

SWATI MAITRA

Assistant Professor

Ranbir & Chitra Gupta School of Infrastructure Design and Management

Indian Institute of Technology Kharagpur

Kharagpur 721 302, INDIA

E_mail: swati@infra.iitkgp.ac.in; swatimiit@gmail.com

Tel: 91-3222 304946 (O), 91-9434741236 (M)



Education

- Ph.D. in Civil (Transportation) Engineering from IIT Kharagpur
- M.Tech. in Civil (Structural) Engineering from IIT Bombay
- B.E. in Civil Engineering from Bengal Engineering College, Shibpur

Research Areas

- Transport Infrastructure
- Concrete Pavement
- Concrete and Cementitious Materials
- Retrofitting and Rehabilitation
- Road Safety

Subjects Teaching

- Retrofitting and Rehabilitation of Infrastructure (new course offered)
- Planning and Development of Road Infrastructure (new course offered)
- Construction Technology for Civil Infrastructure (new course offered)
- Project Management Laboratory
- Simulation Laboratory

Ph.D./M.Tech/M.S. Students Guidance

- Ph. D – 2 (ongoing, single guidance)
- M. Tech – 2 (ongoing, single guidance), 4 (completed, 3 single guidance)
- M. S. – 1 (ongoing, joint guidance)

Employment Record

From July 2016 to till date

Assistant Professor

RCG School of Infrastructure Design and Management
Indian Institute of Technology Kharagpur,
Kharagpur- 721 302, India

From Jan 2013 to May 2016

Scientist, WOS-A, DST, Govt. of India

SRIC, Department of Civil Engineering
Indian Institute of Technology Kharagpur
Kharagpur- 721 302, India

From Feb 1998 to Jun 2001

Research Associate

Department of Civil Engineering
Indian Institute of Technology Bombay
Mumbai- 400 076, India

From Apr 1991 to Jan 1998 **Design Engineer**
Apex Techno Consultants Pvt. Ltd.
Kolkata – 700 001, India

From Jul 1989 to Apr 1991 **Assistant Engineer**
D. Sinha & Associates
Kolkata – 700 016, India

Publications in Book/Manual Chapters

- Maitra, S. and Bera R. (2017). “Know Your Roads” in Training Manual for Drivers, Ed. by Maitra, B., ISBN: 978-93-80813-53-0, pp. 1-17
- Maitra, S. and Bhattacharya, K. (2017). “Road Signs” in Training Manual for Drivers, Ed. by Maitra, B., ISBN: 978-93-80813-53-0, pp. 19-45.

Publications in International and National Journals

- Deb, S., Mitra, N., Maitra, S. R. and Basu Majumdar, S. “Comparison of Mechanical Performance and Life Cycle Cost of Natural and Synthetic Fibre Reinforced Cementitious Composites”, Journal of Materials in Civil Engineering, ASCE (accepted for publication).
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2019) “Effect of Joint and Pavement Related Parameters on Load Transfer Characteristics of Aggregate Interlocked Jointed Concrete Pavement”, Transportation in Developing Economies, Springer, 5:15, <https://doi.org/10.1007/s40890-019-0080-x>.
- Maitra, S. R., Reddy, K. S., Ramachandra, L. S. and Pandey, B. B. (2018) “Numerical Analysis of Short Paneled Concrete Pavement”, Indian Highways, 46(8), 11-19.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2018) “Stress Intensity Factor based Damage Prediction Model for Plain Concrete under Cyclic Loading”, Journal of Materials in Civil Engineering, ASCE, 30(7), 04018118-1-12.
- Deb, S., Mitra, N., Basu Majumdar, S. and Maitra, S. R. (2018). "Improvement in tensile and flexural ductility with the addition of different types of poly-propylene fibres in cementitious composites", Construction and Building Materials, 180, 405-411.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2015). “Estimation of Joint Parameters for the Finite Element Analysis of Jointed Concrete Pavement using Structural Evaluation Results.” International Journal of Pavement Engineering and Asphalt Technology, 16(2), 21-38.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2015). “A Comprehensive Three-Dimensional Finite Element Model for the Analysis of Jointed Concrete Pavement.” Journal of the Indian Roads Congress, 75-4, 73-81.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2014). “Numerical Investigation of Fatigue Characteristics of Concrete Pavement.” International Journal of Fracture, 189, 181-193.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2010). “Load Transfer Characteristics of Aggregate Interlocking in Concrete Pavement.” Journal of Transportation Engineering, ASCE, 136 (3), 190-195.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2009). “Load Transfer Characteristics of Dowel Bar System in Jointed Concrete Pavement.” Journal of Transportation Engineering, ASCE, 135(11), 813-821.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2009). “Experimental Evaluation of Interface Friction and Study of its Influence on Concrete Pavement response.” Journal of Transportation Engineering, ASCE, 135(8), 563-571.
- Basu, D., Maitra, S. R. and Maitra, B. (2006). "Modelling passenger car equivalency at an urban midblock using stream speed as measure of equivalence." European Transport, XII, 34, 75-87.

