Design of Ballasted Railway Track: Current Practices and New Developments

Overview

Rail transport forms a significant part of the transportation infrastructure in a country and plays a major role in economic progress. Recent traffic congestion of roadways in many countries around the globe has driven railways to grow into the most popular means of public transportation, which has increased the demand for heavier and faster trains. Indian Railways is geared up to improve its infrastructure to fulfill the future need of growing traffic.

This course brings together fundamental concepts, current practices, recent developments, and some of the Australian experience in the design of ballasted railway tracks. This course discusses various parameters required for the ballasted railway track design and details the procedures for calculating the bearing capacity of ballast. The impact of ballast breakage and ballast fouling will also be discussed in the course using realistic examples. Further, the role of geosynthetics on track settlement and load-deformation characteristics of geogrid-reinforced ballast will be discussed. Further lectures identify the design procedures for the sub-ballast and filtration layer. A lecture on railway track infrastructure in India highlights the current trends and possible solutions to ballasted railway track problems of India. This course intends to equip and enhance the capabilities of engineers, researchers, and students to design the ballasted railway track efficiently. The primary objectives of the course are as follows:

i) Introducing participants to the fundamentals and parameters of ballasted railway track design
ii) Exposing participants to the procedures of determining the bearing capacity of ballasted railway track, and the thickness of the granular layer
iii) Exposing participants to the application of geosynthetics in railway tracks
iv) Providing exposure to problems such as ballast breakage, and ballast fouling, and their solutions, through case studies
v) Enhancing the capability of the participants to design ballasted railway tracks efficiently through worked-out examples

Modules	Lectures: 12 hours, Tutorials: 04 hours Duration: 05 days (06-10 February 2023)
You Should Attend If…	▪ You are a post-graduate student in any specialization of Civil Engineering (Geotechnical Engg., Transportation Engg., Structural Engg.) ▪ You are working as a Research Scholar / Engineer / Research Scientist from government organizations including R&D laboratories and private firms ▪ You are a faculty from an academic institution/Researcher working in any sector and interested in railway track design
Fee Schedule	Fees for the course: • **Participants From Outside India: US $300** • **Industry/ Research Organizations: Rs. 5,000** • **Academic Institutions (Faculty): Rs. 2,500** • **Academic Institutions (Students & Ph.D. Scholars): Rs. 1,000** The course will be conducted in **offline mode** at IIT Dharwad, Dharwad, Karnataka, and the number of participants for the course will be limited to fifty
How to register?	Step 1: Visit https://gian.iitkgp.ac.in/GREGN/index and create a login User ID and Password. Fill up the blank registration form and do web registration by paying Rs. 500/- online through Net Banking/Debit/Credit card. This gives the user lifetime registration to enroll in any GIAN courses offered Step 2: Log in to the GIAN portal with the user ID and Password already created in Step 1. Click on the Course Registration option at the top of the Registration form. **Select the Course** titled" Design of Ballasted Railway Track: Current Practices and New Developments" from the list and **click on the 'Save' option and "Confirm Course"** Step 3: **Confirmation from the Course Coordinator** Step 4: **After confirmation, the course registration fee can be made through NEFT Transfer** to the following account details: Beneficiary Name: **IIT DHARWAD R AND D ACCOUNT**; Bank: **Canara Bank**; Branch: **Belur Indl Area SME**, Dharwad; Beneficiary Account No.: **4070101001880**; IFS Code: **CNR80004070**.

Design of Ballasted Railway Track: Current Practices and New Developments

About the Speakers

Dr. Sanjay Nimbalkar is a Senior Lecturer in the School of Civil and Environmental Engineering at the University of Technology Sydney (UTS) in Australia. His research interests include railway embankment stability analyses, earth retaining structures, ground improvement approaches, circular economy, tailing dams, and constitutive and numerical modelling. He is a Chartered Professional Engineer: CPEng (Engineers Australia). He is the recipient of the "Thomas Telford Premium award" from the Institution of Civil Engineer (ICE), UK (2014) and the "Professor Joseph M. Sussman Best Paper Prize" from Frontiers in Built Environment, Switzerland (2020). He is a EMCR fellow of the Australian Academy of Science, which is funded by the Australia-India Strategic Research Fund (AISRF) (2020-2022). He is a lead Chief Investigator of recently concluded joint research project on "Heavy-haul Indian Railway: Towards Safe, Efficient and Sustainable Design" funded by Australia-India Council. He is a strong advocate of Australia and India working together to share high-quality technical knowledge for designing, building, and maintaining sustainable railway tracks, having successfully led a number of collaborative initiatives involving Australian and Indian scholars. In addition, he is an adjunct faculty member at the Indian Institute of Technology Madras and an adjunct Associate Professor at the Indian Institute of Technology Bombay.

Prof. Deepankar Choudhury is Prof. T. Kant Chair Professor (HAG) & Head of the Civil Engineering Department at the Indian Institute of Technology (IIT) Bombay, Mumbai, India. His major research interests include Soil Dynamics, Geotechnical Earthquake Engineering, and Computational Geomechanics. Prof. Choudhury also worked as a Visiting Fellow/Faculty at NUS Singapore, UoW Australia, UC Berkeley USA, Kagoshima Univ. Japan, TU Darmstadt Germany and Incheon National Univ. South Korea. Prof. Choudhury is the only Geotechnical Engineer in India who is an elected Fellow (FNASc) of the oldest Science Academy of India, viz. The National Academy of Sciences, India. Internationally he is an Alexander von Humboldt Fellow of Germany, JSPS Fellow of Japan, and TWAS-VS Fellow of The World Academy of Sciences, Italy, in addition to National Fellow of the Institution of Engineers India (FIE), Indian Geotechnical Society (FIGS), Indian Society of Earthquake Technology (FISET).

Dr. B. Giridhar Rajesh is an Assistant Professor at the Indian Institute of Technology Dharwad, India. His research experience lies in the areas of Soil Dynamics, Geotechnical Earthquake Engineering, Ground Improvement techniques, and Industrial By-Products for Sustainable Development. He completed his Ph.D. in Civil Engineering from IIT Bombay, India. He is a recipient of the IGS-FERROCO YGE Best paper award for 2016. He also received Best Ph.D. Thesis Award for the period 2017-2019 for outstanding research contributions from the Indian Institute of Technology Bombay, Mumbai, India. He is a recipient of the IACMAG Excellent Paper Award-2022 from the International Association for Computer Methods and Advances in Geomechanics (IACMAG), USA.

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