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Investigation on enhancement of seismic performance of unreinforced masonry structures

Susanta Banerjee Dr.

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I look forward for collaborating with researchers across the globe with common interest. Interested collaborators may contact at susanta.banerjee@manipal.edu

Potential PhD scholars or PDF who are interested to join to group may contact susanta.banerjee@manipal.edu.

Experience

- **Assistant Professor: Department of Civil Engineering, Manipal Institute of Technology, Bengaluru, Manipal Academy of Higher Education (MAHE)**

Role: Teaching and Research.

2021 to present

- **Ph.D. Research Scholar: Department of Civil Engineering, IIT(ISM), Dhanbad**
Title of thesis: Cost-Effective Sustainable Approach for Improving Behaviour of Masonry Structures under Seismic Loading.

Supervisors: Prof. Sanket Nayak, IIT(ISM), Dhanbad and
Prof. Sreekanta Das, University of Windsor, Canada

2017 to 2021

- **Assistant Professor: School of Civil Engineering, Kalinga Institute of Industrial Technology (KIIT)- Deemed to be University, Bhubaneswar**

Role: Teaching and Research.

2014 to 2017

Research & Consultancy works

- **Research Associate, IIT(ISM), Dhanbad** under the supervision of Prof. Sanket Nayak.
Research summary: Experimental investigation on improving the bond behavior of masonry. Further, the adequacy of using fibers in masonry mortar was also investigated.

June 2021 to October 2021

- **Third party Quality Checking of Construction Materials:** Integrated Commercial cum Residential Complex and development works, Bhubaneswar

Funding Agency: **NBCC Ltd.**

Role: Co-PI

2016 to 2017

- **Vetting of Structural Design and Drawing:** Officer's Quarters, Suryanagar, Bhubaneswar

Funding Agency: **LIC India.**

Role: Co-PI

2016 to 2017

- Actively involved in the experimental facets of the SERB sponsored project.

PI: Prof. Sanket Nayak, IIT(ISM), Dhanbad

2017 to 2020

Publications

Journals (SCI / SCOPUS)

1. Ranjan, N., **Banerjee, S.**, Nayak, S., and Das, S. (2022), "Efficacy of waste plastic towards enhancement of shear and flexure carrying capacity of masonry structures", **Journal of Cleaner Production (Elsevier)**, 365: 132669, DOI: [10.1016/j.jclepro.2022.132669](https://doi.org/10.1016/j.jclepro.2022.132669). (SCI- Q1).
2. Mandal, R., Panda, S.K., Kisku N., Rajhans, P., **Banerjee, S.**, Nayak, S. (2022), "Improvement of shear capacity of RAC beams by adopting identical mortar volume method of mix-design along with dual-stage mixing approach", **European Journal of Environmental and Civil Engineering (Taylor & Francis)**, DOI: [10.1080/19648189.2022.2083023](https://doi.org/10.1080/19648189.2022.2083023). (SCI- Q2).
3. **Banerjee, S.**, Nayak, S. and Das, S. (2021), "Adjudging efficacy of geonet reinforcement on the seismic performance of brick masonry structures: an experimental study", **Materials and Structures (Springer)**, 54: 213, DOI: [10.1617/s11527-021-01805-8](https://doi.org/10.1617/s11527-021-01805-8). (SCI- Q1).
4. **Banerjee S.**, Nayak S. and Das S. (2021), "Seismic performance enhancement of masonry building models strengthened with the cost-effective materials under bi-directional excitation", **Engineering Structures (Elsevier)**, 242: 112516, DOI: [10.1016/j.engstruct.2021.112516](https://doi.org/10.1016/j.engstruct.2021.112516). (SCI- Q1).
5. **Banerjee, S.**, Nayak, S. and Das, S. (2020), "Improving the in-plane behavior of brick masonry wallet using PP band and steel wire mesh", **Journal of Materials in Civil Engineering, (ASCE)**, 32(6): 04020132, DOI: [10.1061/\(ASCE\)MT.1943-5533.0003159](https://doi.org/10.1061/(ASCE)MT.1943-5533.0003159). (SCI- Q1).
6. **Banerjee, S.**, Nayak, S. and Das, S. (2020), "Shear and flexural behaviour of unreinforced masonry wallet with steel wire mesh", **Journal of Building Engineering, (Elsevier)**, 30:101254, DOI: [10.1016/j.jobe.2020.101254](https://doi.org/10.1016/j.jobe.2020.101254). (SCI- Q1).
7. **Banerjee, S.**, Nayak, S. and Das, S. (2020), "Augmenting the seismic performance of masonry models using polypropylene band and steel wire mesh through shaking table testing", **Structures, (Elsevier)**, 26, 340-347, DOI: [10.1016/j.istruc.2020.04.027](https://doi.org/10.1016/j.istruc.2020.04.027). (SCI- Q1).