- Mukherjee, A., Boothby, T. E., Bakis, C. E., Joshi, M. V. and Maitra, S. R. (2004). "Mechanical Behavior of Fiber-Reinforced Polymer-Wrapped Concrete Columns—Complicating Effects." *Journal of Composites for Construction*, ASCE, 8(2), 97-103.

Publications in International/ National Conferences

- Das, P. and Maitra, S.R. (2019). "Identifying Priority areas of Intervention for Improving Pedestrian Infrastructure in a Tourist Location based on Tourists' Perception" accepted in *5th International Conference of Transportation Research Group of India, CTRG 2019*
- Maitra, S. R. and Reddy, K. S. (2019). "Material and Size Effect on Fatigue Damage of Concrete for Pavement Application", *15th World Conference on Transport Research (WCTR 2019)*, May 25-31, 2019, IIT Bombay, India
- Basu, D., Roy, S., Maitra, S.R., and Majumdar, B.B. (2019). "An assessment towards identifying improvement needs of urban bus stop infrastructure: Knowledge gained from Bhubaneswar", *Proceedings of the 15th World Conference on Transport Research (WCTR2019)*, May 25-31, 2019, IIT Bombay, India
- Maitra, S. R., Reddy, K. S. and Ramachandra, V. (2019). "Whitetopping: An Environment-Friendly Pavement Rehabilitation Strategy for Urban Roads." *Proceedings of the International Seminar Construction and Maintenance of Rigid Pavement – Current Practice and Way Forward* by Indian Roads Congress, New Delhi, January 18-19, 2019, New Delhi, India
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2017). "Effect of Joint and Pavement Parameters on Load Transfer Characteristics of Granular Interlocked Jointed Concrete Pavement." *Compendium of 4th International Conference of Transport Research Group of India, CTRG 2017*, Dec 17-20, IIT Bombay, India
- Deb, S., Mitra, N., Maitra, S. R. and Basu Majumdar, S. (2016). "Investigation of Mechanical Properties of Engineered Cementitious Composites for the Development of Alternatives to Conventional Concrete for Sustainable Infrastructures", *Proceedings of the International Conference, Structural Engineering Convention, SEC 2016*, Dec 21-23, Chennai, India
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2016). "Fracture and Fatigue Life Estimation of Plain Concrete – an Experimental Investigation." *Proceedings of the International Conference on Experimental Mechanics, ICEM17*, Rhodes, Greece.
- Maitra, S. R., Reddy, K. S., Ramachandra, L. S. and Pandey, B. B. (2015). "Analysis of Short Paneled Concrete Pavement for Urban Roads." *Proceedings of the 3rd International Conference of Transportation Research Group of India (CTRG, 2015)*, Kolkata, India.
- Maitra, S. R. (2015). "Sustainable Concrete Roads - Research Needs in Indian Context." *Proceedings of All India Seminar on Concrete Roads – An Alternative in Indian Milieu*, The Institute of Engineers, Kolkata, India.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2014). "Effect of Pavement Parameters on Fatigue Resistance of Concrete Pavement." *Proceedings of the International Conference on Theoretical, Applied, Computational and Experimental Mechanics, ICTACEM 2014*, IIT Kharagpur, India.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2013). "Estimation of Critical Stress in Jointed Concrete Pavement." *Procedia, Social and Behavioral Sciences*, Vol. 104, 208-217, Agra, India.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2011). "Structural Evaluation of an In-Service Concrete Pavement." *Proceedings of the 1st International Conference of Transportation Research Group of India (CTRG, 2011)*, Bangalore, India.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2007). "Influence of interface condition on concrete pavement response - an experimental evaluation." *Proceedings of the International Conference on Advanced Characterisation of Pavement and Soil Engineering Materials*, Athens, Greece, Vol. 2, 1455-1462.

- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2007). "Load Transfer in Dowel-Jointed Concrete Pavement." *Proceedings of the International Conference on Civil Engineering in New Millennium: Opportunities and Challenges (CENeM-2007)*, Bengal Engineering and Science University, Shibpur, India. Vol. III, 2132-2138.
- Maitra, S. R., Reddy, K. S. and Ramachandra, L. S. (2006). "Interface Behavior in Concrete Pavement." *Proceedings of 2nd International Congress of Computational Mechanics and Simulations (ICCMS 2006)*, Indian Institute of Technology, Guwahati, India.
- Mukherjee, A., Maitra, S. R. and Joshi, M. V. (2002). "FRPC confined concrete columns - Experimental and analytical studies." *Proceedings of the International Conference on Advances in Civil Engineering (ACE-2002)*, Indian Institute of Technology, Kharagpur, India.

Publication in International Newsletter

- Maitra, S. R. (2011). "Numerical and Experimental Investigations of Jointed Concrete Pavement." *Newsletter, International Society for Concrete Pavements*, 8(3).

Awards & Recognition

- DAAD Fellowship of Bilateral Exchange of Academics, for the visit to Technische Universitat, Darmstadt, Germany for research, funded by German Academic Exchange Service, 2019
- Bihar PWD Medal in 77th IRC Annual Session, 2016 for Outstanding paper on 'Road Research' by Indian Roads Congress, Govt. of India, for the paper published in Journal of the Indian Roads Congress, 75-4, 2015
- Best Paper award in the 3rd International Conference of Transportation Research Group of India, Kolkata, 2015
- Recipient of MHRD Scholarship during Doctoral studies, July 2004 - June 2008

Contribution in Developing Guidelines for Indian Roads Congress

- IRC: 117 – 2015. Guidelines for the Structural Evaluation of Rigid Pavement by Falling Weight Deflectometer, Indian Roads Congress
- IRC: SP: 76 – 2015. Guidelines for Conventional & Thin Whitetopping, Indian Roads Congress

Short Term Course / Training Program Organized

- 'Road Safety Audit' Co-Coordinator, Training Program, sponsored by MORTH, Govt. of India and Asian Institute of Transport Development, New Delhi, at IIT Kharagpur, October 21 to 25, 2019
- 'From Infrastructure Creation to Rehabilitation: Redefining the Role of Engineers', Coordinator, GIAN Course, sponsored by MHRD, Govt. of India, at IIT Kharagpur, September 02 to 06, 2019
- 'Sustainable Urban Transport: Design of Road infrastructure and Facilities', Coordinator, TEQIP sponsored 3-day Short Term Course, IIT Kharagpur, February 15 to 17, 2019
- 'Concrete Roads: Analysis, Design and Evaluation', Coordinator, TEQIP sponsored 3-day Short Term Course, IIT Kharagpur, February 27 to March 01, 2017
- 'Learning Safe Drive - Training for Trainers of Motor Training Schools', Joint Coordinator, Transport Department, Govt. of West Bengal sponsored 3-day Training Programme, IIT Kharagpur, August 23 – 25, 2017

Distinguished Guest Lectures in Other Institutes/Organizations

- Institute of Construction and Building Materials, TU Darmstadt, Germany, June, 2019
- School of Design, National Yunlin University of Science & Technology, Douliu, Taiwan, Aug 2018
- Department of Civil Engineering, Tsinghua University, Beijing, China, June 2015
- Department of Civil Engineering, NIT Agartala, May, 2015
- Department of Civil Engineering, NIT Srinagar, October, 2012

- Department of Civil Engineering, NIT Surat, September, 2012
- Institute for Transportation, Technische Universitat Darmstadt, Germany, May, 2010

Invited Lectures in Short-Term Courses / Workshops / Seminars

- “Whitetopping – A Sustainable Option for Pavement Rehabilitation” One-day Workshop, School of Infrastructure, IIT Bhubaneswar, November 08, 2019.
- “New Technology Applications in Road Pavements” AICTE Short Term Course, Civil Engineering Department, NIT Rourkela, January 12-16, 2019.
- “Conventional and Intelligent Measures for Enhancing Road Safety” Short Term Course under GIAN, MHRD, IIT Kharagpur, December 10-14, 2018.
- “Road Safety Engineering Measures” Training Programme, Organized by IIT Kharagpur and Asian Institute of Transport Research, New Delhi, at IIT Kharagpur, July 30-Aug 03, 2018
- “Sustainable Materials for Engineering Applications (SMEA-2018)”, AICTE QIP Short Term Course, Civil Engineering Department, VSSUT, Burla, May 14-19, 2018
- “Maintenance and Preservation Treatment of Highways to Economically Enhance Service Life in Sustainable Manner”, Short Term Course under GIAN, MHRD, National Institute of Technology Rourkela, December 21-30, 2016.
- “Learning Safe Drive - Training for Trainers of Motor Training Schools”, Workshop, Organized by IIT Kharagpur and Transport Department, Govt. of West Bengal, at IIT Kharagpur, October 3-5, 2016
- “Sustainable Urban Transportation for Patna: A Curtain Raiser”, National Workshop, Civil Engineering Department, NIT Patna, September 27-28, 2016
- “Recent Advances and Innovation in Transportation Engineering”, QIP Short Term Course, Civil Engineering Department, VSSUT, Burla, April 25-30, 2016
- “Modern Trends in Design and Maintenance in Rigid Pavements”, National Workshop, Civil Engineering Department, IEST, Shibpur, April 7-9, 2016
- “Concrete Roads – An Alternative in Indian Milieu”, as Key note speaker, All India Seminar, Organized by Civil Engineering Division, The Institute of Engineers (India), Kolkata, August 27-28, 2015
- DePAVE, Short Term Course for Engineers, Department of Civil Engineering, IIT Kharagpur, November, 18-21, 2015
- Short Term Course for the Engineers in Uttar Pradesh, Department of Civil Engineering, IIT Kharagpur, July 2-4, 2013

