Pavan Vaddey, Ph.D., P.E.

Associate

Dr. Vaddey is an Associate in the Concrete & Cement-Based Materials Group at CTLGroup. As an associate at CTLGroup, Dr. Vaddey has provided technical consulting services related to the on-site concrete troubleshooting and durability issues, development and qualification of high performance and conventional concrete mixtures for construction, reinforcement corrosion and concrete degradation mechanisms. His other areas of expertise include characterization and qualification of construction materials (cementitious materials, natural and light weight aggregates etc.), assessment of in-service concrete structures for repair and rehabilitation, experimental data visualization and interpretation, statistical analyses, and modelling.

Prior to joining CTLGroup, Dr. Vaddey worked as a research assistant at Oregon State University (OSU) on a wide range of research projects funded by Oregon Department of Transportation, American Concrete Institute, and industry clients. His work mainly involved performing cementitious material characterization, chloride analyses of concrete systems, corrosion monitoring using electrochemical techniques, evaluating concrete resistance towards various degradation mechanisms, and evaluating the service life of concrete for new and existing structures.

Representative Project Experience

Marine Concrete and Service life Modelling

- Assisted several clients with the development, qualification, and quality control of marine concrete mixtures in compliance with requirements set by Unified Facilities Guide Specifications (UFGS) for projects located in Naval and/or Airforce bases in Guam, Hawaii, San Diego, and Yokosuka, Japan.
- Qualification procedure typically involved evaluating the mixture for mechanical and durability performance, and service life estimation through fib-bulletin 34 model code.

High-Performance Concrete and Constituent Material Qualification

- Assisted several clients with the qualification and quality control of Illinois Tollway Class AX and HPC concrete mixtures, development and qualification of concrete mixtures for precast applications, and qualifications of mixtures for 3D-printing applications. The scope of work involved managing fabrication and testing of concrete specimens for various properties including but not limited to drying and restrained shrinkage (ASTM C157, C1581), chloride penetration (ASTM C1202, NT492, AASHTO T 277), freeze-thaw and scaling resistance (ASTM C666, C672).
- Served as a project manager for multiple projects that involved qualification of innovative cementitious/chemical materials as ASTM C494 Type S admixture, qualification of lightweight aggregate per ASTM C330, ASTM C331, and ASTM C1761 specification requirements for clients across the US.

Academic Credentials

Ph.D. in Civil Engineering
Oregon State University, USA, 2020

Dual degree (B.Tech and M.Tech.) in Civil Engineering, Indian Institute of Technology Madras, India, 2013

Licensure / Certification

Professional Engineer (MI)

Professional Affiliations

American Concrete Institute (Voting member 222 and 213; Associate member 201, 365, and 357)

American Society of Testing and Materials

Contact Information

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Department of Transportation (DOT) Funded Research:

Missouri DOT

- Served as a lead engineer on a research project led by CTLGroup that investigated the effect of various design parameters including fiber type and source, and fiber dosage on the performance of fiber-reinforced concrete (FRC) systems for potential use in bridge overlays.
- Scope of work included evaluation of various FRC properties including compressive strength (ASTM C39), resistivity (AASHTO T 358), unrestrained drying shrinkage (ASTM C157), restrained shrinkage (ASTM C1581), flexural toughness (ASTM C1609 and ASTM C1550), freeze-thaw resistance (ASTM C666), scaling resistance (ASTM C672), abrasion resistance (ASTM C779), and bond strength (ASTM C1583).
- Was responsible for developing performance engineered FRC criteria that can be employed to determine the acceptability of FRC for overlay applications and developing specification/special provision that can be used as a guideline by various parties involved in the construction of FRC overlays in the state of Missouri.

Wisconsin DOT

- Assisted on a research study led by CTLGroup that investigated the performance of internally cured concrete mixtures (containing lightweight aggregates and super-absorbent polymers) for bridge deck and paving applications.
- Scope of work included evaluation of various mortar/concrete mixtures through autogenous shrinkage (ASTM C1698), compressive strength (ASTM C39), flexural strength (ASTM C78), chloride penetration (ASTM C1202 and NT 492), resistivity (AASHTO T 358), unrestrained drying shrinkage (ASTM C157), restrained shrinkage (ASTM C1581), flexural toughness (ASTM C1609 and ASTM C1550), freeze-thaw resistance (ASTM C666), scaling resistance (ASTM C672), abrasion resistance (ASTM C779), and bond strength (ASTM C1583).

Oregon DOT

- Served as a lead staff researcher at OSU on a research project that involved developing and testing optimized mixture designs for improved performance of paving concrete mixtures. The optimization involved minimizing the overall cementitious content for mixtures developed with a variety of locally available aggregates.
- Served as a graduate student researcher for a research project that investigated the potential optimization of the reinforcement design parameters for interface shear applications by using high-strength steel. Scope of work included fabricating and testing of push-off test specimens, and statistical analyses of the test data for identifying the potential influencing parameters on steel-concrete shear interface strength.
- The outcomes of these research studies are being implemented to develop specifications for slip-form paving concrete for pavements and improve the existing specifications for structural applications in the state of Oregon.

