



### **3-Day Workshop**

**on**

### **Geotechnical and Environmental Aspects of Urban Infrastructure Development (GEUID-2017), organized during December 20 – 22, 2017 at IITRAM**

A 3-day workshop on “Geotechnical and Environmental Aspects of Urban Infrastructure Development” was organized during December 20 – 22, 2017 by Civil Engineering Department of IITRAM. The event was focused on Geotechnical and Environmental aspects of Infrastructure development in urban areas and included various themes such as Geotechnical Investigations, Foundations, Slope stabilization, Roads / Pavement design as well as Waste Management and Waste Water Treatment. The workshop had technical discussions on the practical aspects of Geotechnical and Environmental problems and solutions related to Urban Infrastructure development including case studies. The workshop aimed at dissemination of latest knowledge and technical know-how in above areas by various experts from government bodies / Industry as well as IITRAM faculty.

Practicing engineers from various Government bodies, Industry as well as Faculty from reputed colleges participated in the workshop. Participants included delegates from Municipal corporations of Ahmedabad as well as Vapi and Navsari Nagarpalika, Gujarat Urban Development Mission (GUDM), Gujarat Water Supply and Sewerage Board (G.W.S.S.B), Engineers from Dal Al-Handasah Pvt. Ltd., Pune; Faculty from CEPT University, Nirma University, DDU Nadiad, Ganpat University, Indus University and SRICT Bharuch.

The workshop was inaugurated by Mr. Vivek Kapadia, Chief Engineer, Water Resources Department, Govt. of Gujarat by lighting the lamp followed with prayer by Mr. Archan Bhangaonkar (M. Tech 1<sup>st</sup> year Civil Engineering Student). Dr. A. U. Digraskar, Director, IITRAM gave the inaugural speech and briefed the participants about IITRAM and objective behind organising such interactive workshops at IITRAM. Dr. Yogesh Shah, Coordinator, Civil Engineering Department shared with the delegates the details and achievements of Civil Engineering Department, IITRAM and also presented the objectives of the workshop. Dr. Shanti Prassana, Dean IITRAM wished the organisers and participants a successful workshop.

Expert lectures were delivered by various experts from Government of Gujarat, Industry and Academia such as Mr. Vivek Kapadia, Chief Engineer, Government of Gujarat; Dr. Anurag Kandya, Faculty, PDPU; Mr. Bhausahab Sasawade, Metrochm India Pvt Ltd and Mr. Tejas Belani, Geotechnical Specialist, Howe Engineering Projects India Pvt. Ltd. Dr. Trudeep Dave, Dr. Vikas P Singh, Dr. Jai Devi Jeyaraman and Dr. Kannan Iyer (Faculty, Civil Engineering Department, IITRAM) also delivered lectures on various aspects related to the theme of the workshop. The technical sessions included interactive deliberations on geotechnical aspects of foundation design, foundation isolation, pavement/road design, dealing with challenging soils and soil stabilization including case studies. The Environmental aspects of the workshop included sessions on Solid Waste Management and Waste Water Treatment which gave insight on the concepts and recent developments in the areas of Waste and Waste Water Treatment. A lab session was also conducted to provide exposure to the participants on the application of advanced techniques such as Voltammetry and Ion Chromatography for Waste Water Analysis.



Overall, the sessions were very interactive. The practicing engineers shared various problems faced by them at site and various possible solutions were discussed. All participants shared their experiences and learning's from the workshop. Dr. N. N. Bhuptani, Registrar, IITRAM, also interacted with the participants. The participants shared their suggestions and feedback regarding the workshop.

### **Acknowledgement:**

Department of Civil Engineering, IITRAM expresses sincere gratitude to Dr. A. U. Digraskar, Director, IITRAM and Dr. N. N. Bhuptani, Registrar, IITRAM for their motivation, guidance and continuous support at various stages of organising the workshop. We also thank Dr. Shanti Prassana, Dean, IITRAM and Dr. Yogesh Shah, Coordinator, Department of Civil Engineering, IITRAM for their guidance and support during organising of the workshop. We also thank the faculty and non-teaching staff of Civil Engineering Department for their continuous support for the workshop. We express thanks to M. Tech 1<sup>st</sup> year Civil Engineering students Mr. Amit Tripathi, Mr. Utkarsh Patel, Mr. Pritam Singh, Mr. Archan Bhangaonkar and Mr. Karan Solanki for their dedicated support and help for successfully organising the workshop. We express our gratitude to Prof. Manisha Mehta, Mr. Vijay Parmar, Mrs. B. N. Patel and other administration staff of IITRAM for their support at various stages of organising the workshop. We also thank various government bodies such as Gujarat Urban Development Mission (GUDM), Gujarat Water Supply and Sewerage Board (G.W.S.S.B), Ahmedabad Municipal Corporation, Vapi and Navsari Nagarpalika as well as Dar Al-Handasah, Pune and various universities/colleges in Gujarat for sending their delegates for the workshop. We thank all the participants for their active participation during the workshop.



