

Dr. PIYALI SENGUPTA

M. ASCE, M. ACI, A.M. EERI, M. IABSE, M.IEI

Assistant Professor

Department of Civil Engineering

Indian Institute of Technology (ISM), Dhanbad

Dhanbad - 826004, Jharkhand, India

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Address: Block 8, Flat 117, Type IV Quarters (Govindpur Road Side)

IIT (ISM) Dhanbad, Dhanbad - 826004, Jharkhand, India



Research Interests:

- Earthquake Engineering
- Blast and Impact
- Structural Reliability
- Multi-Hazard Risk
- Damage and Retrofit
- Computational Mechanics
- Bridge Engineering
- Marine Structures
- Structural Materials

Academic Qualification:

Doctor of Philosophy (August 2009 – July 2013)

Division of Structures and Mechanics, School of Civil and Environmental Engineering, Nanyang Technological University (NTU), Singapore

CGPA: **4.5/5**

Thesis Title: *Hysteresis Models and Fragility Assessments of Reinforced Concrete Structural Components*; Supervisor: Associate Professor Bing Li

Date of PhD Thesis Submission: *30 July 2013*; Date of PhD Degree Conferment: *1 July 2014*

Bachelor of Engineering (2003 – 2007): Civil Engineering

Indian Institute of Engineering Science and Technology (IIST) Shibpur, West Bengal, India

Marks: **78.61%** (1st class Honours); **Rank 2** in the graduating class of **93** students

Higher Secondary Examination (2003)

Bengal Engineering College Model School, West Bengal, India

Marks: **86.3%**

Secondary Examination (2001)

Bengal Engineering College Model School, West Bengal, India

Marks: **91.63%**

Past Employment History:

Total Years of Research and Industry Experience till July 2021: **9 years 9 months**

- Assistant Professor (27.06.2017 – till date): 4 years 1 month till July 2021
Department of Civil Engineering, Indian Institute of Technology (ISM) Dhanbad, India
- Post-Doctoral Fellow (02.11.2016 – 27.06.2017): 8 months
Department of Civil Engineering, Indian Institute of Technology (ISM) Dhanbad, India
- Research Fellow (1.07.2014 – 10.09.2016): 2 years 2 months
Department of Civil and Environmental Engineering, National University of Singapore
- Research Engineer (03.06.2014 – 30.06.2014): 1 month
Department of Civil and Environmental Engineering, National University of Singapore
- Graduate Engineer (1.08.2013 – 31.05.2014): 10 months
Projects & Operations, EMAS-AMC PTE LTD, Singapore
- Project Associate (31.07.2008 – 24.06.2009): 11 months
Department of Civil Engineering, Indian Institute of Technology Kanpur, India
- Engineer (1.08.2007 – 29.07.2008): 1 year
Structural Engineering, M. N. Dastur & Co (Pvt.) Limited, Kolkata, India

Computational Skills:

Structural Engineering and Finite Element Software: ABAQUS, ANSYS, SAP2000, ETABS, STAAD Pro, RISA, SAFE, RESPONSE, ORCAFLEX, FLEXCOM, HARP, UC-WIN/MESH, UC-WIN/WCOMD, CSI Bridge, PERFORM-3D, DIANA, OPENSEES, GiD, RUAUMOKO

Computing Software: MATLAB, MATHCAD

Programming Language: FORTRAN

Drawing and Plotting Software: AUTOCAD, INVENTOR, KALEIDAGRAPH

Teaching Responsibilities at IIT (ISM) Dhanbad:

- Solid Mechanics - Theory (CEC 13101) - B.Tech 3rd Semester
- Solid Mechanics - Practical (CEC 13201) - B.Tech 3rd Semester
- Structural Analysis I - Theory (CEC 14102) - B.Tech 4th Semester
- Structural Analysis I - Practical (CEC 14202) - B.Tech 4th Semester
- Design of Concrete Structure II - Theory (CEC 16104) - B.Tech 6th Semester
- Design of Concrete Structure II - Sessional (CEH 16701) - Honours Course - B.Tech 6th Semester
- Bridge Engineering - Theory (CEH 17101) - Honours Course - B.Tech 7th Semester
- Structures Laboratory - I (CEC 515) - M.Tech 1st Semester
- Bridge Engineering - Theory (CED 514) - M.Tech 2nd Semester

