CURRICULUM VITAE

Umesh Hule

Doctoral research scholar

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EDUCATION

Ph.D. (Civil Engineering) Indian Institute of Technology Madras, Chennai, India, 600036 Research topic: Carbonation and Carbonation-Induced Corrosion in Steel-Cementitious Systems with Supplementary Cementitious Materials **CGPA: 9**	*Aug 2021-present*
M.TECH. (Construction Management) College of Engineering Pune (COEP), Pune, India, 411005 Project report: Development of Project Definition Rating Index (PDRI) for Tunnels **CGPA: 8.54**	*Aug 2021*
B. E. (Civil Engineering) Maharashtra Institute of Technology (MIT), Pune, India, 411038. Project: Feasibility analysis of sewage sludge digestion using anaerobic reaction **Percentage: 73.4 %** (First Class with Distinction)	*Jul 2018*

RESEARCH EXPERIENCE

▪ As a post-graduate student at the College of Engineering Pune (COEP) Project title: Development of Project Definition Rating Index (PDRI) for Tunnels *M.Tech. Project work under the guidance of Dr. M.S. Ranadive, Professor and Head, Civil Department, College of Engineering, Pune, India*	*Aug 2020 – Jun 2021*

Tunnel constructions are usually high-risk and complex projects. Often these projects lead to overrun in completion time and cost. Hence, thorough planning using an integrated tool is necessary to complete the project successfully. This study aimed to develop an effective risk management tool and help the project team understand issues in tunnel projects. The study conducted a questionnaire survey among contractors, consultants, and researchers to obtain qualitative inputs to develop a Project Definition Rating Index (PDRI) for tunnel projects. For this, the concept of Front-end planning (FEP) is used. The success rate of two case studies on tunnel projects was calculated using the developed PDRI tool. The data showed the tool's benefits in identifying high-risk factors and mitigating potential clashes in land appraisal requirements, permitting requirements, coordination of work, and scheduling.

▪ As an undergraduate student at Maharashtra Institute of Technology (MIT-Pune) Project title: Feasibility analysis of sewage sludge digestion using anaerobic reaction *Umesh Hule, Akshay Deshmukh, Rohan Dhatbale, Pranav Gawade, under the guidance of Prof. Nivedita Gogate*	*Jan - Jun 2018*

The world is running behind renewable sources of energy. The reuse and recovery of energy from the sludge can be a sustainable solution for the future. This project attempted to evaluate the feasibility of treating the sludge of wastewater treatment plants (WWTPs) anaerobically to generate methane. The post-treatment process, like Anaerobic digestion, is the most widely used process for sludge stabilization because it can reduce organic matter by up to 50%. As a result, waste generation is reduced, and the post-treatment process is optimized. The study estimated the potential of methane as a fuel to produce electricity. A cost-benefit analysis revealed that treating sludge anaerobically to generate electricity is not a self-sufficient treatment requiring public investment.

PROJECTS

▪ The project on "High-performance concretes for nuclear power plants in coastal regions – corrosion & service life assessments," where the corrosion inhibitors and nano-particles were used to enhance the corrosion resistance of steel to increase the service life of the structure exposed to the marine environment.	*Apr 2021 – July 2024*
▪ A joint research project of IIT Madras, India, and Holcim Innovation Center, France, on the "carbonation and carbonation-induced corrosion in concretes with various supplementary cementitious materials (SCMs)". I am working on assessing the corrosion resistance of steel in concrete with SCMs, predicting the structure's corrosion-free service life, and finding ways to extend its durability.	*May 2022 – Mar 2025*

TEACHING EXPERIENCE

• NPTEL TA for the Advanced Topics in Science and Technology of Concrete	*Feb 2025*
• NPTEL (PMRF TA) for the Modern Construction Materials	*Jan 2025*
• NPTEL (PMRF TA) for the Basic Construction Materials	*Apr 2024*
• NPTEL (PMRF TA) for the Design of Reinforced Concrete Structures	*Jul 2023*
• NPTEL (PMRF TA) for the Maintenance and Repair of Concrete Structures	*Apr 2023*

JOURNAL PUBLICATION

- U. Hule, R.G. Pillai, "Corrosion characteristics in carbonating systems with various supplementary cementitious materials" Cement Concrete Research, 2025 (Under Review)
- U. Hule, S. Rathnarajan, R. G. Pillai, R. Gettu, and M. Santhanam, "10-year natural carbonation of concretes with limestone, flyash, volcanic ash, and slag and exposed to tropical climate in India," Data in Brief, 2024. https://data.mendeley.com/datasets/gkcf2z4ts5/1

