Exponent®
Engineering & Scientific Consulting

Ines Torra-Bilal, Ph.D., P.E.

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Professional Profile

Dr. Torra-Bilal, a licensed professional engineer, specializes in structural failure investigations, behavior assessment of various structures subjected to extreme loading, and strengthening and repair of various structures. Her expertise includes structural design and code compliance evaluations, failure analysis and cause determination, and seismic evaluation.

Dr. Torra-Bilal's research interests focused on studying the methods & techniques to bridging theory into practice and capturing the accurate behavior of various structural materials up to failure using finite element tools. Her doctoral dissertation was focused on investigating the seismic performance of various precast concrete beam-column connections leading to safer applications of precast concrete structures during seismic events. She conducted an integrated experimental and numerical study to develop novel connection methods to be used during earthquake events and developed a design procedure to be incorporated in current applicable design codes to be used by practicing engineers. Additionally, Dr. Torra-Bilal has performed research on fire resistance of steel structures with damaged fireproofing materials, performance and design procedure of cross-laminated timber (CLT) and performance of composite structures.

Prior to joining Exponent, Dr. Torra-Bilal was a structural engineer at HNTB Corporation, where she performed advanced analysis, design, detailing and plan development throughout various design phases of complex bridges and other infrastructure related structures for multiple US DOTs. During her time with HNTB Corporation, she applied innovative tools to address clients' needs and propose effective solutions. Dr. Torra-Bilal served as a research assistant and lecturer at University of Illinois at Chicago and as a patent analyst at the Office of Technology Management, before joining HNTB Corporation.

In conjunction with her technical consulting work, Dr. Torra-Bilal is a member of several professional organizations including the American Society of Civil Engineers/ Structural Engineering Institute (ASCE/SEI), Structural Engineering Association of Illinois (SEAOI), American Concrete Institute (ACI), Earthquake Engineering Research Institute (EERI), and Society of Women Engineers (SWE). Within ASCE, she is a member of Young Member Professional Committee and Advances in Simulation Committee and within SEAOI, she is a member of WiSE (Women in Structural Engineering) Committee. She serves as a reviewer of Elsevier Structures Journal, and Journal of Structural Engineering as well as ASCE Practice Periodical on Structural Design and Construction Journal. She is a recurring guest lecturer at University of Illinois at Chicago.

Academic Credentials & Professional Honors

Ph.D., Civiil Engineering, University of Illinois, 2020

M.S., Civil and Structural Engineering, University of Illinois, 2017

B.S., Bioengineering, University of Illinois, 2015

Transportation and Development Institute (T&DI) ASCE Award, 2020

Abraham Lincoln Fellowship, 2017

Christopher Burke Competition Award, 2017

Illinois State Professional Engineer (ISPE) Award Recipient, 2015

Bell Honor Recipient, 2015

Chi Epsilon Civil Engineering Honor Society

Tau Beta Pi Engineering Honor Society

Magna Cum Laude Honor

Prior Experience

Engineer III, HNTB Corporation, 2020-2023

Graduate and Teaching Assistant, University of Illinois at Chicago, 2017-2020

Patent Analyst, Office of Technology Management, University of Illinois, 2014-2017

Professional Affiliations

American Society of Civil Engineers/ Structural Engineering Institute (ASCE/SEI)

• Committee: Advances in Simulation

• Committee: Young Engineers Professional

Structural Engineering Association of Illinois (SEAOI)

American Concrete Institute (ACI)

Earthquake Engineering Research Institute (EERI)

Society of Women in Engineering (SWE)

Publications

Baran E, Mahamid M, Torra-Bilal I. “Performance of a moment resisting beam-column connection for precast concrete construction” Engineering Structures. (246):113005, 2021.