Inauguration of the workshop with  
Lamp Lighting



Dignitaries at Inauguration Function  
of Workshop

### [Photographs of Inauguration Function of the Workshop](#)



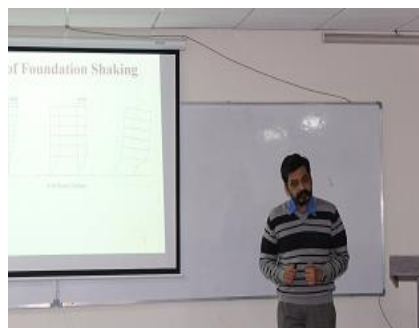
## **Technical Details of the Workshop**

### **Technical Sessions on Day - 01:**

The inaugural expert lecture was delivered by Mr. Kapadia on ‘Foundation Safety from Vibrations’. Various concepts and issues such as effects of foundation shaking, liquefaction, landslides and methods of protecting foundation from these effects were discussed in detail. The concepts and issues related to machine foundation and foundation isolation were also shared with the participants. The insights provided by Mr. Kapadia on various practical issues and solutions were highly appreciated by all.

Dr. Kannan Iyer (Faculty, IITRAM) delivered lecture on ‘In-situ Geotechnical Investigations for Urban Infrastructure’. The need, stages, extent of geotechnical investigations and expected outcome from the investigations was discussed during the session. Geophysical methods as well as intrusive in-situ methods such as Standard Penetration Test (SPT), Cone Penetration Test (CPT), Vane Shear Test, Pressuremeter Test and Dilatometer tests were discussed. The advantages of CPT test with respect to other tests such as SPT tests were shared and its importance for urban areas was also highlighted. The recent advancements in Cone penetration testing and its application for predicting engineering behaviour of different soils were also discussed.

Dr. Vikas Pratap Singh (Faculty, IITRAM) delivered lecture on “Soil Nailing: Introduction, Design Concept and Learning from Case Studies”. The first part of the session was focused on various aspects such as load transfer mechanism of Soil Nailing, general guidelines, design requirements, testing and sequence of construction. During the second part of the session, case studies on performance of Soil Nailing under seismic conditions and failure of Soil Nail wall were discussed to provide the participants with insight on practical issues related to application of Soil Nailing technique. The advantages of Soil Nailing as a more feasible, efficient and economical solution as compared to conventional retaining wall for supporting vertical or near vertical cuts in urban areas was highlighted. The deliberations of the session were appreciated by the participants.



Mr. Vivek Kapadia delivering expert lecture on Foundation Safety from Vibrations



Dr. Vikas Pratap Singh delivering expert lecture on Soil Nailing and its Applications



Dr. Kannan Iyer delivering lecture on In-situ Geotechnical Investigations for Urban Infrastructure



Delegates attending the Workshop



Delegates attending the Workshop



Felicitations of Mr. Vivek Kapadia  
by Dr. A. U. Digraskar



3 Days Workshop on “Geotechnical and Environmental Aspects of  
Urban Infrastructure Development”, IITRAM, Ahmedabad  
(20<sup>th</sup> – 22<sup>nd</sup> December 2017)

Group Photograph of participants with  
Chief Guest, Mr. Vivek Kapadia and  
Dr. A. U. Digraskar, Director, IITRAM

### Photographs of Day-1 of the Workshop

#### **Technical Sessions on Day - 02:**

The second day of the workshop focused on Environmental aspects in Urban areas. The concepts and recent developments related to Solid Waste Management and Waste Water Treatment were discussed by experts during the day. The day was concluded with a Lab session demonstrating latest techniques for Environmental analysis.

The first technical session of second day of the workshop was delivered by Dr. Jay Devi Jeyaraman (Faculty, IITRAM) on ‘Solid Waste Management: Concepts and Recent Developments’. Various issues and concerns related to Solid Waste Management such as segregation, collection and disposal of waste was discussed. Various aspects of waste management such as size reduction of waste; composting, incineration, landfilling, and refuse derived fuel were shared during the session. Advanced techniques of waste segregation including Screw Press, Magnetic Separator, Eddy Separator, Optical Sorting, Laser Induced Breakdown Spectroscopy (LIBS), Spectral Imaging Sorting Technique, etc. were discussed





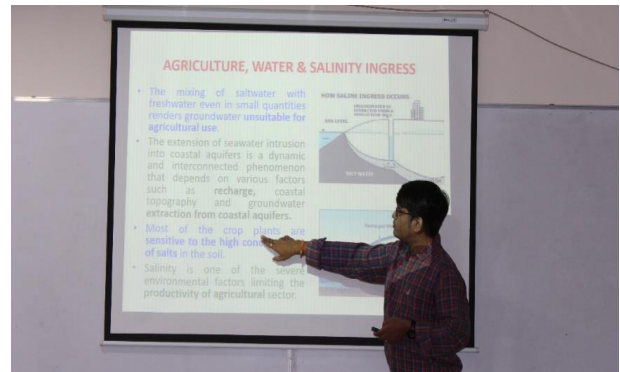
during the session. The importance of proper scientific segregation and treatment of waste was appreciated by all participants.