CONFERENCE PUBLICATION

- U. Hule, C. Pichaimuthu, and R.G. Pillai, "Effect of corrosion inhibiting admixtures on corrosion characteristics of steel in carbonating nanoparticles-based fly ash concrete" for the 10th international conference on concrete under severe conditions- Environment and loading (CONSEC24), Chennai, India
- U. Hule, R.G. Pillai, "Assessing steel corrosion resistance in limestone calcined clay cement (LC3) with corrosion inhibitor exposed to carbonation" for the 78th RILEM Annual Week & RILEM Conference on Sustainable Materials & Structures: SMS 2024, Toulouse France
- U. Hule, R.G. Pillai, "Characterizing pHthreshold and estimating service life of various steel cementitious systems" for the 77th RILEM Annual Week and the 1st Interdisciplinary Symposium on Smart & Sustainable Infrastructures (ISSSI 2023), Vancouver Canada.
- U. Hule, S. Rathnarajan, S. Jain, R. G. Pillai, and M. Santhanam, "Carbonation and carbonation-induced corrosion in limestone calcined clay (LC3) concrete systems" International Conference on

Condition Assessment, Rehabilitation & Retrofitting of Structures (CARRS 2023), Hyderabad, India

- S. Rathnarajan, U. Hule, R. G. Pillai, and R. Gettu, "Long-Term Natural Carbonation in Concretes with Fly Ash and Limestone Calcined Clay Systems," in International RILEM Conference on Synergising Expertise towards Sustainability and Robustness of Cement-based Materials and Concrete Structures, Cham: Springer Nature Switzerland, 2023, pp. 1133–1140.

CONFERENCE AND WORKSHOP ATTENDED

• The special research internship (PG) program at NUT Japan (JASSO)	*Jan-Feb 2025*
• 7th One-day workshop on Corrosion and its Control in Concrete Structures (C3S), IIT Madras Research Park, Chennai, India	*Sept 2024*
• The 10th international conference on concrete under severe conditions-Environment and loading (CONSEC24), Chennai, India	*Sept 2024*
• The 78th RILEM Annual Week & RILEM Conference on Sustainable Materials & Structures: SMS 2024, Toulouse France	*Aug 2024*
• Two days Training program on Science and Application of LC3, IIT Delhi, India	*May 2024*
• The 77th RILEM Annual Week and the 1st Interdisciplinary Symposium on Smart & Sustainable Infrastructures (ISSSI 2023), Vancouver Canada.	*Sept 2023*
• GIAN course on Corrosion prevention and control: Importance in the era of sustainable development	*Apr 2023*
• A week on building industry-academia collaboration on Technologies for Low Carbon & Lean Construction, Chennai, India	*Feb 2023*
• Calcined Clays for Sustainable Concrete (CCSC 2022), Lausanne, Switzerland	*Jul 2022*
• Seminar on Corrosion Control in Concrete Structures (C3S), Chennai, India	*Dec 2021*
• 2-Day International Workshop on Advances in Technologies for Low Carbon & Lean Construction	*Dec 2021*
• International Virtual Workshop on Advances in Tunneling and Underground Construction, Organized by: Faculty of Tunnel Engineering at MIT-WPU	*Mar 2021*
• International conference on Advances in Construction Technology and Management (ACTM-2021), Organized by: COEP	*Jan 2021*

COURSES UNDERTAKEN at IITM

Modern Construction Materials	*Jul – Nov 2021*
Characterization of Construction Materials	
Maintenance and Rehabilitation of Constructed Facilities	
Corrosion Engineering	*Jan – May 2022*
Bridge Engineering	
Advance Concrete Technology	

CERTIFIED COURSES COMPLITED

NPTEL course on Maintenance and Repair of Concrete Structures	*Jan – May 2021*
NPTEL course on Advance Concrete Technology	*Jul – Nov 2020*
NPTEL course on Introduction to Accounting and Finance for Civil Engineers	

PREVIOUS WORK EXPERENCE

Junior Engineer at Tirupati Construction Pvt. Ltd.	*Jan - Jul 2019*

I worked as an assistant surveyor, where I was assigned to monitor and report the progress of the work on a daily basis. I had the responsibilities to manage labors, construction equipments, and on-site materials.

Also, I have gained experience in estimating earthwork quantities to prepare the subgrade as per the drawing profile.	
REFERENCES	
Dr. Radhakrishna G Pillai Associate Professor at Dept. of Civil Eng., Indian Institute of Technology Madras Chennai, India- 600 036 **E-mail ID:** pillai@civil.iitm.ac.in	**Dr. M. S. Ranadive** Professor and Head, Civil Department, College of Engineering, Pune, India, E-mail ID: hod.civil@coep.ac.in