CURRICULUM VITAE

Dr. Umesh Hule

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EDUCATION

Ph.D. (Civil Engineering) — *Aug 2021-2026*
Indian Institute of Technology Madras, Chennai, India, 600036
Research topic: Carbonation-Induced Corrosion in Steel in Low-Clinker Concretes and Service life design
CGPA: 9

M.TECH. (Construction Management) — *Aug 2021*
College of Engineering Pune (COEP), Pune, India, 411005
Project report: Development of Project Definition Rating Index (PDRI) for Tunnels
CGPA: 8.54

B. E. (Civil Engineering) — *Dec 2018*
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)

RESEARCH EXPERIENCE

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

Tunnel construction is usually a high-risk, complex project. Often, these projects result in overruns in completion time and cost. Hence, thorough planning with an integrated tool is necessary to successfully complete the project. 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 rates of two tunnel project case studies were 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, permitting, and work coordination and scheduling.

- As an undergraduate student at Maharashtra Institute of Technology (MIT-Pune) — *Jan - Jun 2018*
  Project title: Feasibility analysis of sewage sludge digestion using anaerobic reaction, *under the guidance of Prof. Nivedita Gogate*

The world is moving toward renewable energy sources. The reuse and recovery of energy from the sludge can be a sustainable solution for the future. This project evaluated the feasibility of treating

wastewater treatment plant (WWTP) sludge 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 for electricity generation. A cost-benefit analysis revealed that treating sludge anaerobically to generate electricity is not a self-sufficient treatment requiring public investment.

RESEARCH PROJECTS

▪ The project on "High-performance concretes for nuclear power plants in coastal regions – corrosion & service life assessments," where the corrosion inhibitors and nanoparticles 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 Centre, 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 Advance Concrete Technology	*Jul 2025*
• NPTEL TA for the Admixture and Special Concrete	*Jun 2025*
• 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 of steel in concretes with fly ash and limestone calcined clay exposed to carbon dioxide, Constr. Build. Mater. 515 (2026) 145620. https://doi.org/10.1016/j.conbuildmat.2026.145620.
- **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
- Hule, U., & Pillai, R. G. Corrosion initiation characteristics of steel in limestone calcined clay concrete (LC3) and exposed to carbon dioxide (**Under review**)
- Hule, U., & Pillai, R. G. Corrosion propagation and durability design of reinforced concrete with limestone calcined clay (LC3) exposed to carbon dioxide (Under consideration)
- Hule, U., Pillai, R. G., Gettu, R., & Santhanam, M. Long-term durability of reinforced concrete structure with LC3 under coastal environmental conditions - a case study of demonstration structure
- Hule, U., Sivakumar, A., & Pillai, R. G. Durable embedded sensors for long-term monitoring of microclimate at/near the surface of steel in concrete (**Patent Filed**)

CONFERENCE PUBLICATION

- U. Hule, C. Pichaimuthu, R.G. Pillai, "Corrosion resistance of steel in limestone calcined clay cement (LC3) with corrosion inhibitor subjected to carbonation, International Conference on

Condition Assessment, Rehabilitation & Retrofitting of Structures (CARRS 2025), IIT Roorkee, India, **Best Paper award**

- U. Hule, R.G. Pillai, "Carbonation-induced corrosion characteristics of steel-cementitious systems with fly ash and limestone calcined clay-based binders" for the 79th RILEM Annual Week & ICONS 2025 International Conference on Advances in Engineering and Technology for sustainable development, Hanoi, Vietnam
- 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

• 5th International Conference on Calcined Clay for Sustainable Concrete (ICCCSC 2026), Cape Town, South Africa	*Feb 2026*
• International Conference on Condition Assessment, Rehabilitation & Retrofitting of Structures (CARRS 2025), IIT Roorkee, India	*Dec 2025*
• Innovations in Concrete" in 6th Asian Conference on Ecstasy in Concrete (ACECON 2025), Hyderabad, India	*Dec 2025*
• Third Edition of Research Scholars Meeting on Electrochemistry, Corrosion and Coatings (RSM-ECC 3.0)	*Nov 2025*
• The 79th RILEM Annual Week & ICONS 2025 International Conference on Advances in Engineering and Technology for sustainable development, Hanoi, Vietnam	*Aug 2025*
• The GIAN Course on Design and Construction of Precast Concrete Buildings	*Jul 2025*
• 2nd CORTEM 2025 - CII International Summit on Corrosion Technology & Management, Chennai	*Jul 2025*
• Third International Conference on Construction Materials and Structures "Synergy of Materials and Structures (ICCMS-2025), IIT Tirupati, India	*Jul 2025*
• 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. • GIAN course on Corrosion prevention and control: Importance in the era of sustainable development • A week on building industry-academia collaboration on Technologies for Low Carbon & Lean Construction, Chennai, India • Calcined Clays for Sustainable Concrete (CCSC 2022), Lausanne, Switzerland • Seminar on Corrosion Control in Concrete Structures (C3S), Chennai, India • 2-Day International Workshop on Advances in Technologies for Low Carbon & Lean Construction • International Virtual Workshop on Advances in Tunneling and Underground Construction, Organized by: Faculty of Tunnel Engineering at MIT-WPU • International conference on Advances in Construction Technology and Management (ACTM-2021), Organized by: COEP	*Sept 2023* *Apr 2023* *Feb 2023* *Jul 2022* *Dec 2021* *Dec 2021* *Mar 2021* *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 COMPLETED	
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 EXPERIENCE	
Junior Engineer at Tirupati Construction Pvt. Ltd.	*Jan - Jul 2019*
I worked as an assistant surveyor on a national highway project, where I monitored and reported site progress while coordinating labour, construction equipment, and on-site materials. This role gave me hands-on experience in estimating earthwork quantities and preparing the subgrade in accordance with design profiles, and it exposed me to real site conditions. During this short tenure as a site engineer, I was able to apply my undergraduate knowledge to optimize costs by scheduling construction equipment to maximize output while maintaining high safety standards.	

REFERENCES	
Dr. Radhakrishna G Pillai Professor at Dept. of Civil Eng., Indian Institute of Technology Madras Chennai, India- 600 036 **E-mail ID:** pillai@civil.iitm.ac.in	**Dr. Manu Santhanam** Dean ICSR, Professor at Dept. of Civil Eng., Indian Institute of Technology Madras Chennai, India- 600 036 **E-mail ID:** manus@civil.iitm.ac.in

CV updated on 10/07/2026