

Farnaz Batool Ph.D.

Professor

Civil Engineering Department

NED University of Engineering & Technology, Karachi.

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PROFESSIONAL EDUCATION

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| • Ph.D. Materials, Structural Engineering, University of Alberta, Canada. | 2015 |
| • M. Engg, Masters of Structural Engineering, NED University, Karachi. | 2003 |
| • B.E, Bachelor of Civil Engineering, NED University, Karachi. | 1997 |

ACADEMIC & INDUSTRIAL EMPLOYMENT HISTORY

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| • Professor, Civil Engineering Department NED University, Karachi | Oct 2025- till date |
| • Associate Professor, Civil Engineering Department NED University, Karachi | Jan 2022- Oct 2025 |
| • Assistant Professor, Civil Engineering Department NED University, Karachi. | Jan 2003 - Dec 2021 |
| • Lecturer, Civil Engineering Department, NED University, Karachi. | Feb 1999 - Dec 2002 |
| • Research & Development Engineer, Alpha Adroit Engineering Ltd, Canada. | May 2016- Aug 2018 |
| • Ph.D. Scholar & Teaching Assistant, University of Alberta, Canada | Sep 2009- Mar 2015 |

RESEARCH PROJECTS/ FUNDINGS (Completed or ongoing)

- Project: **Development and Performance Evaluation of Phase Change Material-based Plaster for Thermal Insulation of Walls**, amount Rs.3.0 million, SRSP, awarded by Sindh HEC, working as PI, 2025-2027, ongoing.
- Project: **Weathering the Storm: Application to Compressed Earth Blocks**, amount Rs.2.7 million, SRSP, awarded by Sindh HEC, working as Co-PI, 2025-2027, **ongoing**.
- Project: **Development of Thermal Block as Sustainable and Energy Efficient Construction Material**, amount Rs.13.00 million, NRPU, awarded by HEC, working as PI, 2022-2025, **Completed**.
- Project: **Development of Sustainable Building Material for Restoration and Conservation**, amount Rs.10.00 million, NRPU, awarded by HEC, working as PI, 2023-2026, **Ongoing**.
- Project: **Thermally Insulating Foamerete Composite Panels for Structural Applications**, amount Rs 3.40 million awarded by NED University and MoST Endowment, Working as PI, 2023-2025, **Ongoing**.
- Project: **Synthesis of Geopolymer from Industrial Waste of Porcelain Tiles and Sugarcane Bagasse Ash**, amount Rs 10.00 million awarded by NED University, Working as PI, 2023-2025, **Ongoing**.
- Project: **Evaluation of Historical Building Material Properties for Repair by Using Advanced Techniques**, amount Rs.0.85 million awarded by NED University, worked as PI, 2020-2021, **Completed**.

PH.D. & MASTER'S STUDENT SUPERVISED

- **Ph.D. Thesis Title:** “Performance of Thermal Block with Phase Change Material and Foamcrete for Thermal Insulation” as a main supervisor, 2022-2026, *ongoing*.
- **Ph.D. Thesis Title:** “Synthesis and Performance of Nanocellulose Geopolymer as a Repair Material for Historical Structures” as a main supervisor 2022-2026, *ongoing*.
- **Ph.D. Thesis Title:** “Synthesis of Geopolymer Concrete from Industrial Waste of Porcelain Tiles and Sugarcane Bagasse Ash” as a main supervisor 2021-2025, *ongoing*.
- **Ph.D. Thesis Title:** “Thermally Insulating Foamcrete Composite Panels for Structural Applications” as main supervisor 2021-2025, *ongoing*.
- **Master's Thesis Title:** “Synthesis of Geopolymer for the Repair of Historical Tiles” as Main supervisor, 2024-2025, *ongoing*.
- **Master's Thesis Title:** “Influence of Nano Cellulose fibres on the Mechanical Properties of Geopolymer” as main supervisor, 2025-2027, *ongoing*.
- **Master's Thesis Title:** “Extraction and Surface Modification of cellulose nano fibres for Phase Change Materials” as co-supervisor, 2024-2025, *ongoing*.
- **Master's Thesis Title:** “Characterization and Mechanical Properties of ceramic-based aggregate Concrete Utilizing Crushed Ceramic Tiles and Powder as aggregate replacement” as a main supervisor, 2023-2024, *completed*.
- **Master's Thesis Title:** “Hygrothermal simulation of multilayer wall containing foamcrete with pozzolans” as a co-supervisor, 2022-2023, *completed*.
- **Master's Thesis Title:** “Evaluation of Historical Building Materials Properties for Restoration with Non-Destructive Techniques” as a co-supervisor, 2021-2022, *completed*.