8. **Banerjee, S.,** Nayak, S. and Das, S. (2019), “Enhancing the flexural behaviour of masonry wallet using PP band and steel wire mesh”, **Construction and Building Materials, (Elsevier), 194,** 179-191, DOI: [10.1016/j.conbuildmat.2018.11.001](https://doi.org/10.1016/j.conbuildmat.2018.11.001). (SCI- Q1).
9. **Banerjee, S.,** and Patro, S. K. (2016), “Inelastic seismic response of building with friction damper”, **Journal of The Institution of Engineers (India): Series A, (Springer), 97(4),** 395-404, DOI: [10.1007/s40030-016-0184-9](https://doi.org/10.1007/s40030-016-0184-9). (SCOPUS).

Conferences

1. **Banerjee, S.,** Nayak, S., Das, S. (2018), “Cost effective retrofitting techniques for enhancing seismic behaviour of unreinforced masonry buildings”, **16SEE, 20- 22nd December 2018, IIT Roorkee,** Uttarakhand, India, Paper No. 92.
2. **Banerjee, S.,** Nayak, S., Das, S. (2018), “Experimental study on in-plane behaviour of masonry wall strengthened with steel wire mesh”, **SEC-2018, 19-21st December 2018, Jadavpur University,** West Bengal, India.
3. Nayak, S., **Banerjee, S.** and Das, S. (2018), “Augmenting out-of-plane behaviour of masonry wallet using PP-band and steel wire mesh”, **14th International Conference on Concrete and Technology (CONCET- 2018), 8th to 9th August 2018, University of Malaya, Kuala Lumpur, Malaysia, IOP Conf. Series: Materials Science and Engineering 431; 072003, DOI: 10.1088/1757-899X/431/7/072003.** (SCOPUS).
4. **Banerjee, S.,** Nayak, S. and Das, S. (2018), “Enhancing shear capacity of masonry wallet using PP-band and steel wire mesh”, **14th International Conference on Concrete and Technology (CONCET-2018), 8th to 9th August 2018, University of Malaya, Kuala Lumpur, Malaysia, IOP Conf. Series: Materials Science and Engineering 431; 072004, DOI: 10.1088/1757-899X/431/7/072004.** (SCOPUS).

Scholastic Achievements

- **Elite+Silver Certificate** for scoring 84% marks in Eight-week NPTEL Online Certification course on “Matrix Method of Structural Analysis” from September 2020 to November 2020, conducted by IIT Kharagpur.
- **Duo-India Student Fellowship Award** by ASEM-DUO in the year 2019 to carry out research in Politecnico di Milano, Italy.
- **Gold Medal Award** (Syed Mumtaz Ali Memorial) by Institution of Engineers, India, Bhubaneswar chapter in the year 2019.
- **Foreign Travel Grant** by CSIR, Govt. of India to attend the 14th International Conference on Concrete and Technology (CONCET- 2018), 8th to 9th August, 2018, held at Malaysia.
- Received **Best Paper Award** in the 14th International Conference on Concrete and Technology (CONCET- 2018), 8th to 9th August, 2018, University of Malaya, held at Malaysia.
- **MHRD fellowship** to pursue Ph.D. in Dept. of Civil Engineering at IIT(ISM), Dhanbad.

Instrument Handling Experience

- Expert user of (Used for the purpose of):
 - **UTM** (Diagonal compression test of masonry wallet)
 - **FTM** (Flexure test of masonry wallet, concrete prism and RC beam)
 - **CTM** (Compression test of concrete cube, mortar cube, brick specimen)
 - **Unidirectional Shake Table** (Testing of masonry building model)
 - **Bi-axial Shake Table** (Testing of masonry building model)
- Actively participated in the **Development of Bi-axial Shake Table Facility** and other related instrumental facilities at Dept. of Civil Engineering, IIT(ISM), Dhanbad, under the guidance of Prof. Sanket Nayak.

Member of Professional Bodies

- **Associate Member** of “American Society of Civil Engineers” (ASCE), Membership Number- 9972086.
- **Member** of “National Information Centre of Earthquake Engineering” (NICEE), Membership Number- 14JY0094.
- **Young Member** of “International Union of Laboratories and Experts in Construction Materials, Systems and Structures” (RILEM, France), Membership Number- 41276.

Active Research Collaboration

- IIT (ISM), Dhanbad
- University of Windsor, Canada

Reviewer of Journal

- Journal of Materials in Civil Engineering, ASCE.
- Journal of The Institution of Engineers (India): Series A, Springer.