Mahamid M, Torra-Bilal I, Taghipour A, McNallan M. “Comparison between Hydrocarbon Pool Fire and Standard ASTM Fire Effects on Damaged Fireproofing of Steel Beams” Journal of Structural Fire Engineering, 2018

Torra-Bilal I, Mahamid M, Baran E. “Cyclic behavior of precast beam- to-column connections: An experimental and numerical investigation” Structures, 2022.

Mahamid M, Ozevin D, Torra-Bilal I. “Technical Note: Structural Design and Inspectability of Highway Bridges” Practice Periodical on Structural Design and Construction, 2019

Torra-Bilal I, Mahamid M. “Analysis and Design of Cross-Laminated Timber Mats” Practice Periodical on Structural Design and Construction, 2018

Mahamid M, Torra-Bilal I. “Computational Models for Analysis of Cross Laminated Timber Members supported by Soil” First International Conference on Timber Structures, UK, June 2017

Mahamid M, Torra-Bilal I, Taghipour A. “The Influence of Damaged Fireproofing on Fire Resistance of Steel Beams: An Investigation with Different Types of Fireproofing Material” The Tenth International of Structural Engineering and Construction Conference, May 2019

Mahamid M, Torra-Bilal I, Taghipour A. “Comparison of fire resistance of damaged fireproofed steel beams under Hydrocarbon pool fire and ASTM E119 fire exposure” SiF 2018– The 10th International Conference on Structures in Fire, Ulster University, Belfast, UK, June 6-8, 2018

Mahamid M, Torra-Bilal I. “Approach and Constitutive Numerical Models of Concrete behavior in Composite Structures” NAFEMS (National Agency for Finite Element Methods and Standards) World Congress 2019

Torra-Bilal I, Mahamid M. “Performance of Precast Connections on a Moment Resisting Frame under cyclic loading” Structures Congress, Orlando, FL April 2019.

Torra-Bilal I, Mahamid M, Taghipour A. “The Behavior of Structural Steel Elements with Damaged Fire Protection Material” Structures Congress, Orlando, FL April 2019.

Torra-Bilal I, Mahamid M, Baran E. “An Investigation and Design of Novel Moment Resisting Beam-Column Connections for Precast Concrete Construction” Submitted to Journal of Building Engineering, Under review.

Presentations

The Influence of Damaged Fireproofing on Fire Resistance of Steel Beams: An Investigation with Different Types of Fireproofing Material, The Tenth International Structural Engineering and Construction Conference, 2019

Performance of Precast Connections on a Moment Resisting Frame under cyclic loading, Structures Congress, Orlando, FL April 2019

The Behavior of Structural Steel Elements with Damaged Fire Protection Material, Structures Congress, Orlando, FL April 2019

FEA of Non-traditional Cross-Laminated Timber, ANSYS Innovation Conference, Chicago, IL October 2016

Fracture analysis and Rehabilitation of damaged reinforced concrete piers in Minnesota, HNTB Innovation Council, July 2021

An innovative approach in designing seismic resistant precast beam-column Connections, Young Engineers Symposium, January 2022

I-494 Existing Pier Evaluation using non-linear composite concrete modeling, IDOT Bridge Seminar, Springfield, IL September 2022

I-494 Existing Pier Evaluation using non-linear composite concrete modeling, IDOT Bridge Seminar,

Naperville, IL September 2022

Innovative Technology: Existing Pier Evaluation with VecTor2, UIUC (University of Illinois at Urbana-Champaign) Structural Engineering Conference, March 2023.

Additional Education & Training

Finite Element Software Seminars on Accuracy and Innovative Methods

LUSAS Nonlinear Software Training and Certificate

Finite Element Analysis Tools: ANSYS, LS-DYNA, ABAQUS

Analysis and Design Tools: AutoCAD, MicroStation, LARSA 4D, CSi Bridge, Bentley Systems, LUSAS, VecTor2, SAP2000, Risa, ETABS

Peer Reviews

Journal of Structural Engineering

Structures

Practice Periodical on Structural Design and Construction