Reviewer of International Journals & Proceedings

- Composites Part B, Elsevier
- Engineering Structures, Elsevier
- Transport Reviews, Taylor & Francis
- Journal of Transportation Engineering, ASCE
- International Journal of Pavement Engineering, IJPE
- Proc. for World Conference of Transport Research, WCTR
- Proc. for International Conference of Transportation Research Group of India, CTRG
- Proc. for the International Conference of Transportation, TPMDC
- Proc. for the International Conference of Concrete Pavement, ICCP

Membership of Professional Societies

- Life Member, Transport Research Group of India
- Life Member, Indian Roads Congress
- Life Member, Institute of Engineers (India)

- Team Member, Track I, World Conference of Transport Research Scientific Committee

Professional Course

- Participated in Executive Course titled “Traffic Safety Principles for Engineers” in the International Conference for Transportation Research Group of India, Mumbai, 2017
- Participated in Executive Course titled “Improving Road Safety and Accessibility” in the International Conference for Transportation Research Group of India, Kolkata, December, 2015

Departmental Administrative Activities

- Faculty Advisor M. Tech. 1st Year (2017-18, 2018-19, 2019-20)
- Time Table In-Charge M. Tech. (2017-18, 2018-19, 2019-20)
- Exam In-Charge M. Tech. (2017-18, 2018-19, 2019-20)
- Seminar In-Charge (2017-18, 2018-19, 2019-20)
- Admission & Registration In-Charge (2019-20)
- Thesis in-Charge M. Tech. 2nd Year (2016-17)

Research Projects (current and completed)

- Technology Innovations and Pilot Projects for Alternatives to HMA in Road Construction, Principal Investigator, Sponsored by Kolkata Municipal Corporation, Rs. 21 lakhs, 1.5 years (Ongoing)
- Developing A Spatial Data Infrastructure with Application In Urban Transport, Joint Principal Investigator, Sponsored by DST, Govt. of India, Rs. 28.88 Lakhs, 2 years (2019-21)
- Thin Whitetopping: A Pilot Study for Design, Construction and Performance Evaluation, Principal Investigator, Sponsored by PWD, Govt. of West Bengal with Ultratech Cement Ltd. as Industry Partner, Rs. 40 lakhs, 2.5 years (Ongoing)
- Smart and Integrated Pedestrian System Design, Co-Investigator, Sponsored by MHRD/MUD/GMR/Vikram Solar, Rs. 212.7 Lakhs, 3 years (Ongoing)
- Engineered Cement Composites - A Replacement for Conventional Concrete for Sustainable Infrastructure, Sponsored by MHRD/IIT Kharagpur, under Future of Cities, Co-Investigator (May 2014 to Apr 2018) (completed)
- Development of Pervious Concrete Mix Design and Specification for Pavement Applications, Sponsored by MHRD/IIT Kharagpur, under Future of Cities, Co-Investigator (completed)
- Investigation of Crack Propagation and Fatigue Fracture Characteristics of Cement Concrete Pavement, Principal Investigator, Sponsored by DST, Govt. of India, under WOS-A, Rs. 27.0 Lakhs (completed)

Consultancy Projects (current and completed)

