Pratik P. Bhatt

PhD, PE

Senior Staff Consultant

Dr. Pratik Bhatt is a Senior Staff Consultant at Engineering Systems Inc. (ESi) and a licensed Professional Engineer specializing in advanced structural analysis and forensic investigation of structures affected by natural and manmade hazards.

Dr. Bhatt performs forensic investigations of structural distress, damage, construction defects, and failures of structural systems and components. His work includes field inspections, condition assessment, root-cause failure analysis, building code research and analysis, and development of repair and retrofit solutions for damaged structures using traditional or composite materials across residential, commercial, and infrastructure-related projects.

Dr. Bhatt has a strong background in engineering mechanics and nonlinear finite element modeling and is well versed in the mechanics of structures and materials at elevated temperatures. He has extensive experience in designing and executing experimental test programs, including specialized test setups, custom fixtures, and applying advanced laboratory techniques to characterize material and structural behavior under extreme loading conditions. His doctoral research focused on evaluating fire performance of fiber-reinforced polymer (FRP)–strengthened concrete members through fire tests and numerical modeling and developed machine learning-based tools for fire resistance prediction. He has published multiple articles in refereed journals, conference proceedings, and technical books.

At ESi, Dr. Bhatt applies this combined expertise to support complex forensic and engineering investigations, including multiple hazards performance evaluations and infrastructure resilience assessments for critical structures.

Education

Ph.D., Civil Engineering, Michigan State University, 2021

M.S. (R), Civil Engineering (Structural), Indian Institute of Technology (IIT) Delhi, 2014

B.E., Civil Engineering, Maharaja Sayajirao University of Baroda, 2010

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ESi Aurora

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Aurora, Illinois 60504

Areas of Specialization

- Advanced Structural Analysis
- Computational and Finite Element Modeling
- Failure Analysis and Root Cause Investigation
- Fatigue and Fracture Analysis
- Structural Condition and Damage Assessment
- Structural Fire Analysis & Design
- Repair & Retrofit Design
- Structural Strengthening using Polymer Composites
- Design of Steel and Concrete Structures
- Machine Learning and Artificial Intelligence Applications in Structural Engineering

Registered Professional Engineer

- State of Michigan PE License No. 6201316325

Positions Held

Engineering Systems Inc., Aurora, Illinois

- Senior Staff Consultant, 2024 – Present

Walter P Moore, Kansas City, Missouri

- Structural Forensic Engineer Diagnostics Group, 2022 - 2024

Michigan State University, East Lansing, Michigan

- Teaching and Research Assistant, 2014 - 2021

Indian Institute of Technology (IIT) Delhi, New Delhi, India

- Research Assistant, 2011 - 2014

Linde Engineering India Pvt. Ltd., Vadodara, India

- Structural Design Engineer, 2010

Professional Affiliations

National Academy of Forensic Engineers (NAFE)

- Member, 2024 – Present

American Society of Civil Engineers (ASCE)

- Member, 2024 – Present
- Committee Member, Fire Protection SEI Technical Community Executive Committee, 2024 – Present
- Committee Member, Multi-Hazard Mitigation Fire Protection SEI Technical Community Executive Committee, 2024 – Present

Member American Concrete Institute (ACI)

- Member since 2024
- Committee Member, 216-00 Fire Resistance and Fire Protection of Structures - Joint ACI-TMS, 2024 – Present

- Committee Member, 440-00 Fiber-Reinforced Polymer Reinforcement, 2024 – Present
- Committee Member, 440-0F FRP-Repair-Strengthening Member, 2024 – Present

Training and Certification

- OSHA 30 Hour General Industry Outreach, 2024
- OSHA Confined Space Certification – National OSHA Foundation, 2024
- Overhead Crane Inspector – Qualified, 2024

Honors/Awards

- Department of Civil and Environmental Engineering Dissertation Completion Fellowship, 2020
- Indo-US Science and Technology Forum (IUSSTF) Fellowship for Advancement of Structural Fire Engineering Research in India, 2014
- GATE Fellowship from Government of India, 2011-2013
- 3 gold medals for Outstanding Academic Performance in B.E. Civil, 2010

Publications

"Machine Learning Approach for Predicting Fire Resistance of FRP-Strengthened Concrete Beams," **P. P. Bhatt**, N. Sharma, V. K. R. Kodur, and M. Z. Naser, Structural Concrete (fib CEB-FIP), 2024.

"Thermomechanical Properties of Constituent Materials for Evaluating Fire Resistance of FRP-Strengthened Concrete Structures," V. K. R. Kodur and **P. P. Bhatt**, Construction Materials and Their Properties for Fire Resistance and Insulation, pp. 301–339, 2024.

"Methodologies for Evaluating FRP-Concrete Interfacial Bond Strength at Elevated Temperatures," **P. P. Bhatt**, and V. K. R. Kodur, Fiber Reinforced Polymeric Materials and Sustainable Structures, pp. 19–31, 2023.

"Fire Resistance Evaluation of Concrete Beams and Slabs Incorporating Natural Fiber-Reinforced Polymers," V. K. R. Kodur, S. Venkatachari, **P. P. Bhatt**, V. Matsagar, and S. B. Singh, Polymers, Vol. 15, No. 3, pp. 755, 2023.

