Smruti Sourava Mohapatra, Ph. D., M. ASCE

Associate Professor, Department of Civil Engineering, Indian Institute of Technology (Indian School of Mines) Dhanbad, Dhanbad, Jharkhand, India. Mobile: +91-9861443377 ; Office: +91-3262235160 Email: <u>smruti@iitism.ac.in</u>



Research Interest:

- Traffic flow modeling
- Statistical analysis
- Utilization of alternate material in pavement
- Freight flow modelling
- Traffic safety
- Haul road design and maintenance

Educational Qualification:

- ▶ Ph.D. (Civil Engineering, 2012-2016)
 - o Indian Institute of Technology Bhubaneswar, Odisha, India
 - o Title of Thesis: Study of U-Turn Movement at Median Openings
 - Area of research: Traffic Flow Modeling
- Master of Technology (Transportation Engineering, 2010-2012)
 - o National Institute of Technology Rourkela, Odisha, India
 - Title of Thesis: Level of Service Criteria of Urban Streets in Indian Context Using Advanced Classification Tools
 - $\circ~$ Area of research: Clustering and Level of service analysis
- Bachelor of Technology (Civil Engineering, 2006-2010)
 KIIT University, Bhubaneswar, Odisha, India

Experience:

- Associate Professor, Department of Civil Engineering, Indian Institute of Technology (ISM) Dhanbad since 9th August, 2023.
- Assistant Professor, Department of Civil Engineering, Indian Institute of Technology (ISM) Dhanbad since 5th August, 2015 to 8th August 2023.
- Assistant Professor, Department of Civil Engineering, VSS University of Technology, Burla from July, 2014 to June 2015.
- Research Scholar, School of Infrastructure, IIT Bhubaneswar from July 2012 to July 2015 .

Publications: Journals (38 Published)

- Vivek, A. K., Mohapatra, S. S. and Padhi, A. (2024). Level of Service Criteria of Rail Road Grade Crossing Based on the Perceptions of Motorist and Non-motorist, Transportation in Developing Economies, 10(2), 1-19. <u>https://doi.org/10.1007/s40890-024-00209-x</u>
- Mishra, N. B., Pani, A., Bansal, P., Mohapatra, S. S., & Sahu, P. K. (2024). Towards sustainable logistics in India: Forecasting freight transport emissions and policy evaluations. Transportation Research Part D: Transport and Environment, 133, 104267. https://doi.org/10.1016/j.trd.2024.104267
- Tudu, C., Mohanty, M., Mohapatra, S. S., & Nayak, S. (2024). A systematic review exploring the feasibility of waste plastic as different constituents towards sustainable concrete. Construction and Building Materials, 428, 136210. <u>https://doi.org/10.1016/j.conbuildmat.2024.136210</u>
- Mohanty, M., & Mohapatra, S. S. (2024). Long-Term Strength and Durability of Cement-Treated Coal Mine Overburden Materials to be Used in Subbase and Base Layers of low-volume Roads. Journal of Materials in Civil Engineering, 36(4), 04024035. <u>https://doi.org/10.1061/JMCEE7.MTENG-16621</u>
- Vivek, A. K., Gupta, S., Khan, T., & Mohapatra, S. S. (2024). Strategies to mitigate safety and associated problems at gated rail road grade crossing: a structural equation modelling approach. Transport Policy, 146, 19-30. DOI: <u>https://doi.org/10.1016/j.tranpol.2023.11.002</u>
- Mohanty, M., Mohapatra, S. S., & Padhi, A. (2023). Exploring mechanical and microstructural properties of cement-stabilized coal mine overburden materials. Road Materials and Pavement Design, 1-33. DOI: <u>https://doi.org/10.1080/14680629.2023.2287219</u>
- Khan, T., Vivek, A. K., Mohapatra, S. S., & Patnaik, A. K. (2023). Realistic Approach for Capacity Estimation of U-Turns Under Heterogeneous Traffic Condition. Transportation Research Record, 03611981231203227.DOI: <u>https://doi.org/10.1177/03611981231203227</u>
- Mishra, N. B., Pani, A., Mohapatra, S. S., & Sahu, P. K. (2023). Decoding Private or Commercial Vehicle Ownership Decisions for Low-Carbon Mobility Transitions: A Systematic Review of the Literature. Transportation Research Record, 03611981231194346. DOI: https://doi.org/10.1177/03611981231194346
- Vivek, A. K., & Mohapatra, S. S. (2023). An observational study on pedestrian and bicyclist violations at railroad grade crossings: exploring the impact of geometrical and operational attributes. Journal of Safety Research, 87, 395-406. DOI: <u>https://doi.org/10.1016/j.jsr.2023.08.011</u>
- Mishra, N. B., Mohapatra, S. S., Pani, A., & Sahu, P. K. (2023). Exploring variation of length of haul and associated freight transport emission of Indian establishments: A survival analysis approach. Transport Policy, 140, 18-29. DOI: <u>https://doi.org/10.1016/j.tranpol.2023.06.010</u>