R&D Projects at IIT (ISM) Dhanbad:

- ❖ Title of the Project: Multi-Hazard Performance Assessment of Highway Bridges under Seismic and Blast Loading; Project No: ECR/2018/000040
Funding Organization: DST SERB (Early Career Research Award)
PI: Dr. Piyali Sengupta; Amount: 26.85 Lakhs; Status: Ongoing
- ❖ Title of the Project: Vulnerability Assessment of Bridges under Dynamic Loading
Funding Organization: TEQIP-III
PI: Dr. Piyali Sengupta; Amount: 2 Lakhs; Status: Completed
- ❖ Title of the Project: Reliability-based Performance Evaluation of Marine Risers
Project No: FRS(111)/ 2017-18/CE
Funding Organization: IIT (ISM) Dhanbad
PI: Dr. Piyali Sengupta; Amount: 10 Lakhs; Status: Ongoing

Scholarships and Awards:

1. American Society of Civil Engineers (ASCE) India Section, Eastern Region: Secretary (2019 - 2021)
2. Inclusion of Biography in Marquis Who's Who in the World in 2015, 2016 and 2018
3. Research Grant for ASME 2016 35th International Conference on Ocean, Offshore and Arctic Engineering OMAE 2016, Busan, Korea, June 19-24, 2016
4. Research Fellowship from Department of Civil and Environmental Engineering of National University of Singapore (2014 - 2016)
5. Research Grant for paper presentation in 9th Pacific Conference on Earthquake Engineering in Auckland, New Zealand on 14-16 April, 2011 from School of Civil and Environmental Engineering of Nanyang Technological University, Singapore
6. Doctoral Research Scholarship from School of Civil and Environmental Engineering of Nanyang Technological University Singapore (2009 - 2013)
7. Rank certificate in Undergraduate Study for 2nd rank in the Graduating class of 93 students (2007) from Bengal Engineering and Science University, Shibpur (presently IEST Shibpur), West Bengal, India
8. B.E. College Alumni Association (BECAA) Oman Scholarship for Academic Excellence (2006 - 2007) in Bengal Engineering and Science University, Shibpur (presently IEST Shibpur), West Bengal, India

9. Merit Scholarships in Undergraduate study (2004 - 2007) from Bengal Engineering and Science University, Shibpur (presently IEST Shibpur), West Bengal, India
10. State-level Rank in Secondary Examination from West Bengal Board of Secondary Education (2001).

List of Publications:

International Journal Articles (SCI/ SCIE):

