

Exponent®
Engineering & Scientific Consulting

Sina Saberi, Ph.D.

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Professional Profile

Dr. Saberi specializes in structural and offshore engineering with expertise in multiscale computational modeling, fracture mechanics, and finite element analysis. His work focuses on understanding and predicting damage, crack initiation, and crack propagation in complex structural systems subjected to cyclic, thermal, and environmental loading, with particular emphasis on transportation and marine infrastructure.

Dr. Saberi applies advanced numerical modeling techniques, including multiscale finite element methods and viscoelastic cohesive zone formulations, to investigate fatigue life, failure mechanisms, and structural integrity. His work integrates analytical modeling, numerical simulation, and experimental data to support engineering evaluations related to structural performance, durability, and damage tolerance.

Rail / Transportation

Dr. Saberi performs computational investigations of subsurface crack initiation and propagation in railway rails subjected to rolling contact fatigue. His experience includes developing specimen-specific finite element models informed by nondestructive evaluation data and comparing numerical predictions with full-scale experimental testing. This work supports assessments of crack growth behavior, fatigue life, and failure risk in rail infrastructure.

Offshore / Marine Structures

Dr. Saberi has offshore structural design experience from work in Europe, including the design of concrete sleepers for seabed pipelines. His responsibilities included structural analysis and preparation of technical design documentation to support subsea pipeline stability and load transfer. He also has academic and professional experience in offshore structural analysis, wave–structure interaction, and marine structural systems.

Structural Engineering

Dr. Saberi has prior experience in structural design and site management for civil and industrial projects, including reinforced concrete and steel structures. His background enables him to evaluate structural behavior under complex loading scenarios and contribute analytical insight to engineering problem-solving across transportation, marine, and infrastructure sectors.

Academic Credentials & Professional Honors

Ph.D., Ocean Engineering, Texas A&M University, 2025

M.S., Offshore Structure Engineering, University of Bologna, 2021

M.S., Structure Engineering, Islamic Azad University, 2016

B.Sc., Civil Engineering, Islamic Azad University, 2013

D. M. Hughes Graduate Scholarship (Texas A&M)

American Bureau of Shipping (ABS) Scholarship

Department of Ocean Engineering Ph.D. Scholarship (Texas A&M)

Magna Cum Laude (University of Bologna)

Academic Appointments

Graduate Assistant Lecturer, Department of Engineering, Texas A&M University, 2022–2024

Prior Experience

Ph.D. Researcher, Texas A&M University – College Station, TX | 2022–2025

Offshore Structure Designer, ++39 Engineering – Pesaro, Italy | 2021–2022

Structural Designer, ParsDasht Chehelsuton – Isfahan, Iran | 2014–2016

Site Manager, Daem Bana Construction Company – Isfahan, Iran | 2013–2014

Publications

Saberi S, Allen DH, Kim Y-R. Computational analysis of subsurface crack in railway under cyclic loading: model embedded within a finite element code. Proceedings of the International Heavy Haul Association Conference (IHHA) 2025.

Saberi S, Whetstone G, Allen DH. Multiscale computational modeling of subsurface cracking in railhead: insights into fatigue fife. Proceedings of the 2024 Joint Rail Conference. 2024 Joint Rail Conference. Columbia, South Carolina, USA. May 13–15, 2024. V001T05A002. ASME.

Saberi S, Fantuzzi N. Analysis of unreinforced and reinforced tubular T-joints structures with open source finite element software. Mechanics of Advanced Materials and Structures 2023; 30(4):912–922.

Saberi S, Memarzadeh P, Zirakian T. Study of buckling stability of cracked plates under uniaxial compression using singular FEM. Journal of Structural Engineering and Mechanics 2019; 69(4):417–426.

Presentations

Saberi S. Multiscale computational modeling of subsurface cracking in railhead: insights into fatigue life. Oral Presentation, ASME Joint Rail Conference (JRC2024), Columbia, SC, 2024.

Saberi S. Computational analysis of subsurface crack in railway under cyclic loading. Oral Presentation, International Heavy Haul Association Conference (IHHA2025), Colorado Springs, CO, 2025

Project Experience

Developed a multiscale finite element framework to simulate subsurface crack propagation in railway rails subjected to cyclic loading. Implemented a viscoelastic cohesive zone model to capture damage evolution at the microscale and coupled it with structural-scale analyses to predict fatigue life. Conducted parametric studies on crack size, orientation, and location to evaluate their effects on mixed-mode fracture growth and rail integrity.

Conducted numerical simulations and laboratory investigations to assess fatigue crack growth behavior in full-scale rail specimens under combined thermal and mechanical loading. Designed and executed test protocols replicating realistic service conditions and compared experimental results with computational predictions to validate the modeling framework.

Designed offshore concrete sleeper systems for seabed pipelines, including structural analysis, detailing, and preparation of technical documentation. Supported site management and construction activities, ensuring compliance with structural design standards and project specifications.

Taught and assisted in undergraduate and graduate engineering courses, including structural mechanics and differential equations, while mentoring students on computational modeling and engineering software applications.