- Vivek, A. K., Mohanty, M and Mohapatra, S. S. (2023). Evaluation of road users' violation at rail road grade crossings. Journal of Transportation Engineering, Part A: Systems, 149(9), 04023086. DOI: <u>https://doi.org/10.1061/JTEPBS.TEENG-7853</u>
- Vivek, A. K. and Mohapatra, S. S. (2023). Level of service analysis of rail road grade crossing from the perspective of walking and bicycling: A perception based study. Transportation Planning and Technology, 46(4), 499-524. DOI: https://doi.org/10.1080/03081060.2023.2201595
- Mohanty, M., Biswal, D., and Mohapatra, S. S. (2023). A systematic review exploring the utilization of coal mining and processing wastes as secondary aggregate in sub-base and base layers of pavement.
 Construction and Building Materials, 130408, DOI: https://doi.org/10.1016/j.conbuildmat.2023.130408
- Khan, T., & Mohapatra, S. S. (2022). Identification of spatial and temporal dilemma zone at midblock median openings: a gap acceptance based approach. Transportation Research Record, 2677 (3), 160-175. DOI: https://doi.org/10.1177/03611981221114118
- Khan, T., Dutta, P., & Mohapatra, S. S. (2022). Categorization of gaps at mid-block median openings in heterogeneous traffic: adjudging the applicability of support vector machine and occupancy time methods. Transportation Letters, 1-14. DOI: <u>https://doi.org/10.1080/19427867.2022.2133375</u>
- Vivek, A. K., Mohapatra, S. S., and Jena, S. (2022). Evaluation of user perception to define level of service criteria of rail road grade crossing: an exploratory statistical approach. Transport policy, 122, 64-76. DOI: https://doi.org/10.1016/j.tranpol.2022.04.013
- Mohanty, M., Mohapatra, S. S., and Nayak, S. (2022). Efficacy of C&D waste in base/subbase layers of pavement–current trends and future prospectives: A systematic review. Construction and Building Materials, 340, 127726. DOI: <u>https://doi.org/10.1016/j.conbuildmat.2022.127726</u>
- Khan, T., Mohapatra, S. S. and Dey, P. P. (2022). Estimation of conflicting traffic volume using spatiotemporal factor, *Institution of Civil Engineers-Transport*, 1-13. DOI: https://doi.org/10.1680/jtran.21.00074
- Khan, T., and Mohapatra, S. S. (2022). Influence of driver and vehicle attributes on operational characteristics of U-turning vehicles, *Current Science*, 122 (6), 705-716. DOI: 10.18520/cs/v122/i6/705-716
- Khan, T., Vivek, A. K. and Mohapatra, S. S. (2021). Comparative appraisal of critical gap estimation techniques in the context of u-turning vehicles, *Transportation Research Record*, 2675(12), 1408-1421. DOI: <u>https://doi.org/10.1177/03611981211035761</u>
- Vivek, A. K., Khan, T. and Mohapatra, S. S. (2021). Safety and associated parameters influencing performance of rail road grade crossings: a critical review of state of the art, *Journal of Safety Research*, 79, 257-272. DOI: <u>https://doi.org/10.1016/j.jsr.2021.09.007</u>