PATENT

- Design and Production of Thermal Block for Insulation (submitted)

PUBLICATIONS

Refereed Journal Papers (Published or under review)

1. Bindiganavile V, Batool F (2012). **Effect of fly ash on thermal properties of cement-based foams evaluated by the transient plane heat source.** *Indian Concrete Journal*, Nov 2012.
2. Mamun M, Batool F, Bindiganavile V (2014). **Thermo-mechanical properties of fiber reinforced cementbased foams exposed to sulfate.** *Construction and Building Materials*, (61), (312-319).
3. Batool F, Bindiganavile V (2016). **Effect of pozzolanic admixture on fresh state properties of cement- based foams.** *Advances in Civil Engineering Materials*, ASTM, Vol.5 No.1.
4. Batool F, Bindiganavile V (2017). **Effect of pozzolanic admixture on thermal properties of lightweight cement-based foams.** *Journal of testing and evaluation*, ASTM, Vol.45, No.5.
5. Batool F, Bindiganavile V (2017). **Air-void size distribution and its effect on thermal conductivity.** *Construction and Building Materials*. Vol 149 No.15.
6. Batool F, Bindiganavile V (2018). **Thermal Conductivity of Hydrated Paste of Cement-Based Foam Microstructure.** *Advances in Civil Engineering Materials*, ASTM, Vol.7, No.1.

7. Batool F, Prasad N, Bindiganavile V (2018). **Statistical Modeling of Thermal Conductivity for Cement-Based Foam**. *Journal of Building Engineering*, Vol.19.
8. Batool F, Bindiganavile V (2018). **Quantification of Factors Influencing the Thermal conductivity of Cement-Based Foam**. *Cement Concrete and Composite*, Vol. 91 Pp.76-86.
9. Batool F, Rafi M, Bindiganavile V (2018). **Thermal Conductivity of Cement-Based Foam: A Review.**, *Journal of Building Engineering*. Vol. 20.
10. Batool F, Bindiganavile V. (2020) **Fresh Properties of Fiber Reinforced Cement-Based Foam with Pozzolans**. *Iranian Journal of Science and Technology, Transactions of Civil Engineering*. doi:10.1007/s40996-020-00357-1.
11. Batool F, Masood A, Ali M. (2020) **Characterization of Sugarcane Bagasse Ash as Pozzolan and Influence on Concrete Properties**. *Arabian Journal for Science and Engineering*. doi:10.1007/s13369019-04301-y.
12. Batool F, Bindiganavile V. (2020) **Evaluation of Thermal Conductivity of Cement-Based Foam Reinforced with Polypropylene Fibers**. *Materials and Structures*. doi: 10.1617/s11527-020-1445-7
13. Batool F, Rafi M, Bindiganavile V (2021). **Factors Influencing the Pore Structure Parameters of Lightweight Cement-Based Foams**, *Journal of testing and evaluation*, ASTM, Vol.49, No.2.
14. Batool F, Khan S, Bindiganavile V. (2021). **Characterization of 3D Microstructure and Thermal Conductivity and Heat Flow of Cement-Based Foam Using Image Technique**. *Frontiers of Structural and Civil Engineering*. 15(3): 643–651, doi:10.1007/s11709-021-0709-9
15. Batool F, Islam K (2021) **Effectiveness of wood waste sawdust to produce medium- to low-strength concrete materials**, *Journal of Building Engineering*, vol 44, doi.org/10.1016/j.job.2021.103237
16. Batool F, Bindiganavile V. (2022) **Hydrated Products Influencing the Thermal Conductivity of Cement-Based Foam with Pozzolan**. *Iranian Journal of Science and Technology, Transactions of Civil Engineering*. 46, 1117–1128, doi:10.1007/s40996-021-00623-w
17. Batool F, Bindiganavile V. (2020) **Microstructural parameters of fiber reinforced cement - based foam and their influence on compressive and thermal properties**. *Journal of Building Engineering* (31).
18. Batool.F, Sangi.J.A, Khan.S, Islam. K (2022). **Material Characterization of a Historical Wall by Using Destructive and Non-destructive Techniques**, *Structures*, Vol 46, doi.org/10.1016/j.istruc.2022.11.006
19. Shahjalal. M, Islam. K, Batool.F, Tiznobaik.M (2023). **Fiber-Reinforced Recycled Aggregate Concrete with Crumb Rubber: A state-of-the-art review**. *Construction and Building Materials*, Vol 404, doi.org/10.1016/j.conbuildmat.
20. Cakiroglu.C, Batool.F, Islam.K, Nehdi.M (2024). **Explainable ensemble learning predictive model for thermal conductivity of cement-based foam**. *Construction and Building Materials*, Vol 421, doi.org/10.1016/j.conbuildmat.
21. Batool.F, Naqvi.S, Faisal.S, Sangi.A.J,(2024). **Characterization of Denim Effluent Treatment Plant Sludge and its Influence on Concrete Hardened Properties**. *Iranian Journal of Science and Technology, Transactions of Civil Engineering*. <https://doi.org/10.1007/s40996-024-01476-9>.
22. Barakzai, E.S., Batool, F. Sangi, A.J. (2025). **Geometrical design optimization of foamcrete composite roof panel using thermal simulation**, *Journal of Building Engineering*, 99, p. 111581. doi: 10.1016/j.job.2024.111581.
23. Fatima,B, Batool, F. Sangi, A.J. (2025). **Experimental Investigation on the Use of Ceramic Tiles as Aggregates in Concrete**, *Innovative infrastructure solutions* (under review).
24. Sajid H, Batool F, Chen B (2025). **Hygrothermal Simulation of Buildings Walls with Foamcrete**, *Journal of Building Engineering* (under review).
25. Fatima, A, Batool, F. and Sangi, A.J. (2025). **Geometrical Design and Material Optimization of Foamcrete Composite Blocks for Insulation**, *Arabian Journal for Science and Engineering* (under review).

