCE GEOTECHNICAL SPECIAL PUBLICATIONS

1. **Raj, D.** and Singh, Y. (2016) "Pseudostatic Analysis of Coupled Building-Foundation-Slope System for Seismic and Gravity Actions", Geo-China 2016, Shandong, **ASCE GSP -267**.
2. **Raj, D.** and Singh, Y. (2016) "Effect of Building Loads on Stability of Hill Slopes", Geo-Chicago 2016, Chicago, **ASCE GSP -271**.

BOOK CHAPTERS

1. Modha, K.G., Surana, M., Nath, K., Shastri, R., Haldar, P., **Raj, D.**, Prakash, S., Bhardwaj, A. and Singh, Y. (2023) "Seismic Risk Assessment of a Himalayan Town: A Case Study of Queen of Hills, Mussoorie, Uttarakhand, India", Proceedings of 17th Symposium on Earthquake Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 330, Springer, Singapore.
2. Sharma, V., **Raj, D.** and Gupta, R. (2023) "Three-dimensional slope stability under bidirectional pseudo-static seismic load", Proceedings of 17th Symposium on Earthquake Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 331, Springer, Singapore.

3. Bharathi, M., **Raj, D.** and Dubey, R.N. (2023) "Effect of Vibration Induced by Dynamic Tests on an Adjacent Building - Finite Element Investigations", Proceedings of 17th Symposium on Earthquake Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 331, Springer, Singapore.
4. Kumar, A., Kumawat, S. K., Jain, M., Dangayach, S., **Raj, D.** and Sharma, H.K. (2023) "Geotechnical Characterisation of Natural Sub-base and Subgrade Material for Pavements", Proceedings of 17th Symposium on Earthquake Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 331, Springer, Singapore.
5. Anand, V., Mahatab, M., Sharma, A., **Raj, D.**, Jat, M.K., Sarkar, R., and Pal, S. (2023) "A Cluster-based Seismic Risk Assessment: Economic Loss using GIS for Jaipur Sub-urban Area", Proceedings of 17th Symposium on Earthquake Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 332, Springer, Singapore.
6. Choudhury, P.D. and **Raj, D.** (2023) "A Critical Review of Existing Building Regulations and Bye-laws in Hilly Regions of India", Proceedings of 17th Symposium on Earthquake Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 332, Springer, Singapore.
7. Lalramngheta, Kumar, A., Dangayach, S. and **Raj, D.** (2022) "Landslide Hazard Zonation Mapping of Champhai District of Mizoram, India", Recent Developments in Geotechnics and Structural Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 338, Springer, Singapore.
8. Goyal, A., Maurya, A., **Raj, D.** and Bharathi, M. (2021) "Effect of Slope Inclination on V-H and V-M Capacity Envelope of Strip Foundation on Undrained Clay Slope", Foundation and Forensic Geotechnical Engineering, Lecture Notes in Civil Engineering book series (LNCE), Vol 295, Springer, Singapore.
9. Bharathi, M., **Raj, D.**, and Singh, Y. (2022) "Metro Train-Induced Vibration Measurement on Buildings", Earthquakes and Structures, Lecture Notes in Civil Engineering book series (LNCE), Vol 188, Springer, Singapore.
10. **Raj, D.**, Bharathi, M. and Shukla, S.K. (2021) "Seismic Stability of Unsupported Conical Excavation in Clayey Ground", Proceedings of the Indian Geotechnical Conference 2019, Lecture Notes in Civil Engineering book series (LNCE), Vol 133, Springer, Singapore.
11. Srivastava, A., **Raj, D.** and Singh, Y. (2021) "Seismic Earth Pressure Coefficients for Vertical Wall using Force-Displacement Curves", Proceedings of the Indian Geotechnical Conference 2019, Lecture Notes in Civil Engineering (LNCE), Vol 138, Springer, Singapore.
12. Prakash, S., **Raj, D.** and Singh, Y. (2021) "Foundation Bearing Capacity Estimation on Rock-mass using Hoek-Brown Failure Criterion and Equivalent Mohr-Coulomb Parameters", Proceedings of the Indian Geotechnical Conference 2019, Lecture Notes in Civil Engineering (LNCE), Vol 133, Springer, Singapore.

13. Modha, K.G., **Raj, D.** and Singh, Y. (2021) "Topographic Amplification of Earthquake Ground Motion on Hills of Bell-Shaped Geometry", Proceedings of the Indian Geotechnical Conference 2019, Lecture Notes in Civil Engineering (LNCE), Vol 138, Springer, Singapore.
14. Nautiyal, P., **Raj, D.**, Bharathi, M. and Dubey, R.N. (2021) "Ground Response Analysis: Comparison of 1D, 2D and 3D Approach", Proceedings of the Indian Geotechnical Conference 2019, Lecture Notes in Civil Engineering (LNCE), Vol 138, Springer, Singapore.
15. Rungta, V., **Raj, D.** and Mukerjee S. (2019) "Stability Analysis of a Tailings Dam – A Comparative Study", Geotechnical Applications, Lecture Notes in Civil Engineering, Vol 13. Springer, Singapore.

