

Dr. Rakesh Kumar

Ph.D., Indian Institute of Technology, Delhi, 2004.

Professor

Transportation Engineering and Planning Section

Civil Engineering Department

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Areas of interest

- ✦ Pavement Engineering (Design, Construction, Evaluation, Maintenance, and Rehabilitation)
- ✦ Utilization of Slags, Geosynthetic, Chemical Stabilizers, and Others Non-Conventional Materials for Subgrade, Subbase, and Base Engineering
- ✦ Bituminous layer design, Evaluation, Maintenance, and Rehabilitation
- ✦ Use of Drone Survey and Laser operated instruments for functional and LWD, FWD, for structural evaluation of pavement for QA & QC
- ✦ Planning, design, and implementation of Public Bus Transit (BRTS)

Dr. Rakesh Kumar, a graduate in Civil Engineering, post-graduate & Doctorate, has around 20 years of professional experience in the field of Pavement Engineering. He is interested in factors that lead to a more efficient, equitable and sustainable Urban and Regional Pavement System, with a focus on optimal use of Natural resources in Pavement construction and rehabilitation. He also works related to the spatial allocation of public resources in the Public Bus Transit system in Urban Cities.

Have worked on various projects encompassing Highway Planning, Design and Construction, Highway Investigation and Evaluation and Rehabilitation, Accident study and Analysis, Road Safety Audit and Review, Passenger and Freight Traffic Forecast, Toll Rate Analysis, Toll Plaza design, Sustainable Intersection/ Roundabout / Signal Design, Assisting in Financial / BOT analysis, Industrial Flexible and Rigid Pavement Design, Preparation of Detailed Project Report (DPR), Interaction with clients, Engineers, Professionals, Presentation at various Stages of Highway development Projects.

He works on different goal-oriented research projects funded by Department of Science of Technology (DST), Ministry of Science and Technology, Govt. of India and has published research papers more than 30 in reputed International Journals like ASCE, Science Direct, Springer, Taylor and Francis, TRB, Inderscience, etc.

Current Research Projects

- “Environmental and Socioeconomic assessment of Bio-monitoring of Water filter in mitigating water-borne diseases” Duration: 2007-2010. Funding agency: SSD, DST, GOI. Status: **Completed.**
- “Mapping and Monitoring of Water Resource Data and Modeling Water System in Selected Watershed,” Duration: 2010-2013. Funding agency: NRDMS, DST, GOI. Co-PI, Status: **Completed**
- “Design and Development of Dynamically Controlled Walker System” Duration: 2012-2016. Funding Agency: SEED, DST, GOI. Co-PI, Status: **Completed.**
- “Utilization of Copper slag and Flyash for Road Construction and Building Materials” Duration: 2012-2016. Funding agency: FAU, DST, GOI. Status: **Ongoing.**
- “Development of Guideline for Preventing Elderly Users Injuries at Intersection” Duration: 2012-2016. Funding agency: SEED, DST, GOI. Status: **Ongoing.**

Research Students Doctoral Degree Awarded

- Ms. Trivedi Jyoti Snehal (D11CE001) Theme: Prediction of Rutting Model for NH and SH.
- Alok Kumar (DS12MG001) Theme: PPP Model in Highway Infrastructure
- Mr. Sunny Deol (D12CE007) Theme: Evaluation of Pavement using FWD.
- Mr. Balya Manjurali Imadadali (D12CE005) Theme: Integrated Feeder mode with BRTS
- Tushar R. Bagul (D12CE006) Theme: Real World Driving Cycle for Three- wheelers.
- Mr. Vinod Kumar Adigopula (D14CE006) Theme: Evaluation of LVR using LWD