- Mohapatra, S. S., Pani, A., and Sahu, P.K. (2021). Examining the impacts of logistics sprawl on freight transportation in Indian cities: implications for planning and sustainable development, *Journal of Urban Planning and Development*, 147(4), 04021050. DOI: <u>10.1061/(ASCE)UP.1943-</u> 5444.0000745.
- 23. Khan, T. and **Mohapatra, S.S.** (2021) Modelling lateral merging position of vehicles in divided urban roads, *Current Science*, 120(11), 1768-1777.
- 24. **Mohapatra, S.S.** and Dey, P.P. (2021). Application of cluster analysis to define level of service criteria of U-turns at median openings, *European Transport*, 81(3), 1-17.
- Yadav, S., Hachem-Vermette, C., Panda, S. K., Tiwari, G. N., and Mohapatra, S. S. (2021). Determination of optimum tilt and azimuth angle of BiSPVT system along with its performance due to shadow of adjacent buildings, *Solar Energy*, 215, 206-219.
- Khan, T. and Mohapatra, S.S. (2020). Effect of operational attributes on lateral merging position characteristics at mid-block median opening, *Transportation Letters: The International Journal of Transportation Research*, 13(2), 83-96. DOI: <u>https://10.1080/19427867.2019.1710037</u> (Published online)
- Khan, T. and Mohapatra, S.S. (2020). Lateral placement characteristics of u-turning vehicles: a statistical investigation, *Transportation in Developing Economies*, Vol. 6, No. 3. DOI: https://doi.org/10.1007/s40890-019-0091-7
- Dash, S., Mohapatra, S. S., & Dey, P. P. (2019). Estimation of critical gap of U-turns at uncontrolled median openings, *Transportation Letters: The International Journal of Transportation Research*, Vol. 11, No. 5, 229-240.
- 29. Sil, G., Mohapatra, S. S., Dey, P.P., and Chandra, S. (2019). Service delay and merging time evaluation at median openings, *European Transport*, Issue 71, Paper no. 3.
- 30. Mohapatra, S.S., and Dey, P.P. (2018). Estimation of U-turn capacity at median openings, *Journal* of *Transportation Engineering, Part A: Systems*, Vol. 144, No.9, 04018049 (Published online)
- 31. Sil, G., **Mohapatra, S. S.**, Dey, P.P., and Chandra, S. (2018). Merging process of U-turns at uncontrolled median openings under mixed traffic conditions, *Transport*, Vol. 33, No.2, 370-379.
- 32. Mohapatra, S.S., Dey, P.P., and Chandra, S. (2016). Conflicting volume of U-turns at uncontrolled median openings, *Institution of Civil Engineers-Transport*, Vol. 169, No. 4, pp. 195-204.
- 33. **Mohapatra, S. S.**, Dey, P. P., and Chandra, S. (2016). Modeling the critical position of U-turning vehicles at uncontrolled median openings, **KSCE Journal of Civil Engineering**, Vol. 20, No. 1, pp. 411-420.

- Mohapatra, S. S., and Dey, P. P. (2015). Lateral placement of U-turns at median openings on six-lane divided urban roads, *Transportation Letters: The International Journal of Transportation Research*, Vol. 7, No. 5, pp. 252-263.
- 35. **Mohapatra, S. S.**, Sil, G., and Dey, P. P. (2015). Quantification of LOS at median openings through cluster analysis, *Indian Highways*, New Delhi, Vol. 43, No.3, pp. 25-31.
- 36. Bhuyan, P. K., and **Mohapatra, S. S.** (2014) Affinity propagation clustering in defining level of service criteria of urban streets, *Transport*, Vol. 29, No. 4, pp. 401-411.
- Mohapatra, S. S., Bhuyan, P. K., and Rao, K. V. (2012). Genetic algorithm fuzzy clustering using GPS data for defining level of service criteria of urban streets, *European Transport*, Issue 52, Paper no. 7.
- Mohapatra, S. S., and Bhuyan, P. K. (2012). Self Organizing Map of Artificial Neural Network for Defining Level of Service Criteria of Urban Streets, International Journal for Traffic and Transport Engineering, Vol. 2, Issue 3, pp. 236-252.