Refereed Conference Papers

26. Sajid H, Batool F, Chen B (2023). **The Impact of Foamcrete Density on the Hygrothermal Performance of Building: A Simulation Study**. Proceedings of the 2nd International Conference on Advances in Civil Infrastructure and Construction Materials.
27. Sajid H, Batool F, Chen B (2023). **Hygrothermal Simulation of Multilayer Foamcrete Wall Panel with Pozzolans**. Proceedings of the 4th International Congress on Materials & Structure Stability, in Materials Today Proceedings Journal.
28. Batool F (2002). **Earthquake Mitigation. National Seminar on Atmospheric and Ionospheric Physics (AIP)**. August 19, Karachi, Pakistan.
29. Batool F, Rafeeqi S.F.A (2008). **Passive Resistance to Blast Loading**. IDRC Conference, August 25- 27, Davos, Switzerland.
30. Qadir A, Rafi M.M, Batool F (2002). **Post-disaster mitigation-Relief to human sufferings**. In: International Conference on Protection of Structures against Hazards. Singapore.
31. Batool F, Bindiganavile V (2011). **Effect of fly ash on thermal properties of cement-based foams evaluated by the transient plane heat source**. Proceedings, 2nd International Engineering, Mechanics and Materials Specialty Conference. CSCE, Ottawa, Ontario, June 14-17.
32. Batool F, Bindiganavile V (2013). **Thermal conductivity of cement-based foams and applicability of predictive models**. Proceedings, Rilem, 7th International Concrete under Severe Conditions – Environment and Loading, CONSEC13, Conference, China, Sep 23.

INDUSTRIAL& ACADEMIC COLLABORATION

- Working with Shabbir Tiles, Karachi on the “**Utilization of Ceramic Waste in Concrete**” 2023-till now, investigation in progress.
- Working with SiKa Pakistan, on the “**Development on New Chemicals for the Restoration of Historical Buildings**”, 2023-till now, Preliminary investigation is underway.
- Working with Department of Chemical & Energy Engineering at PAF-IAST, Haripur on the “**Development of Nano Phase Change Materials**”, 2023-till now, Preliminary investigation still underway.
- Jointly Supervised Master Thesis titled” **Hygrothermal Simulation of Multilayer Wall Containing Foamcrete with Pozzolans**” at School of Naval Architecture, Ocean and Civil Engineering Shanghai Jiao Tong University, China with Prof Bing Chen, **2022-2024**, completed.

RESEARCH INFRASTRUCTURE STRENGTHENING CONTRIBUTION

- Involved in the design and development of **Foam Concrete Laboratory** at the Department of Civil Engineering, 2022-2023.
- Working on the proposal for the development of the **Material Characterization Laboratory** at the Department of Civil Engineering.
- Involved in the **Procurement of Laboratory** equipment for postgraduate students at the Department of Civil Engineering, 2022-till date.
- Designed three Ph.D. courses and two Master’s courses.

MEMBER BOARD/TECHNICAL COMMITTEE/REVIEWER/ADVISOR

- Member, Technical Working Group on Resilient Housing & Settlement Planning, SHRRP (Sindh housing, recovery and reconstruction platform).
- Member Board of Studies.

- Member Admission Committee for Post Graduate Students.
- Class Advisor, First Year, 2018-till date.
- Reviewer, Journal of Building Engineering, 2020-till date
- Reviewer, Spring Nature, 2019-till date.
- Reviewer, Construction Building Material (CBM), 2018-till date.
- Reviewer, Materials, 2020- till date.
- Reviewer, Cement and Concrete Composites, 2021-till date.

RESEARCH & TECHNOLOGY SHOWCASE

- Participated in 3rd Sindh HEC Research & Technology Showcase, 2024 held on 1st June in Expo centre Karachi. Thermal Block was introduced.

HONOURS & AWARDS

- Best Researcher Award, 2021.
- Best Researcher Award, 2020.
- Best Published Researcher Award, NEDAASC, 2018.
- Recipient of Best Paper Award, NEDAASC, 2017.
- Twelve High Impact Journal Publication Awards.
- Recipient of Collaborative Research and Development Grant program, Scholarship by *Natural Sciences and Engineering Research Council (NSERC-Canada)* 2014.
- Recipient of Academic Excellence, Silver Medal, in Bachelor of Civil Engineering 1997.

CONFERENCE PARTICIPATION

- Session Chair, 14th International Civil Engineering Conference, 15-16th Nov 2024, Karachi.
- Session Chair, 13th International Civil Engineering Conference, 10-11th Nov 2023, Karachi.
- Session Chair, 12th International Civil Engineering Conference, Integrating Technology in Civil Engineering, 13-14th May 2022, Karachi.