Pursuing Doctoral Research Students

- Ms. Deepti Patel (D13CE005) Theme: Evaluation of Cooper slag and Flyash, in flexible pavement
- Ms. Radha J. Gonawala (D14CE004) Theme: Use of COREX in unbound layers in Flexible Pavement
- Ms. Apeksha Mendhe (DS14CE011) Theme: Pedestrian Accessibility Through Roundabout
- Mr. Vishal Shinde, (DS15CE006) Theme: Rigid Pavement Joints delay construction
- Mr. Praful Shinkar (D18CE023), Theme: Geometry Intervention in Roundabout

Selected Publications (International Journals/National)

- Commuters' Attitude Analysis of Feeder Public Transit Service: A Case Study, (2018) Iranian Journal of Science and Technology, Transactions of Civil Engineering, Manjurali I. Balya & Rakesh Kumar
- Stiffness-based quality control Evaluation of modified Subgrade soil using lightweight deflectometer, ASCE, Journal of Materials in Civil Engineering, 29(9): page no.1 to 9, 2017. Rakesh Kumar, Vinod Kumar, and Sunny Deol
- Structural Evaluation of Flexible Pavement Using Nondestructive Techniques in Low Volume Road, Advancement in the Design and Performance of Sustainable Asphalt Pavements, Sustainable Civil Infrastructures, Springer, (DOI 10.1007/978-3-319-61908-8_13) Pages: 168-184, 2017. Rakesh Kumar, Vinod Kumar, and Sunny Deol
- A Correlation Between Lightweight Deflectometer Backcalculation and Dynamic Cone Penetrometer Values of Modified Subgrade Soil, Paper No: 17-04169, Transportation Research Board 96th Annual Meeting (TRB), 2017-1-8 to 2017-1-12, Washington DC, United States, 2017. Rakesh Kumar, Vinod Kumar, and Sunny Deol
- Laboratory study on the effects of GBFS and Lime stabilizers in subgrade layers for expansive soil, International Journal of Earth Sciences and Engineering, Vol 10. No.06 pp 1201-1205. Rakesh Kumar and Radha Gonawala
- Proposed Integrated Bicycle Feeder Mode Service Analysis for Bus Rapid Transit System- A Multinomial Logit Model Approach, International Journal for Traffic and Transport Engineering, DOI: 10.7708/ijtte.2017.7(1).08, 7 (1) 108-116, 2017. Manjurali I. Balya, Rakesh Kumar
- Feeder Mode Choice Modeling for Proposed Integrated Public Transit Service of Ahmedabad City: A Case Study, World Review of Intermodal Transportation Research (WRITR), Inderscience, (SCOPUS-Elsevier), Vol. 6, No. 3, 177-192, 2017, Manjurali I. Balya, Rakesh Kumar
- Impact of para-transit travel time reliability on urban mobility: a case study, World Review of Intermodal Transportation Research (WRITR), Inderscience, (SCOPUS-Elsevier), DOI: 10.1504/WRITR.2017.10003648, 6(2) 93-109, 2017 Rakesh Kumar and Fatima Electricwala
- Comparative studies of lightweight deflectometer and Benkelman beam deflectometer in low volume roads, Journal of Traffic and Transportation Engineering, Science Direct, 3 (5): 438-447, 2016. Rakesh Kumar, Vinod Kumar, and Sunny Deol.
- Impact of Green Shading on Urban Bus Stop Structure, IEEE *Xplore*, IEEE, DOI 10.1109/CICT.2016.128, page no 616-623, 2016. Rakesh Kumar and Fatima Electricwala
- Decision Model of performance evaluation of flexible pavement, Inderscience; International Journal of Engineering Management and Economics *Vol-5 No.3/4 pp-290-307, 2015*. Jyoti Trivedi, Rakesh Kumar
- Analysis of Elderly Road User's Characteristics at Roundabout: A Case Study, Journal of Traffic and Logistics Engineering Vol. 3, No. 1, page no. 57-61, 2015. Rakesh Kumar, Radha J. Gonawala, and Fatima S. Electricwala
- Experience of public-private partnership in Highway Infrastructure development: an exploratory study of PPP developed countries and scenario in India. Int. Journal Procurement Management, Vol.8 no.5, page no 608-626, 2015. Hemantkumar P. Bulsara, Alok Kumar, Rakesh Kumar
- Optimization of Construction Resource Using Lean construction technique, Inderscience; International Journal of Engineering Management and Economics-*Vol-4 No.3/4 pp-213-228, 2014*. Jyoti Trivedi, Rakesh Kumar
- Introduction of Public Bus Transit in Indian Cities", International Journal of Sustainable Built Environment, Science Direct, 1(3), 27-34, 2014. Rakesh Kumar and Fatima Electricwala
- Impacts of Bus Rapid Transit Lanes on Traffic and Commuter Mobility, ASCE Urban Transportation Planning, Volume 133, Number 2, 2007. Vaishali M. Patankar, Rakesh Kumar, and Geetam Tiwari
- Assessment of Drinking Water Supply in Hilly Rural Habitations of Northeastern Region", International Journal of Earth Sciences and Engineering, Vol 6. No.2 pp 338-346, 2013. Rakesh Kumar and Mayuri Chabukdhara
- Identification of Black Zones on National Highways: A Case Study of an Indian City", International Journal of Traffic and Transportation Engineering 2013, 2(6): 135-141. Rakesh Kumar and Fatima Electricwala
- Optimization of Construction equipment utility using Neural Network", NICMAR, Vol 28 No.3, 2013 Rakesh Kumar and Jyoti Trivedi