Conferences

- Khan, T. and Mohapatra, S.S. "Comparative Appraisal of Critical Gap Estimation techniques in the Context of U-turning Vehicles", *Proceedings of the 100th Annual Meeting of Transportation Research Board, Washington, DC*, January 9-13, 2021. (*Accepted for presentation*)
- Khan, T. and Mohapatra, S.S. "Practical Approach for Estimation of Conflicting Traffic Volume at Mid-Block Median Opening", *Proceedings of the 99th Annual Meeting of Transportation Research Board, Washington, DC, January 12-16, 2020. (Accepted for presentation)*
- Khan, T. and Mohapatra, S.S. "Effect of driver and vehicle characteristics on service delay of Uturning vehicles: A case study in six-lane divided urban roads of India", *The Sixteenth International Conference on Civil, Structural & Environmental Engineering*, Riva del Garda, September 16-19, 2019. (Paper presented. Travel grant received from ITS Scheme of SERB, DST)
- Khan, T. and Mohapatra, S.S. "Placement Characteristics of Major Stream Vehicular Traffic at Median Openings", *International Conference on Advanced Traffic Engineering and Transportation Planning*, Sydney, Australia, February 27-28, 2019. (Oral Paper Presented)
- Khan, T. and Mohapatra, S.S. "Lateral Placement Characteristics of U-turning Vehicles: A Statistical Investigation", 3rd National Conference on Recent Advances on Traffic Engineering, SVNIT, Surat, India, August 11-12, 2018. (Oral Paper Presented)
- Sil, G., Mohapatra, S.S., and Dey, P.P., Chandra, S. "Assessment of service delay and merging time at uncontrolled median openings", *Proceedings of the 96th Annual Meeting of Transportation Research Board, Washington, DC, January 8-12, 2017 (CD-ROM).*

- Mohapatra, S.S. and Dey, P.P. "Capacity of U-turn movement at median openings", In Proceedings of the 95th Annual Meeting of Transportation Research Board, Washington, DC, January 10-14, 2016. (CD-ROM).
- Mohapatra, S.S., and Dey, P.P. "Modeling the placement of conflicting traffic at uncontrolled median openings", 3rd Conference of Transport Research Group, 17th -20th December, 2015, Kolkata, India. (Paper presented)
- Mohapatra, S.S., Sil, G., and Dey, P.P. "Affinity propagation clustering for quantification of level of service at uncontrolled median opening", *The 19th International Conference of Hong Kong Society for Transportation Studies*, 13th-15th December, 2014, The Hong Kong Polytechnic University, Hong Kong, Paper id- HKSTS19-308. (Paper presented. Travel grant received from ITS Scheme of SERB, DST)
- 10. Mohapatra, S.S., Dey, P.P. "Modeling the critical position of U-turning vehicles at uncontrolled median openings on 6-lane divided urban roads", *TPMDC*, IIT Bombay. (Paper presented)
- 11. Mohapatra, S.S., Sil, G., and Dey, P.P. "Defining level of service at uncontrolled median openings through *K*-medoid clustering", *International Conference on Industrial Engineering Science and Applications (IESA 2014)*, April 2-4, 2014, NIT Durgapur, Durgapur, India. (Paper presented)
- Sil, G., Mohapatra, S.S., and Dey, P.P. "Effect of conflicting vehicles on service delay under mixed traffic conditions", *International Conference on Industrial Engineering Science and Applications* (*IESA 2014*), April 2-4, 2014 NIT Durgapur, Durgapur, India. (Paper presented)
- Sil, G., Mohapatra, S.S., and Dey, P.P. "Service delay at uncontrolled median openings", *International Conference on Advances in Civil Engineering and Chemistry of Innovative Materials* (ACECIM'14), 13th – 14th March, 2014, SRM University, Chennai, India.
- Mohapatra, S.S., Dey, P.P. "Lateral placement of U-turns at uncontrolled median openings on fourlane divided roads", *International Conference on Advances in Civil Engineering and Chemistry of Innovative Materials* (ACECIM'14), 13th – 14th March, 2014, SRM University, Chennai, India.
- Mohapatra, S.S., Sil, G., and Dey, P.P. "Defining level of service at uncontrolled median openings: a clustering approach", *Transportation Young Researchers Symposium (TYRES 2014)*, 27th – 29th March, 2014, NIT Warangal, Warangal, India. (Paper Presented)

Details of Major R&D Projects:

 Title of Project: Development of Suitable Methodology for Utilization of Coal Mine Overburden in Road Construction Amount: Rs. 14,96,000 Funding Agency: DST, NM-ICPS on Technology Innovation inExploration & Mining (TexMin) Role: PI Status: Ongoing