1. **Sengupta, P.** and Li, B. “Modified Bouc-Wen Model for Hysteresis Behavior of RC Beam-Column Joints with Limited Transverse Reinforcement”, *Engineering Structures*, Vol. 46, 2013, pp. 392-406. **(Impact Factor: 4.471)**
2. Huang, Z., Li, B. and **Sengupta, P.** “Reliability Assessment of Damaged RC Moment-Resisting Frame against Progressive Collapse under Static Loading Conditions”, *ASCE Journal of Engineering Mechanics*, Vol. 139 (1), 2013, pp. 1-17. **(Impact Factor: 2.62)**
3. Huang, Z., Li, B. and **Sengupta, P.** “Reliability Assessment of Damaged RC Moment-Resisting Frame against Progressive Collapse under Dynamic Loading Conditions”, *Advances in Structural Engineering*, Vol. 17 (2), 2014, pp. 211-232. **(Impact Factor: 1.8)**
4. **Sengupta, P.** and Li, B. “Hysteresis Behavior of Reinforced Concrete Walls”, *ASCE Journal of Structural Engineering*, Vol. 140 (7), 2014, pp. 1-18. **(Impact Factor: 3.312)**
5. **Sengupta, P.** and Li, B. “Seismic Fragility Evaluation of Lightly Reinforced Concrete Beam-Column Joints”, *Journal of Earthquake Engineering*, Vol. 18 (7), 2014, pp. 1102-1128. **(Impact Factor: 3.994)**
6. **Sengupta, P.** and Li, B. “Seismic Fragility Assessment of Reinforced Concrete Structural Walls”, *Journal of Earthquake Engineering*. Vol. 20 (5), 2016, pp. 809-840. **(Impact Factor: 3.994)**
7. **Sengupta, P.** and Li, B. “Hysteresis Modeling of Reinforced Concrete Structures: State of the Art”, *ACI Structural Journal*. Vol. 114 (1), 2017, pp. 25-38. **(Impact Factor: 1.744)**
8. Dutta, S.C., Das, P.K. and **Sengupta, P.** “Seismic Behaviour of Irregular Structures”, *Structural Engineering International*. Vol. 27 (4), 2017, pp. 526-545. **(Impact Factor: 1.056)**
9. Dey, M., **Sengupta, P.** and Chakraborty, S. “Fundamental periods of reinforced concrete building frames resting on sloping ground”, *Earthquakes and Structures*. Vol. 14 (4), 2018, pp. 305-312. **(Impact Factor: 2.018)**
10. Das, P.K., Dutta, S.C. and **Sengupta, P.** “Damage Assessment of Recent Indian Earthquakes: Reviewing Existing RVS Schemes”, *Current Science*. Vol. 119 (2), 2020, pp. 352-363. **(Impact Factor: 1.102)**

International Conference Proceedings:

11. **Sengupta, P.** and Li, B. “Hysteresis Behaviour of Reinforced Concrete Non-ductile Beam-Column Joints”, *9th Pacific Conference on Earthquake Engineering*, Auckland, New Zealand, April 14-16, 2011.
12. **Sengupta, P.** and Li, B. “A Hysteresis Model for Seismic Performance Assessment of Reinforced Concrete Walls”, *4th International Conference on Protection of Structures against Hazards*, Singapore, November 15-16, 2012.
13. **Sengupta, P.**, Low, Y.M., Zhang, X, Bernad, P.F.A. and Koh, C.G. “Reliability Assessment of Marine Drilling Risers with Correlated Random Variables”, *Proceedings of the ASME 2016 35th International Conference on Ocean, Offshore and Arctic Engineering OMAE2016*, Busan, Korea, June 19-24, 2016.
14. Krishna, A. and **Sengupta, P.** “Effect of Reinforcement Corrosion on Seismic Performance of Reinforced Concrete Structures,” *World Research Forum for Engineers and Researchers International Conference*, New Delhi, India, November 5, 2017.
15. Krishna, A. and **Sengupta, P.** “Recent Research Advances on Railway Bridges,” *World Research Forum for Engineers and Researchers International Conference*, New Delhi, India, November 5, 2017.
16. Kulsi, S., Jaiswal, U. and **Sengupta, P.** “Fundamental Period of Vertically Irregular Reinforced Concrete Buildings,” *International Conference on Innovations in Structural Engineering*, Osmania University, Hyderabad, India, December 29-31, 2017.
17. Krishna, A. and **Sengupta, P.** “Performance Evaluation of Railway Bridges under Wheel Loading,” *International Conference on Innovations in Structural Engineering*, Osmania University, Hyderabad, India, December 29-31, 2017.
18. Jaiswal, U. and **Sengupta, P.** “Seismic Performance of Reinforced Concrete Buildings with Plan Asymmetry,” *International Conference on Innovations in Structural Engineering*, Osmania University, Hyderabad, India, December 29-31, 2017.
19. Krishna, A. and **Sengupta, P.** “Seismic Vulnerability Assessment of Railway Bridges,” *International Conference on Innovations in Structural Engineering*, Osmania University, Hyderabad, India, December 29-31, 2017.
20. Bhardwaj, P., Krishna, A. and **Sengupta, P.** “Effect of Soil-Structure Interaction on Seismic Vulnerability of Buildings,” *International Conference on Innovations in Structural Engineering*, Osmania University, Hyderabad, India, December 29-31, 2017.