- Proof Consultancy of 4-laning of Kutchery Chowk Ranchi-Piska More-Biju Para Section (from km 0.000 to km 34.000) of NH-75 with PQC Pavement in the state of Jharkhand(SRIC Code: PCMS), Consultant-in-Charge, M/S Varaha Infra Ltd- Sunil Hitech Engineering Ltd. Rs. 16 Lakhs (completed)
- Traffic Impact Study for the Proposed Development at KPC Medical College and Hospital, Jadavpur (SRIC Code: TIKM), (Consultant-in-Charge: Prof. B. Maitra, Co-Consultant: Dr. S. Maitra and others), Rs. 9.44 Lakhs (2019) (ongoing)
- Traffic Impact Study of the Proposed Commercial Development at 25, N. S. Road, Kolkata - 700001 (SRIC Code: TICD), (Consultant-in-Charge: Prof. B. Maitra, Co-Consultant: Dr. S. Maitra and others), Rs. 7.08 Lakhs (2019) (ongoing)

- Capacity Building for Enhancing Road Safety Knowledge in the State of West Bengal (CEP Code: CEP/STC/17-18/CIV/45), Co-Consultant, Transport Department, Govt. of West Bengal, Rs. 76.0 Lakhs, 1 year (Ongoing)
- Traffic Study in Kolkata and Preparation of Vision Document to Curb and Control Vehicular Pollution in the Twin Cities of Kolkata and Howrah (SRIC Code: RCAA), Co-Consultant, Transport Department, Govt. of West Bengal, Rs. 15.7 lakhs, 2 years (Ongoing)
- Safety Consultancy Service for the Stretch of Four Lining of Sambalpur-Baragarh-Chattisgarh/Odisha Border Section of NH-6 from Km 0.00 to Km 88.00 in the State of Odisha (SRIC Code: SSKK), Co-Consultant, NHAI, Govt. of India, Rs. 52.8 lakhs, 4 years (Ongoing)
- Research and Analysis of Procedures of Issuing Driving License and Technical Audit of Motor Training Schools in West Bengal Under Overall Perspective of Road Safety Code, Transport Department, Govt. of West Bengal, Co-Consultant (2016)(Ongoing)
- Safety Consultancy for Construction of New Bridge/Structure, Repair of Existing Four Lane Highway from Baleswar to Kharagpur Section of NH-60 (Km 0.00 To Km 119.30) in the State of Orissa and West Bengal, and Its Operation and Maintenance under NHDP Phase-I to be executed at BOT (Toll) on DBFOT Pattern, Co-Consultant (August 2015 to August 2018) (Ongoing)

Jan 1998 to Jun 2001

Research Associate

Department of Civil Engineering, IIT Bombay

Research Project "Role of Fiber Matrix Interface in Fracture Toughness of Brittle Matrix Components"

- Involved in the sensitivity analysis using finite element method of ceramic matrix composites of different combinations in the research project.
- Responsible for analysis and checking of structural engineering design and drawings of several industrial projects of concrete and steel structures

Apr 1991 to Jan 1998

Design Engineer

Apex Techno Consultants Pvt. Ltd., Kolkata

- Responsible for civil and structural engineering design, drawings and detailing works of industrial concrete and steel structures, junction house, pump house, substation buildings, conveyor supporting structures, steel trestles, water tanks, cable trenches, drains & culverts, concrete thickeners and bins etc.
- Involved in several industrial projects like Modernization of Durgapur Steel Plant, Modernization of Rourkela Steel Plant, Bakreshwar Thermal Power Project, TISCO BhelatandWashery, Primary Washing Station, Dudhichua, Hot Strip Mill Project, Dolvi, IPITATA Sponge Iron Plant, Bulk Cement Terminal, Mangalore, Offsites & Utilities Projects for Spic Petrochemicals Ltd., Graphite Beneficiation Plant, Madras etc.

July 1989 to Apr 1991

Assistant Engineer

D. Sinha & Associates, Kolkata

- Responsible for civil and structural engineering design, drawings and detailing works of residential reinforced concrete buildings.

Ph.D. thesis

Numerical and Experimental Investigations of Jointed Plain Concrete Pavement

Development of three-dimensional finite element model for Jointed Plain Concrete Pavement considering slab-foundation interaction, interface behavior between concrete slab and foundation, load transfer at joints by dowel bar and aggregate interlocking mechanisms, effect of temperature variation

Experimental evaluation of different interface characteristics between slab and foundation

Structural evaluation of in-service concrete roads using Falling Weight Deflectometer

Investigation of several design issues, e.g., critical stress due to the combined effect of wheel load & temperature, dowel group action, load transfer efficiency

M. Tech thesis

Fiber Reinforced Polymer Composites in the Rehabilitation and Strengthening of Reinforced Concrete Columns

Experimental investigation of FRP wrapped circular and rectangular concrete columns with varying levels of confinement

Development of analytical model for confined concrete column

Development of design methods for confined concrete column