- 2. Title of Project: Critical Assessment of Road Network, Pavement and its' Elements as per Codal Provisions.
 Amount: Rs. 15,03,000
 Funding Agency: L&T, EDRC Role: PI
 Status: Completed
- Title of Project: Effect of Geometrical Attributes of Median Opening on Capacity Of U-Turn Amount: 2,00,000 Funding Agency: MRP, TEQIP-III Role: PI Status: Completed
- 4. Title of Project: Driver and Traffic Characteristics at Uncontrolled Junctions Amount: Rs. 10,20,000
 Funding Agency: FRS, ISM Role: PI Status: Completed
- Title of Project: Benefits of Composite Cement over OPC and PSC in Terms of Strength and Durability. Amount: Rs. 6,00,000/-Funding Agency: OCL India Limited Role: Co-PI Status: Completed

Research guidance:

<u>Ph. D.</u>

- Name of Candidate: Mr. Tathagatha Khan Year of Joining: August, 2017 Topic of research: Operational Assessment of U-Turns at Mid-Block Median Openings Status: Awarded in August, 2022
- Name of Candidate: Mr. Adheesh Kumar Vivek Year of Joining: August, 2018 Topic of research: Safety Evaluation and Performance Analysis of Rail Road Grade Crossing Status: Awarded in May, 2023
- Name of Candidate: Mrs. Monika Mohanty Year of Joining: August, 2020 Topic of research: Sustainable utilization of mine waste in road construction Status: Awarded in January, 2025
- Name of Candidate: Mr. Nirmalendu Mishra
 Year of Joining: August, 2020
 Topic of research: Commercial vehicle ownership modeling

Status: Ongoing

- Name of Candidate: Mr. Faijan Ali Ansari Year of Joining: August, 2021 Topic of research: Work Zone Safety Status: Ongoing
- 6. Name of Candidate: Mr. Koorma Rajendra Babu Year of Joining: August, 2021 Topic of research: Haul Road Design Status: Ongoing
- Name of Candidate: Mr. Soumen Kundu Year of Joining: August, 2021 Topic of research: Traffic Assessment at median openings Status: Ongoing
- Name of Candidate: Mr. Sonu Kumar Year of Joining: August, 2023 Topic of research: Suistnabale pavement construction Status: Ongoing

Details of Major Consultancy Assignments:

- Name of the Work: Vetting of Structural Drawings based on Design Work of Major Upgradation and Redevelopment of Ranchi Railway Station of South Eastern Railway Client: Ram Kripal Singh Construction Pvt. Ltd. Role: Co-CI Status: Ongoing
- Name of the Work: Design Rationalization of Elephants Underpass in Concurrence with National Standards
 Client: M/s Rotrans Infra Projects Pvt. Ltd., Bhubaneswar Role: Co-CI Status: Completed
- 3. Name of the Work: Characterization and Performance Evaluation of Bituminous Materials for Rationalization of its Usage in Pavement Construction Client: M/s PRA Daamar Private Limited, Raipur Role: CI Status: Completed
- 4. Name of the Work: Vetting of Design Drawing for Rectification of Identified Black Spots and Construction of Service Road to Existing VUP in Udhampur (J&K) Client: M/s Bandh & Co., Sri Nagar. Role: CI

Status: Completed

- 5. Name of the Work: Pavement Evaluation of Kharatunda-Barwa Addd (Nh-2) Road Project, Dhanbad Constructed with Zydex Technology Client: Zydex Industries, Gujrat. Role: CI Status: Completed
- Name of the Work: Vetting of Concrete Mix Design & Bituminous Mix Design of Ranchi Smart City Project.
 Client: L&T Construction.
 Role: CI
 Status: Completed
- Name of the Work: Evaluation of tensile strength of steel rebars. Client: Saluja Steel & Power Pvt. Ltd. Role: CI Status: Completed
- Name of the Work: Vetting of structural design & drawing of minor bridges, culverts & VUPs. Client: NHAI Role: Co-CI Status: Completed
- Name of the Work: Checking of structural design & drawing of three Railway over bridges. Client: Ram Kripal Singh Construction Pvt. Ltd. Role: Co-CI Status: Completed
- 10. Name of the Work: Quality assurance of bituminous roads at CCWP colony Saraidhela, Dhanbad.
 Client: BCCL, Dhanbad
 Role: CI
 Status: Completed