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Chloride-Induced Corrosion Assessment

- Designed and developed a test method as a student researcher at OSU for evaluating corrosion threshold of steel due to chlorides in cementitious systems. This novel method is mainly focused on testing the specimens in a relatively short time, thereby increasing its practicality. The developed test procedure has been considered by the 222-TG1 task group as one of the potential standardized tests for evaluating critical chloride threshold of steel in reinforced cementitious systems.
- Assisted several clients as an Associate at CTLGroup that involved assessment of degree of reinforcement corrosion in existing structures and implantation of repair strategies for prolonging the remaining service life.

Publications

Amini, K., Vaddey, P., Birch, B., Corr, D.,"**Fiber Reinforced Concrete for Bridge Deck Overlays**," Missouri Dept. of Transportation. Construction and Materials Division, 2023.

Deo, O., Bhuskute, N., Berscher, E., Vaddey, P., Pacheco, J., "**Belitic Calcium Sulfoaluminate Concrete Runway**." Concrete International, accepted for publication, 2023.

Ahmed, A., Shakouri, M., Trejo, D., Vaddey, P., "**Effect of curing temperature and water-to-cement ratio on corrosion of steel in calcium aluminate cement concrete**." Construction and Building Materials 350, 128875, 2022.

Adil, G., Halmen, C. Vaddey, P., Pacheco, J., Trejo, D., "**Multi-Laboratory Validation Study of a Critical Chloride Threshold Test Method**." Materials Journal 119 (6), 2022.

Chopperla, KST., Smith, S., Drimalas, T., Vaddey, P., Bentivegna, A., Kurtis, K. "**Unified Durability Guidance in ACI Committee Documents**." ACI Materials Journal 119 (2), 29-41, 2022.

Trejo, D., Vaddey, P., Vasudevan, D., Isgor, B., Amirkhanian, N., "**Constructability and Durability of Concrete Pavements**," Oregon Department of Transportation. Research Section, 2022.

Teymouri, M., Shakouri, M., Vaddey, P., "**pH-dependent chloride desorption isotherms of Portland cement paste**," Construction and Building Materials 312, 125415, 2022.

Pacheco, J., Vaddey, P., Amini, K., Vosahlik, J.,"**Internal Curing of Bridge Decks and Concrete Pavement to Reduce Cracking**," Wisconsin. Dept. of Transportation. Research and Library Unit, 2022.

Ahmed, A.A., and Vaddey, P., "**Reliability of Chloride Testing Results in Cementitious Systems Containing Admixed Chlorides**," Sustainable and Resilient Infrastructure, DOI: 10.1080/23789689.2021.1917059.

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Publications Continued

Vaddey, P., and Trejo, D., "**Optimizing Test Parameters for Quantifying Critical Chloride Threshold**," American Concrete Institute, 118 (2), 53-65, 2021.

Trejo, D., Vaddey, P., and Halmen, C., "**Standardizing Test to Quantify Chloride Threshold of Steel in Concrete**," American Concrete Institute, 118 (1), 117-187, 2021.

Barbosa A., Trejo, D., Matus, N., and Vaddey. P., "**Performance of High-strength Steel Reinforcement in Shear Friction Applications**," FHWA-OR-RD-21-02, 2020.

Vaddey, P., Shakouri. M., & Trejo, D., "**Predicting Chloride Testing Outcome of Different Cementitious Systems**," American Concrete Institute, 117(1), 139-151, 2020.

Shakouri. M., Vaddey, P., & Trejo, D., "**Effect of Admixed and External Chlorides on Transport of Chlorides in Concrete. American Concrete Institute**," 116(5), 119-128, 2019.

Trejo, D., Vaddey, P., & Shakouri. M., "**Factors Influencing Chloride Test Results of Cementitious Systems. American Concrete Institute**," 116(5), 119-128, 2019.

Isgor, B., Angst, U., Geiker, M., Halmen, C., Hansson, C., Pacheco, J., Tepke, D., Trejo, D. and Vaddey, P., "**Recommended practice for reporting experimental data produced from studies on corrosion of steel in cementitious systems,**" RILEM Technical Letters, 4, pp. 22-32. doi: 10.21809/rilemtechlett.2019.90, 2019.

Trejo, D., Shakouri. M., Vaddey, P., & Isgor, O., "**Development of empirical models for chloride binding of cementitious systems containing admixed chlorides**," Construction and Building Materials, 189, 157-169, 2018.

Vaddey, P., & Trejo, D., "**Influence of concrete mixture proportions on chloride test measurements. Journal of Materials in Civil Engineering**," 30(8). 10, 2018.

Vaddey, P., Shakouri, M., & Trejo, D., "**A bayesian approach to assess the influence of coarse aggregate on the chloride test outcome,**" Proceedings of an International Conference on Advances in Construction Materials and Systems, 4, Chennai, India, 2017.

Trejo, D., Shakouri, M., and Vaddey, P., "**The need for standardizing testing of input variables for reliable service life prediction of reinforced concrete structures**," Proceedings of an International Conference on Advances in Construction Materials and Systems, 1, Chennai, India, 2017.

Rathnarajan, S., Vaddey, P., Pillai, R., Gettu, R., and Santhanam, M., "**Modelling carbonation rates in concretes with similar strength and with and without slag,**" Proceedings of an International Conference on Advances in Construction Materials and Systems, 4, Chennai, India, 2017.