21. Singh, A., Krishna, A. and **Sengupta, P.** “Seismic Fragility Evaluation of Reinforced Concrete Buildings,” *International Conference on Innovations in Structural Engineering*, Osmania University, Hyderabad, India, December 29-31, 2017.
22. Mondal, P., **Sengupta, P.** and Adhikary, S.D. “Vulnerability Assessment of Reinforced Concrete Beams under Impact Loading”, *2nd International Conference on Advances in Concrete, Structural & Geotechnical Engineering*, BITS Pilani, Pilani Campus, India, February 26-28, 2018.
23. Anand, S., **Sengupta, P.** and Adhikary, S.D. “Wind Loading Effects on Tall Reinforced Concrete Buildings”, *2nd International Conference on Advances in Concrete, Structural & Geotechnical Engineering*, BITS Pilani, Pilani Campus, India, February 26-28, 2018.
24. Pranav, A., Shekhar, S., Singh, S., Agarwal, K., Kumawat, C. and **Sengupta, P.** “Structural Applications of Autoclaved Aerated Concrete,” *International Conference on Advances in Construction Materials and Structures*, IIT Roorkee, India, March 7-8, 2018.
25. Shekhar, S., Pranav, A., Singh, S., Agarwal, K., Kumawat, C. and **Sengupta, P.** “Seismic Vulnerability of Autoclaved Aerated Concrete Buildings,” *International Conference on Advances in Construction Materials and Structures*, IIT Roorkee, India, March 7-8, 2018.
26. Kumar, S. and **Sengupta, P.** “Seismic Fragility Assessment of Reinforced Concrete Columns,” *International Conference on Advances in Construction Materials and Structures*, IIT Roorkee, India, March 7-8, 2018.
27. Krishna, A., Kumar, S. and **Sengupta, P.** “Hysteresis Behavior of Reinforced Concrete Columns,” *International Conference on Advances in Construction Materials and Structures*, IIT Roorkee, India, March 7-8, 2018.
28. Krishna, A. and **Sengupta, P.** “Seismic Vulnerability of Corroded Reinforced Concrete Buildings,” *3rd R.N. Raikar Memorial International Conference and Gettu-Kodur International Symposium*, Mumbai, India, December 14-15, 2018.
29. Acharya, V., Krishna, A. and **Sengupta, P.** “Seismic Vulnerability Assessment of Reinforced Concrete Buildings in Hilly Regions,” *16th Symposium on Earthquake Engineering*, IIT Roorkee, India, December 20-22, 2018.
30. Hussain, M.A., Nandy, A. and **Sengupta, P.** “Numerical Investigation of Reinforced Concrete Bridge Piers under Blast Loading,” *7th International Conference on Design and Analysis of Protective Structures*, Seoul, Korea, December 04-06, 2019.
31. Nandy, A., Hussain, M.A. and **Sengupta, P.** “Fragility Functions for Reinforced Concrete Bridge Decks against Explosion,” *7th International Conference on Design and Analysis of Protective Structures*, Seoul, Korea, December 04-06, 2019.

32. Acharya, V. and **Sengupta, P.** “Seismic Fragility of Buildings resting on Hill Slopes under Mainshock-Aftershock Sequences,” *17th World Conference on Earthquake Engineering*, Sendai, Japan, 2021.

Book and Book Chapters:

33. **Sengupta, P.** (2021) “Hysteresis Models for Seismic Fragility Assessment of Buildings”, LAP Lambert Academic Publishing, pp. 233, ISBN: 978-620-3-58085-3.
34. Mondal, P., **Sengupta, P.** and Adhikary, S.D. (2018) “Vulnerability Assessment of Reinforced Concrete Beams under Impact Loading”, Bloomsbury Publishing India Pvt. Ltd., pp. 521-527, ISBN: 978-93-87471-69-6.
35. Anand, S., **Sengupta, P.** and Adhikary, S.D. (2018) “Wind Loading Effects on High-Rise Reinforced Concrete Buildings”, Bloomsbury Publishing India Pvt. Ltd., pp. 676-682, ISBN: 978-93-87471-69-6.

