





# Dr. Bipin Kumar Chaurasia


Ph.D. Mechanical Engineering | R&D Manager

Safety & Rescue Systems Specialist


## CONTACT INFORMATION

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 **Affiliation:** Indian Inovatix Limited, R&D Dept.

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## PROFESSIONAL SUMMARY

Accomplished Mechanical Engineer and researcher with Ph.D.-level expertise in composite materials, impact dynamics, damage mechanics, and structural design. Currently serving as R&D Manager at Indian Inovatix Limited, Ahmedabad (since January 2024), leading development of magnetic braking systems, emergency escape devices, and fall-arrest solutions for high-risk industrial environments. Demonstrated excellence through peer-reviewed SCI/SCIE publications, a granted design patent, successful funded projects, and extensive postgraduate teaching experience. Strong foundation in multifunctional composites, finite element analysis, and safety-critical product development with active research collaborations.

## CORE EXPERTISE

- Composite Materials & Damage Mechanics
- High Strain Rate & Impact Modeling
- Magnetic Brake & Eddy-Current Systems
- Emergency Escape & Fall-Arrest Devices
- FEA (COMSOL, ANSYS, ABAQUS)
- CAD/CAM & Product Development
- Structural Design & Validation
- Research Collaboration & Leadership

## PROFESSIONAL EXPERIENCE

### R&D Manager

*Indian Inovatix Limited | January 2024 – Present*

- Lead R&D activities and product development for magnetic braking systems, emergency escape devices, and fall-arrest solutions for high-risk industrial environments
- Manage cross-functional teams across design, testing, certification, and deployment of safety-critical systems
- Oversee COMSOL Multiphysics and FEA-based electromagnetic and structural validation of braking and safety devices
- Develop product roadmaps and technical specifications for next-generation safety systems
- Collaborate with academic partners (Ahmedabad University) and industrial stakeholders for advanced research and commercialization

### Postdoctoral Fellow

*School of Engineering and Applied Sciences, Ahmedabad University | January 2023 – January 2024*

- Designed and developed magnetic braking systems using Samarium–Cobalt permanent magnets for safety and rescue applications
- Executed COMSOL Multiphysics simulations for coupled electromagnetic and structural response validation
- Developed Top Man Emergency Escape Devices, confined-space safety systems, and fall-arrest solutions compliant with industrial safety standards
- Performed prototype testing and validation of safety-critical systems for high-risk industrial environments

## EDUCATION

**Ph.D. in Mechanical Engineering** | CGPA: 8.00

*National Institute of Technology Jamshedpur, India | 2023*

**Thesis:** Modelling of Laminated Composite Under High Strain Rate Loading

**Advisors:** Dr. Deepak Kumar and Prof. M. K. Paswan

**M.Tech. in Mechanical Engineering (Polymer Composites & Tribology) | CGPA: 8.70**

*National Institute of Technology Rourkela, India | 2018*

**Thesis:** Mechanical and Tribological Behavior of Eulaliopsis Binata (Short Fiber) Reinforced Epoxy Polymer Composite

**B.Tech. in Mechanical Engineering | CGPA: 8.18**

*Gandhi Engineering College, BPUT, India | 2015*

## TEACHING & ACADEMIC EXPERIENCE

- PDF in school of engineering and applied science
- Assistant professor in Vardhman college of engineering
- Strength of Materials Lab – NIT Jamshedpur (4 years, Research Scholar)
- CAD/CAM Lab – NIT Jamshedpur (4 years, Research Scholar)
- ANSYS Lab – M.Tech. level (2 years)
- Tribology Lab – NIT Rourkela (1 year)
- Engineering Drawing – B.Tech. level (1 year)

## RESEARCH INTERESTS

- Micromechanics & Failure of Composites
- Damage & Fracture Mechanics
- Multifunctional Hybrid Composites
- High Strain Rate & Impact Dynamics
- Structural Design & CAD/CAM
- Safety Systems Design & Validation
- Materials for Aerospace & Defense

## TECHNICAL SKILLS & SOFTWARE

**FEA Tools:** COMSOL Multiphysics, ANSYS, ABAQUS

**CAD Software:** SolidWorks, CATIA V5, AutoCAD

**Programming:** MATLAB, Fortran

**Specializations:** Product Design, Electromagnetic Simulation, Structural Validation

## MAJOR PROJECTS

### 1. Food Wastage Recycler Machine

Sponsored by National Institute of Design (NID), Ministry of Education, Government of India. Developed prototype with waste segregation and processing capabilities.