"Fire Hazard in Tunnels: Review, Assessment, and Mitigation Strategies," V. K. R. Kodur, and **P. P. Bhatt**, The Indian Concrete Journal (Special Issue), Vol. 96, No. 3, pp. 13–25, 2022.

"Deep Neural Network to Predict Fire Resistance of FRP-Strengthened Beams," **P. P. Bhatt**, and N. Sharma, The Concrete Industry in the Era of Artificial Intelligence (ACI SP-350), pp. 69–80, 2021.

“Fire Performance of FRP-Strengthened Concrete Flexural Members,” **P. P. Bhatt**, Ph.D. Dissertation, Michigan State University, 2021.

“Performance of Insulated FRP-Strengthened Concrete Flexural Members under Fire Conditions,” **P. P. Bhatt**, V. K. R. Kodur, A. M. Shakya, and T. Alkrdaji, Frontiers of Structural and Civil Engineering, Vol. 15, pp. 177–193, 2020.

“High-Temperature Properties of Fiber Reinforced Polymers and Fire Insulation for Fire Resistance Modeling of Strengthened Concrete Structures,” V. K. R. Kodur, **P. P. Bhatt**, and M. Z. Naser, Composites Part B: Engineering, Vol. 175, pp. 107104, 2019.

“Numerical Approach to Evaluate Elevated-Temperature Behavior of Steel Fiber Reinforced Concrete Columns,” **P. P. Bhatt**, V. K. R. Kodur, and V. Matsagar, The Indian Concrete Journal (Special Issue), Vol. 93, No. 8, pp. 8–15, 2019.

“Effect of Temperature-Induced Bond Degradation on Fire Performance of FRP-Strengthened Concrete Beams,” **P. P. Bhatt**, V. K. R. Kodur, R. Hawileh, N. Al-Nuaimi, and J. Abdalla, Proceedings of PROTECT 2019, September 2019.

“Fire Resistance of Insulated FRP-Strengthened Concrete Flexural Members,” **P. P. Bhatt**, V. K. R. Kodur, A. M. Shakya, and T. Alkrdaji, Proceedings of CONSEC 2019, June 2019.

“A Numerical Approach for Modeling Response of Fiber Reinforced Polymer Strengthened Concrete Slabs Exposed to Fire,” V. K. R. Kodur and **P. P. Bhatt**, Composite Structures, Vol. 187, pp. 226–240, 2018.

“Numerical Model for Fire Resistance Evaluation of Steel Reinforced Polymer Strengthened Concrete Beams,” **P. P. Bhatt**, V. K. R. Kodur, R. Hawileh, N. Al-Nuaimi, and J. Abdalla, Proceedings of the 10th International Conference on Structures in Fire (SiF 2018), June 2018.

“Emerging Construction Materials for Energy Infrastructure,” V. K. R. Kodur, M. Naser, and **P. P. Bhatt**, Energy Engineering, pp. 113–122, 2017.

“Temperature and Stress Development in Ultra-High-Performance Concrete during Curing,” V. K. R. Kodur, **P. P. Bhatt**, P. Soroushian, and A. Arablouei, Construction and Building Materials, Vol. 122, pp. 63–71, 2016.

“Strategies for Mitigating Fire Hazard in Tunnel Structures,” V. K. R. Kodur and **P. P. Bhatt**, Proceedings of the 6th International Workshop on Structural Life Management of Power Structures, pp. 1–12, 2016.

“Numerical Study on Steel Fiber Reinforced Concrete Columns Subjected to Fire,” V. K. R. Kodur, **P. P. Bhatt**, and V. Matsagar, Proceedings of the 9th International Conference on Structures in Fire (SiF 2016), June 2016.

“Emerging Construction Materials for Energy Installations,” V. K. R. Kodur, M. Naser, and **P. P. Bhatt**, Proceedings of the CAETS Convocation on Pathways to Sustainability, October 2015.

“Fire Performance of Steel Fiber Reinforced Concrete Portals,” **P. P. Bhatt**, M.S. (Research) Thesis, Indian Institute of Technology Delhi, 2014.

“Reinforced Concrete Portal Frame Subjected to Fire,” P. Bhatt, V. A. Matsagar, and A. K. Nagpal, Proceedings of the National Conference on Fire Research and Engineering, March 2014.

Presentations

“Fire Performance of FRP-Strengthened Concrete Flexural Members,” **P. P. Bhatt**, Thornton Tomasetti, November 2021.

“Fire Performance of FRP-Strengthened Concrete Beams,” **P. P. Bhatt**, Gilsanz Murray Steficek Engineers and Architects, May 2021.

“Thermo-Mechanical Response of FRP-Strengthened RC Structures under Fire Conditions,” **P. P. Bhatt**, Massachusetts Institute of Technology, July 2020.

“Fire Performance of Concrete Slabs Strengthened with Fiber Reinforced Polymers,” **P. P. Bhatt**, ACI Spring Convention, March 2017.

“Numerical Study on Steel Fiber Reinforced Concrete Columns Subjected to Fire,” V. K. R. Kodur, **P. P. Bhatt,** and V. Matsagar, 9th International Conference on Structures in Fire (SiF 2016), June 2016.