Thesis/ Project Reports:

36. **Sengupta, P.**, Koh, C.G. and Low, Y.M. “Reliability-based Downtime Estimation of Ultra Deep-Water Marine Drilling Risers”, NUS-Keppel Joint Report submitted to *National Research Foundation*, Singapore, 2016.
37. **Sengupta, P.**, Koh, C.G. and Low, Y.M. “Comparison Study between Reliability-based and Deterministic Analyses of Marine Drilling Risers”, NUS-Keppel Joint Report submitted to *National Research Foundation*, Singapore, 2015.
38. **Sengupta, P.**, Koh, C.G. and Low, Y.M. “Introduction to Reliability-based Design of Ultra Deep Water Drilling Risers”, NUS-Keppel Joint Report submitted to *National Research Foundation*, Singapore, 2015.
39. **Sengupta, P.**, Koh, C.G. and Low, Y.M. “Identification and Quantification of Geometric and Environmental Uncertainties in Ultra Deep Water Drilling Risers”, NUS-Keppel Joint Report submitted to *National Research Foundation*, Singapore, 2014.
40. **Sengupta, P.**, Nguyen, H., Koh, C.G. and Low, Y.M. “A State-of-art Review of existing technologies for Deep Water Drilling Risers”, NUS-Keppel Joint Report submitted to *National Research Foundation*, Singapore, 2014.
41. **Sengupta, P.**, Vu, K.K. and Lee, T.G. “Calculation of Most Probable Maxima of Vessel Response using Rayleigh Distribution”, *Project Report*, EMAS Group, Singapore, 2014.
42. **Sengupta, P.** and Diddams, J. “Finite Element Analysis of Chain Stopper and Chain Installation Chute under Mooring Line Loads”, *Project Report*, EMAS Group, Singapore, 2014.

43. **Sengupta, P.** “Hysteresis Models and Fragility Assessments of Reinforced Concrete Structural Components”, *Doctor of Philosophy Thesis*, Nanyang Technological University, Singapore, 2014.
44. Wijaya, H., **Sengupta, P.** and Agung, R.S. “Analysis and Design of a 30 Storey Building with Butterfly-shaped Cross-Section under Wind and Seismic Loadings”, *Project Report*, Nanyang Technological University, Singapore, 2010.
45. **Sengupta, P.**, Zhang, Y., Lu, J., Sun, B. and Liang, X. “Generation of Occurrence Loss Exceeding Probability Curve of Building Class II in San Francisco Bay, California affected by 18 Possible Seismic Events”, *Independent Study Report*, Nanyang Technological University, Singapore, 2009.
46. **Sengupta, P.** “Planning and Design of an Industrial Complex”, *Final Year Project Report*, Bengal Engineering and Science University Shibpur, India, 2007.

Research Supervisions at IIT (ISM) Dhanbad:

➤ **PhD Students:**

- Souvik Biswas (20DR0144)
Co-guide (if any): None; Status: Ongoing (August 2020 - till date)
- Vedatrayee Acharya (18DR0150)
Co-guide (if any): None; Status: Ongoing (August 2018 - till date)
- Pranjal Srivastava (18DR0098)
Co-guide (if any): None; Status: Ongoing (August 2018 - till date)
- Debjit Mitra Roy (18DP000397)
Co-guide (if any): Dr. Satadru Das Adhikary
Status: Ongoing (January 2018 - till date)

➤ **M.Tech Students:**

- Sandeep Kumar (16MT000729)
Thesis Title: Seismic Vulnerability Evaluation of Reinforced Concrete Columns
Status: Completed
- Shrestha Sankar Kulsi (16MT001069)
Thesis Title: Fundamental Period of Vertically Irregular Buildings
Status: Completed
- Sarita Anand (16MT000802)
Thesis Title: Effect of Wind Loading on Reinforced Concrete Tall Buildings
Co-guide: Dr. Satadru Das Adhikary
Status: Completed