Dr. Anurag Kandya (Faculty, PDPU, Gandhinagar) shared his expertise on ‘Water and Waste Water Treatment: Technology, Management, Perspectives & Challenges’. Various aspects such as Water Sustainability, Water Sensitive Urban Design, Conservation of Lakes and Ground Water Recharge for effective Water Management were discussed. Dr. Kandya also discussed the concepts and issues related to Sewage Farming and shared details of a case study depicting the effect of salinity ingress on agricultural production. Overall, the session was liked by the participants and all accepted the collective responsibility of the current generation to have more sensitivity towards conservation of water resources for future generations.

Mr. Bhausaheb Sasawade (Metrochm India Pvt. Ltd) shared insights about working principle and application of advanced techniques such as Voltammetry and Ion Chromatography for Waste Water Analysis. A lab session was also conducted for the participants to provide them practical exposure and hands-on-experience to these techniques. The participants appreciated the experience gained during the session coordinated by Mr. Bhausaheb Sasawade with help of Dr. Jai Devi Jeyaraman and Mr. Harish V (B. Tech Student, Civil Engineering Department, IITRAM).



Dr. Jai Devi Jeyaraman delivering lecture on Solid Waste Management: Concepts and Recent Developments



Dr. Anurag Kandya delivering expert lecture on Water and Waste Water Treatment



Demonstration of Environmental Analysis during Lab session



Delegates attending the lab session

### [Photographs of Day-2 of the Workshop](#)



### **Technical Sessions on Day-03:**

The third day of the workshop focused on Geotechnical aspects of Urban Infrastructure for foundations, road / pavement and other facilities such as industrial infrastructure. Case studies were also discussed to provide practical insights on various issues and solutions to the participants.

Dr. Kannan Iyer delivered the first session on third day of the workshop on 'Geotechnical Aspects of Foundation Design in Urban Areas'. Various factors affecting foundation selection and design such as type of infrastructure facility developed, ground water table location, soil conditions and its variation, adjacent buildings and utilities, prevailing construction practices and future hazards were discussed. The challenges and solutions for foundation design and construction in difficult soils such as expansive soil, collapsible soil, corrosive soil, and dispersive soil were also shared during the session. The importance of soil-structure interaction, construction method and influence of adjacent structures on foundations in Urban areas were also discussed during the session.

Dr. Trudeep Dave (Faculty, IITRAM) delivered his lecture on 'Pavement Geotechnical Engineering: Problems and Solutions'. The session focused on design requirements of flexible pavement, issues related to problematic subgrade soil and stabilization methods for pavement applications. The significance of using Geosynthetic materials (geotextile, geogrid, geomembrane, etc.) for improving performance related to drainage, filtration, separation and reinforcement for solving various geotechnical problems such as potholes, settlement, rutting, reflective cracking, liquefaction, etc. were also discussed. The application of Geofoam as light weight fill and at Bridge approaches in place of borrowing soil from far located borrow pits, mainly in soft soil conditions to reduce settlement and economize and expedite the project, was also shared during the session. The session was very interactive with active participation by the participants.

Mr. Tejas Belani (Howe Engineering Projects India Pvt. Ltd.) presented his lecture on 'Geotechnical Challenges, Assessment and Mitigation for Infrastructure Development'. A case study on fertilizer plant expansion in Northern India was discussed. The major challenges related to weak subsoil conditions at site and space restrictions due to existing railway track at the site were overcome with detailed geotechnical investigations, liquefaction analysis and ground improvement at the site. Another case study of Port expansion on eastern coast of India was also discussed. The challenge of soft to very soft soil for more than 15m depth at the site was overcome by detailed geotechnical investigations, assessment of alternative solutions and 3-dimensional finite element analysis of selected solution. The case studies provided insight to the participants on geotechnical decisions at various stages of the project including problem identification, assessment of alternative solutions, implementation of selected solution and post-construction monitoring. The practical geotechnical issues and solutions shared during the session were really valuable for enriching the knowledge of the participants and were appreciated by all the participants.



Dr. Trudeep Dave delivering his lecture on Pavement Geotechnical Engineering: Problems and Solutions



Mr. Tejas Belani sharing Geotechnical issues and solutions through case studies



Dr. N. N. Bhuptani, Registrar, IITRAM interacting with the participants of the workshop



Discussion session on final day of the workshop



Certificate and Group Photo distribution to participants during Valedictory function

### [Photographs of concluding day \(Day-3\) of the Workshop](#)

From Organizing Team, GEUID-2017 (Civil Engineering Department, IITRAM)

(Dr. .Trudeep N. Dave, Dr. Vikas Pratap Singh, Dr. Veerbhadra M. Rotte, Dr. Kannan Iyer, Dr. Jai Devi Jeyaraman)

All photographs courtesy: (M. Tech 1<sup>st</sup> year Civil Engineering Students, IITRAM)

Newsletter Edited by: Dr. Kannan Iyer