### 2. Portable Ball Milling Machine

Design Patent Granted (Application No: 356784-001). Engineered cost-effective grinding solution with improved efficiency and portability.

### 3. Aluminium Riveted Joint Analysis

Experimental and numerical investigations for failure prediction and load capacity assessment in aerospace applications.

### 4. High Strain Rate Modelling of CFRP Composite

Dynamic compressive loading analysis and damage evolution mechanisms using ANSYS/ABAQUS (Ph.D. thesis work).

### 5. C-shaped Hybrid Laminates Design

International collaborative project with Gyeongsang National University, Jinju, South Korea. Explored novel laminate geometries for improved performance.

### 6. Cost-Effective Axle Development

Industrial collaboration with RSB Transmission (I) Ltd., Jamshedpur. Developed front and rear axle for 12–14 ton load-carrying vehicles with reduced material costs while maintaining structural integrity.

## PATENTS & INTELLECTUAL PROPERTY

- **Portable Ball Milling Machine** – Design Patent Granted (Application No: 356784-001)

## PUBLICATIONS

### Book Chapters

1. Chaurasia, B.K., Kumar, D., & Acharya, S.K. *Investigation of failure in L-shaped woven carbon fiber-reinforced polymer composite under pull-out and four-point bending*. In Recent Advances in Manufacturing, Automation, Design and Energy Technologies, pp. 693–703. Springer, Singapore, 2022.
2. Chaurasia, B.K., Kumar, D., & Roy, R. *Damage studies in curved hybrid laminates under pull-out loading*. In Advance Composite Material and Structures: Modeling and Analysis. (In press)

### Peer-Reviewed Journal Publications

1. Chaurasia, B.K., Kumar, D., & Paswan, M.K. (2022). *Experimental studies of failure in L-shaped carbon fiber-reinforced polymer composite under pullout and four-point bending*. Journal of The Institution of Engineers (India) Series D, 103, 889–897. <https://doi.org/10.1007/s40033-022-00411-4>
2. Haque, S.A., Ghosh, I., Chaurasia, B.K., & Paswan, M.K. (2023). *Water immersion test and its effect on the mechanical behavior of reinforced natural fiber composites*. Annals of the Bhandarkar Oriental Research Institute, 104(7), 45–62. ISSN: 0378-1143

### Conference Presentations (Selected)

1. *Damage interaction in carbon fibre reinforced polymer laminates under in-plane loading*. ICCS23+MECHCOMP6, September 2020.
2. *Modeling of damage evolution of laminated composites under high strain rate loading*. ICTACEM 2021, December 2021.
3. *High strain rate modeling of CFRP composite under compressive loading*. INCAM 2022, November 2022.
4. *Investigation of failure load in riveted lap joints made of aluminum alloys*. INCAM 2022, November 2022.
5. *Comparison and evaluation of physical properties of short fiber composite and particulate composite*. ICERPSD 2023, May 2023.

### Papers Under Review

- Damage interaction in carbon fiber reinforced polymer laminates under in-plane loading – Composite Structures (SCI)
- Damage analysis of L-shaped glass fiber composite under four-point quasi-static loading – Fibers and Polymers (SCIE/SSCI)
- Dynamic compressive impact behavior of CFRP composite under high strain rate loading – Part C: Journal of Mechanical Engineering Science (ESCI)
- Modeling of damage evolution of laminated composites under high strain rate loading – Composite Part B: Engineering (SCI)
- Delamination and matrix cracking in L-shaped randomly oriented glass fiber composite laminate under quasi-static load – Materials Today Communications (SCIE)

## PROFESSIONAL MEMBERSHIPS

- Indian Society for Applied Mechanics (ISAM)