Selected Publications (International /National Conferences)

- ✓ "Impact of Model shift from private users to proposed BRTS on Surat ecological footprint," Rakesh Kumar 10-12, October 2010, CISTUP, **IISc, Bangalore**
- ✓ "Ridership Impact on Proposed Jaipur Metro Route of Intra-aligned urban Network modes" Rakesh Kumar and Mansa Swami, 21st January 2011, Road infrastructure and Traffic condition in Jaipur City National Conference, **KITE, Jaipur**.

- ✓ “Ridership Impact on BRT using feeder Services” Rakesh Kumar and Mansa Swami. 3rd December 2011, UMI-IUT Research Symposium, **Ministry of Urban Development, New Delhi**.
- ✓ Impact of Elderly Road Users Characteristics at Intersection” 2nd Conference of Transportation Research Group of India (2nd CTRG), Science Direct Procedia - Social and Behavioral Sciences 104 (2013) 1088 – 1094., 2013., **Agra, India**.
- ✓ Overlay Design of Low Volume Road Using Light Weight Deflectometer: A Case Study of Surat, India,” Sunny Deol. Rakesh Kumar, "Recent Trends in Highway Development" October 10-12, **Indian Road Congress, New Delhi**. 2013.
- ✓ Impact of Proposed Modal Shift from Private Users to Bus Rapid Transit System: An Indian City Case Study, International Journal of Civil, Environmental, Structural, Construction and Architectural Engineering Vol:8, No:6, 2014 page no 663-667, International Conference on Civil, Structural and Earthquake Engineering, **Toronto, Canada** , June 16-17, 2014.
- ✓ Effects of Material Characteristics on Flexible Pavement Rutting Phenomena in Gujarat, **3rd Conference of Transportation Research Group (CTRG)** Paper no 727, 17-20 December 2015 – **Kolkata (India)**. Jyoti Trivedi, Rakesh Kumar
- ✓ Rutting Prediction of Flexible Pavement Using Genetic Algorithm, **3rd Conference of Transportation Research Group (CTRG) Paper no 726**, 17-20 December 2015 – **Kolkata (India)**. Jyoti Trivedi, Rakesh Kumar
- ✓ Geometry-induced on the performance of Roundabouts in an Indian city, Radha Jagdish Gonawala & Rakesh Kumar, Paper ID 636, **3rd Conference of Transportation Research Group (CTRG) Paper no 726**, 17-20 December 2015 – **Kolkata (India)**
- ✓ Analysis of elderly road user’s characteristics at roundabout: A case study, Radha J. Gonawala, Fatima Electricwala, and Dr. Rakesh Kumar, Journal of Traffic and Logistics Engineering, ICCUE, March 19-20, 2015, **Florence, Italy**
- ✓ Development of a real-world driving cycle of motorized three-wheelers: A Case Study of Indian City. International Conference on Sustainable Civil Engineering, Rakesh Kumar and Tushar Bagul June 20-21, 2016 **Cape Town, South Africa**,
- ✓ A Correlation Between Lightweight Deflectometer Backcalculation and Dynamic Cone Penetrometer Values of Modified Subgrade Soil, Paper No: 17-04169, Transportation Research Board 96th Annual Meeting (TRB), 2017-1-8 to 2017-1-12, **Washington DC, United States**, 2017. Rakesh Kumar, Vinod Kumar, and Sunny Deol
- ✓ Structural Evaluation of Flexible Pavement Using Nondestructive Techniques in Low Volume Road, Advancement in the Design and Performance of Sustainable Asphalt Pavements, Sustainable Civil Infrastructures, GEOMEAST, 2017, Pages: 168-184, 2017 **Sharm El Sheikh, EGYPT**. Rakesh Kumar, Vinod Kumar, and Sunny Deol
- ✓ Technical tour to WIRTGEN GROUP facilities and Road Technology Days 2018 in **Germany**, March 2018.

