Bhushan Raj Selvaraj

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SUMMARY

Structural Engineer and Researcher with expertise in bridge analysis and design with five years of experience in infrastructure industry. Skillful in computational analysis, parametric design, design optimization and process automation. Effective visual, verbal, and written communicator who can identify efficient ways to solve complex problems using computational tools. Passed the PE Exam (Civil:Structural) and on-track to be a licensed engineer.

EDUCATION

Ph.D. Civil Engineering, The University of Texas at Austin, Austin, TX — May 2025
Dissertation: Analysis and Design of I-Girder Bridges for Heavy Deck Overhang Loads

M.Tech. Civil Engineering, Indian Institute of Technology Kanpur, Kanpur, India — October 2015

B.E. Civil Engineering, Anna University, Chennai, India — May 2013

PROFESSIONAL EXPERIENCE

Assistant Engineering Manager, Larsen & Toubro Construction – Transportation Infrastructure
Mumbai, India — Jan 2018 – Dec 2020

- **Lead Structural Engineer** for the iconic **taxiway bridge**, at Delhi International Airport
  - Designed the bridge as **integral type** (4 x 30m + 26m), simply supported for dead loads and continuous for service loads; Designed a unique **box-type retaining wall** isolated from the bridge
  - Analyzed the bridge for **unique aircraft loads** (live loads, braking forces, jet blast forces)
  - Optimized the design for **strain-dependent loads** by iterative analyses, including construction stage analysis, and soil-structure interaction
  - Served as a liaison with internal engineering divisions, construction team, and proof-checking engineers of Client and Government of India
- Reviewed design calculations and **proposed solutions for optimization** of a 3-span integral curved box girder (46m + 60m + 46m) in the roadside part of Delhi International Airport
- Performed preliminary analysis for **blast loads** on a buried box-type taxiway underpass in Bangalore International Airport
- Designed substructures and foundations of major bridges with deck-continuous superstructure, integral-type aqueducts and flyovers

Senior Design Engineer, Larsen & Toubro Construction – Transportation Infrastructure
Mumbai, India — Nov 2016 – Dec 2017

- Experienced in design of prestressed concrete I-girder bridges, abutments, piers, bents, pile foundations, open foundations in **several major highway projects** in India
- Responsible for preliminary designs, optimization, and verification of bill of quantities to **secure** Engineering, Procurement and Construction (EPC) **contracts** of highways and airports in India
- Reviewed structural designs of bridges and structures to **ensure budgeted profits** in a 100km-long four-lane national highway projects in Western and Southern India
- Developed a Visual Basic programs to **automate** grillage analyses of curved girder-slab bridges in STAAD Pro software and live load analysis of buried box-type bridges

Post-graduate Engineering Trainee, Larsen & Toubro Construction – Transportation Infrastructure
Mumbai, India — Nov 2015 – Nov 2016

- **Standardized designs** with optimum quantities for box culverts and box-type underpasses, retaining walls and drainage structures
- Trained in preparation of bridge layouts, detailed structural drawings, bill of quantities and international bridge design codes from Eurocodes, AASHTO and Indian Road Congress

RESEARCH EXPERIENCE

Graduate Research Assistant, The University of Texas at Austin
Department of Civil, Architectural and Environmental Engineering, Austin, TX

Project 1: Investigate Live Load Distribution and Stability of Prestressed Concrete Girders During Construction | Advisors: Dr. Todd Helwig, & Dr. Matthew Hebdon Sep 2024 – June 2025

- Developing modeling methods to investigate live load distribution in spliced prestressed concrete girder bridges

Project 2: Develop Deck and Overhang Design Guidelines for Sound Walls and Other Heavy Loads
Advisors: Dr. Todd Helwig, Dr. Eric Williamson, & Dr. Michael Engelhardt Aug 2021 – Aug 2024

- Developed refined finite element models of concrete and steel I-girder bridges in Abaqus and studied the influence of modeling assumptions and details
- Developed Python scripts to conduct parametric analyses for a wide range of bridge systems
- Implemented a machine-learning based symbolic regression program to develop equations for railing load distribution factors

Project 3: Develop Guidance for Structural Behavior of Tall Haunches in TxDOT Beam and Girder Bridges
Advisors: Dr. Eric Williamson Jan 2021 – Aug 2021

- Performed push-out tests of steel girder-slab systems with tall haunches to study the effectiveness of shear studs in transferring the interface shear force
- Developed finite element models of tall-haunch push-out test specimens with regular and stacked shear studs and validated with test results showing good prediction of experimental behavior

Graduate Student Researcher, Indian Institute of Technology Kanpur
Department of Civil Engineering, Kanpur, India | Advisor: Dr. Durgesh C. Rai

Project 1: Seismic performance of Fabric Reinforced Cementitious Matrix (FRCM) strengthened masonry infilled reinforced concrete frames May 2014 to Oct 2015

- Developed and validated a finite element model of FRCM strengthened masonry in ABAQUS
- Studied interaction of in-plane damage on out-of-plane strength of masonry infills under seismic forces
- Developed a framework for performance-based seismic design of FRCM strengthened masonry infills in a full-scale RC frame including bi-directional behavior

Project 2: Reconnaissance survey of 2015 Gorkha Earthquake May 2015 to Jun 2015

- Surveyed earthquake affected regions of Nepal and India after the Gorkha Earthquake on April 25, 2015
- Correlated the location of severe damages with geological studies, identified structural defects responsible for collapse/damage, assessed the compliance to local code provisions

HONORS & AWARDS

J. Neils Thompson Graduate Fellowship in Structural Engineering 2024
The University of Texas at Austin

John E. Breen Endowed Presidential Fellowship in Structural Engineering 2023
The University of Texas at Austin

John A. Focht Endowed Presidential Graduate Scholarship in Civil Engineering 2021
The University of Texas at Austin

Graduate Scholarship, Ministry of Human Resource Development, Government of India 2013 -2015

SKILLS AND INTERESTS

Software	Abaqus, Midas Civil, CSiBridge, SAP2000, ETABS, STAAD.Pro, AutoCAD, MS Office
Programming	Python, MATLAB, Visual Basic
Languages	Fluent in Tamil and English; Intermediate in Hindi
Interests	Reading Science and History, Hiking