- Priyanka Mondal (16MT000944)
Thesis Title: Vulnerability Assessment of Reinforced Concrete Structures under Impact Loading
Co-guide: Dr. Satadru Das Adhikary
Status: Completed
- Shubham Kumar (17MT0001852)
Thesis Title: Utilization of Fly Ash Cenosphere in Concrete Constructions
Status: Completed
- Kumar Aishwarya (17MT001949)
Thesis Title: Vulnerability of Bridges under Dynamic Loading
Status: Completed
- Santanu Singh (17MT001609)
Thesis Title: Structural Performance Assessment of Railway Bridges
Status: Completed
- Shivani Jindal (17MT001622)
Thesis Title: Seismic Vulnerability Assessment of Corroded Reinforced Concrete Buildings
Status: Completed
- Md Arshad Hussain (18MT0205)
Thesis Title: Numerical Investigation of Reinforced Concrete Bridge Piers against Explosions
Status: Completed
- Arindam Nandy (18MT0384)
Thesis Title: Vulnerability Assessment of Reinforced Concrete Bridge Decks against Explosions
Status: Completed
- Nikita Sani (18MT0459)
Thesis Title: Numerical Investigation of Rockfall Protection Galleries against Impact Loading
Status: Completed
- Snehal M. Katkar (19MT0385)
Thesis Title: Performance Assessment of Marine Drilling Risers
Status: Completed
- Vivek Kumar (19MT0447)
Thesis Title: Reinforced Concrete Slabs subjected to Rock Fall Impact Loading
Status: Completed
- Mohit Bhartiya (19MT0221)
Thesis Title: Seismic Vulnerability of Hill Buildings under Mainshock-Aftershock Sequences

Co-Guide- Dr. Mohit Agrawal (Dept. Applied Geophysics)

Status: Completed

➤ **B.Tech Students:**

- Anurag Krishna (15JE001086)
Project Title: Seismic Fragility and Hysteresis Response of Reinforced Concrete Columns
Status: Completed
- Utkarsh Jaiswal (15JE001730)
Project Title: Seismic Performance of Reinforced Concrete Buildings with Plan Asymmetry
Status: Completed
- Sumit Shekhar (16JE001973), Abhishek Pranav (16JE002190), Sandeep Singh (16JE002352), Keshav Agrawal (16JE002694), Chetan Kumawat (16JE002697)
Project Title: Performance of Transmission Line Towers under Wind Loading
Status: Completed
- Bhavya Kumar Jain (17JE002734), Ashwani Meena (17JE003163), Arpit Agrawal (17JE003354)
Project Title: Seismic Vulnerability of Cable-Stayed Bridges of Various Structural Configurations
Status: Completed

Professional Membership:

- Member of American Concrete Institute (ACI): Membership ID 1565072
- Member of American Society of Civil Engineers (ASCE): Membership ID 11279785
- Affiliate Member of Earthquake Engineering Research Institute (EERI): Membership ID 19869
- Member of International Association for Bridge and Structural Engineering (IABSE): Membership ID 112378
- Member of Institution of Engineers (India): Membership ID 1727596
- Member of International Association of Protective Structures (IAPS)
- Alumni Member of Nanyang Technological University, Singapore
- Life Member of Global Alumni Association of Bengal Engineering and Science University (GAABESU), Shibpur, West Bengal, India

Reviewer of International Journals:

- American Society of Civil Engineers (ASCE) Journal of Structural Engineering
- American Concrete Institute (ACI) Material Journal
- American Concrete Institute (ACI) Structural Journal
- Earthquake Spectra Journal
- Structure and Infrastructure Engineering Journal

- Journal of Building Engineering
- Structures Journal
- Earthquake Engineering and Engineering Vibration Journal
- Bulletin of Earthquake Engineering Journal
- Arabian Journal of Science and Engineering
- Advances in Civil Engineering Journal
- Journal of The Institution of Engineers (India): Series A from Springer

Personal Information:

Nationality: Indian; Gender: Female; Marital Status: Married;

Languages: Bengali, English and Hindi

Hobbies: Listening Music, Sketching and Painting, Reading Books, Cooking and Poetry.