INTERNATIONAL CONFERENCES

1. Modha, K.G., **Raj, D.**, Singh, Y. and Lang, D.H. (2020) "Topographic Amplification of Earthquake Ground Motion on Different Hill Geometries", 17th World Conference on Earthquake Engineering (17WCEE), Sendai, Japan.
2. Singh, Y., **Raj, D.** and Kaynia, A.M. (2020) "Slope-Building Interaction: Seismic Stability of Slopes under Closely Spaced Buildings", 17th World Conference on Earthquake Engineering (17WCEE), Sendai, Japan.
3. Bharathi M., **Raj, D.** and Dubey, R.N. (2018) "Numerical Evaluation of Undrained Seismic Limiting Pressure behind Soil Gaps in Contiguous Pile Walls", 16th European Conference on Earthquake Engineering (16ECEE), Thessaloniki, Greece.
4. Singh, Y., Ahmad, S., **Raj, D.**, Modha, K.G. and Lang, D.H. (2018) "Spectral Amplification- Modelling for Triangular Hill Geometry", 16th European Conference on Earthquake Engineering (16ECEE), Thessaloniki, Greece.
5. Bharathi M., **Raj, D.**, Dubey, R.N. and Mukerjee, S. (2016) "Numerical Simulation of Dynamic Vertical Tests on Piles", Sixth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, New Delhi, India.
6. Bharathi M., **Raj, D.** and Dubey, R.N. (2014) "Codal Provisions for Design of Machine Foundations - A Review", International Symposium Geohazards 2014, Kathmandu, Nepal.
7. **Raj, D.** and Bharathi M. (2014) "Analysis of Shallow Foundation on Slope: A Comparative Study", International Symposium Geohazards 2014, Kathmandu, Nepal.

NATIONAL CONFERENCES

1. Sharma, V. and **Raj, D.** (2022) "Three-dimensional Slope Stability under Tri-directional Pseudo-static Seismic Loading", Indian Geotechnical Conference, Kochi. (Accepted)

2. Kumawat, S. K., **Raj, D.** and Dangayach, S. (2022) "V-H Capacity Envelopes of Strip Foundations on Cohesionless Soil Overlying Soft Rock Mass", Indian Geotechnical Conference, Kochi. (Accepted)
3. **Raj, D.**, Singh, Y. and Kaynia, A.M. (2018) "Seismic Stability of Slopes under Closely Spaced Buildings", 16th Symposium on Earthquake Engineering, IIT Roorkee.
4. **Raj, D.**, Singh, Y. and Shukla, S.K. (2018) "Seismic Bearing Capacity of Strip Foundation on Slope using FELA", 16th Symposium on Earthquake Engineering, IIT Roorkee.
5. Modha, K.G., **Raj, D.** and Singh, Y. (2018) "Topographic Amplification for Triangular Hill Geometry", 16th Symposium on Earthquake Engineering, IIT Roorkee.
6. Bharathi, M., **Raj, D.** and Dubey, R.N. (2018) "Performance of Short Rigid Pile under Lateral Dynamic Load", 16th Symposium on Earthquake Engineering, IIT Roorkee.
7. Bharathi, M., **Raj, D.**, Shukla, S.K. and Dubey, R.N. (2018) "Seismic Stability Analysis of Slope Stabilized with Piles", 16th Symposium on Earthquake Engineering, IIT Roorkee.
8. **Raj, D.**, Bharathi, M. and Shukla, S.K. (2017) "Uplift Capacity of an Under-reamed Pile Foundation - Finite Element Simulation", Indian Geotechnical Conference, IIT Guwahati.
9. **Raj, D.**, and Singh, Y. (2016) "Effect of Soil-Foundation Nonlinearity on Capacity Spectrum of a RC Building with Isolated Foundations", SEC, SERC Chennai.
10. Mukerjee, S., **Raj, D.** and Bharathi, M. (2015) "Liquefaction Susceptibility of Tailings Material", Indian Geotechnical Conference, COE Pune.
11. Bharathi, M., **Raj, D.**, Mukerjee, S. and Dubey, R.N. (2015) "Numerical Simulation for Horizontal Block Vibration Test", Young Geotechnical Engineers' Symposium on FEM, IIT Bombay.
12. **Raj, D.**, Bharathi, M. and Prajapati, G.I. (2014) "Performance Based Seismic Analysis of Symmetric RC Building Considering Soil Structure Interaction", GEPSID, GNDEC Ludhiana.
13. **Raj, D.** and Bharathi, M. (2013) "Effects of Soil-Structure Interaction on Regular and Braced RC Building", Indian Geotechnical Conference, IIT Roorkee.
14. Bharathi M. and **Raj, D.** (2013) "Comparison of Block and Pile Foundations for Reciprocating Machines", 4th Indian Young Geotechnical Engineers Conference, IIT Madras.
15. **Raj, D.** and Bharathi, M. (2013) "Bearing Capacity of Shallow Foundation on Slope: A Review", GGWUIP, GNDEC, Ludhiana.
16. **Raj, D.** and Prajapati, G.I. (2012) "Effects of Soil-Structure Interaction on Earthquake Resistant Design of Structures", Indian Geotechnical Conference, IIT Delhi.

RESEARCH PROJECTS

1. Co-PI in NDMA funded research project (1000112731) entitled “**Development of Earthquake Disaster Risk Index for 60 Indian Cities**”, ongoing
2. External Co-PI in MHRD-DST research funded project IMPRINT-2 entitled “**Next Generation Earthquake Loss Estimation Tool for Hilly Regions**”, completed

CONSULTANCY PROJECTS

1. Co-PI for the project “Proof checking of design and drawing of Steel Gate Structure at JNU (1000114255)”
2. Co-PI for the project “Proof checking of Pratap stadium and Shivaji Park at Niwai (1000114225)”
3. Co-PI for the project “Vetting of structural drawing of proposed Auditorium in Sikar (1000113765)”
4. Co-PI for the project “Vetting of DPR for Tourist Interpretation cum Cultural Centre at Nathdwara (1000113606)”
5. Co-PI for the project “Proof checking of design drawing of RES and LIG houses in sector 28 Pratap Nagar Jaipur (1000113333)”
6. Co-PI for the project “Vetting of structural design and drawings of project situated at IOCL LBP , ASOTI, PALWAL (1000112997)”

Date: 03/09/2023

Place: Jaipur

Dhiraj Raj