Course Taught:

UG Course

- 1. Engineering Graphics
- 2. Transportation Engineering-I
- 3. Transportation Engineering-II
- 4. Transportation Engineering Lab
- 5. Building Material Construction and Estimation
- 6. Engineering Drawing
- 7. Material Testing Lab

PG Course

- 1. Pavement Materials
- 2. Transportation System Design and Management

- 8. Estimation and Costing
- 9. Traffic Engineering Sessional
- 10. Geotechnical Engineering
- 11. Basic Transportation Engineering
- 12. Highway Material Testing Lab
- 3. Analysis Design of Pavement

Administrative Experience:

- 1. PIC, Transportation Engineering Laboratory
- 2. Member, Dean's Advisory Council (INFRASTRUCTURE)
- 3. Member, Departmental Postgraduate Committee
- 4. Member, Departmental Undergraduate Committee
- 5. Member, Department Review Committee
- 6. Mentor, Undergraduate students of 2019-20 batch

Professional Activities:

- 1. **Reviewer** of the journal *Transportation Letters: The International Journal of Transportation Research, Journal of Transportation Engineering, Part A: Systems, ASCE, Transportation in Developing Economies, Current Science, Journal of Hazardous, Toxic & Radioactive Waste.*
- 2. **Member** of Technical Committee of 7th International Conference on Intelligent Traffic and Transportation (ICITT 2023) will be held in Madrid, Spain during September 18-20, 2023.
- 3. **Member** of Technical Program Committee of 'The United Conference on Architecture, Design, Earth Sciences and Geography (ADESG-2017).
- Member of the Technical committee of The World Symposium on Civil Engineering (WSCE-2017).
- Co-coordinator of short-term Course on Development of Cement Technology for Sustainable Infrastructure, 22nd -24th February, 2019 at IIT(ISM) Dhanbad.
- Co-coordinator of National Workshop on Road Safety Audit (RSA-2015), 6th 7th February 2015 held at VSSUT, Burla.
- Organizing committee member of short-term course on Sustainable Infrastructure, on 8th to 10th of January, 2016 organized by Department of Civil Engineering of Indian School of Mines Dhanbad.
- Organizing committee member of National workshop on Recent Advances in Civil Engineering (RACE-2014), on 25th and 26th of October 2014 organized by Department of Civil Engineering of VSSUT, Burla.

Professional Membership

- Member of American Society of Civil Engineers (ASCE)
- Life Member of Transportation Research Group (TRG)
- Life Member of Institution of Engineers (India)
- Life member of Indian Concrete Institute
- Life member of Indian Road Congress (IRC)

- Life member of Institute of Urban Transport India
- Life member of International Association of Engineers (IAENG)

Accomplishments:

- Got **appreciation** from Director, IIT(ISM) Dhanbad for securing Excellent Teaching Feedback (9.25 out of 10) in the course Transportation System Planning and Management during Monsoon Semester, 2022-23.
- ITS grant of SERB, DST to attend *The Sixteenth International Conference on Civil, Structural & Environmental Engineering*, Riva del Garda, Italy, September 16-19, 2019.
- Development of Transportation Engineering Laboratory at Department of Civil Engineering, IIT(ISM) Dhanbad.
- **ITS grant** of SERB, DST to attend the 19th International Conference of Hong Kong Society for Transportation Studies, 13th-15th December, 2014, held at Hong Kong.
- Two years research experience as research scholar at IIT Bhubaneswar.
- Got silver medal from NIT Rourkela for securing highest CGPA in Transportation Engineering Specialization.
- Scored **highest** GPA in all the 4 semesters during Master of Technology study.
- Qualified National Level test GATE (General Aptitude Test for Engineers) required for doing higher studies after Bachelor Degree

Skills:

- Expertise in application of various clustering algorithms
- **Operating System:** Windows, MS-DOS
- Software: MATLAB, MS-Office, Stastistica, R-Package, N-Logit
- Strong communication skills- oral, written and presentation
- Excellent team skills