Books published

1. Overlay Design of low volume road using LWD” Lap Lambert Academic publishing, 2014.
2. Study of Nuclear Density Gauge for compaction measure, Lap Lambert Academic Publishing, 2015

National and International Expert Lectures

- “A methodology to evaluate renewable energy projects,” National Seminar on Renewable Energy Technology: Issues and Prospects (RETIP-2010), September 24-25, 2010, **NERIST, Itanagar, India**
- “Urban Storm Drainage Design: Highway Perspective,” National Seminar on Urban Storm Drainage Design Analysis and Management, 9th January 2011, **SVNIT, Surat, India**
- “Use of Polymer and Rubber Modified Bitumen in a flexible pavement,” Gujarat Engineering Research Institute (**GERI**), **Vadodara**, 5 March 2011, Gujarat, India
- “BRT System for Indian Conditions,” **NIT Raipur**, 24th March 2011, Chhattisgarh, India
- “Highway Infrastructures: Concepts to Implementation,” **IPS Academy**, 2011, 14-15 October 2011 Indore, M. P, India
- “Some Issues in Intercity Traffic Forecasting,” 16-24 March 2012, College of Engineering and Technology, **University of Saskatchewan, Canada**.
- Expert Talk in two-day “TRANSYT and ARCADY software training program,” **MANIT, Bhopal** 12-14 October 2015
- “Freight transport and its perspective in India.” 18th June 2014, Civil and Environmental Engineering Department, **York University, Toronto, Canada**
- Some Issues in freight intercity Road Design” 22-24 March 2014, College of Engineering and Technology, **University of Saskatchewan, University of Alberta, Canada**
- “Expert talk at One Day Workshop entitles “Instrumentation development for elderly along with R&D Infrastructure” on 25th November. 2016, **AIIMS, Raipur**
- “As an Expert to attend Workshop on” Establishing a research network on vehicular emission reduction (EARNOVER)” organized by **CSIR-CRRI, New Delhi** with support from Shakti Sustainable Energy Foundation on 30th November 2016 **CRRI, New Delhi**
- Expert Talk in one day workshop “Transportation and Development.” 24th Nov 2016, **NIT, Raipur**
- Two-day “software training program,” **NIT Srinagar**, 8-10 April 2017
- Expert Talk in NIT, Raipur, Civil Engineering Department, October 2018

Patent: Two Patents filed (Application No: 201621040423 & Application No: 201621007078)