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Engineering & Scientific Consulting

Margaritis Tonidis, Ph.D.

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Professional Profile

Dr. Tonidis is an expert in the performance of concrete buildings under extreme conditions such as earthquakes and fire. He has experience with both large-scale testing and advanced modeling to investigate structural behavior and identify causes of damage or failure. He has also studied methods for improving the safety of existing structures.

During his Ph.D. at Purdue University, Dr. Tonidis led large-scale testing of reinforced concrete buildings to study how they perform during earthquakes, both in their original condition and after retrofitting. He developed advanced performance-based modeling methods to better predict how older buildings respond to seismic forces, especially at critical beam-column connections. His research also produced a practical modeling approach for a retrofit system known as the Fully Fastened Haunch Retrofit Solution (FFHRS), which incorporates realistic simulation of connection behavior. His expertise includes the response of post-installed and cast-in anchorage systems in concrete, as well as the bond behavior between reinforcing steel bars and concrete.

Dr. Tonidis has contributed to international design codes and guidelines, including the fib Model Code for Concrete Structures 2020. His work provided new design recommendations for lap splices in reinforced concrete members exposed to fire and for the anchorage detailing in beam-column connections under seismic loads.

In addition to his technical and research work, Dr. Tonidis serves as a reviewer for several leading international scientific journals and regularly presents his findings at major engineering conferences worldwide. As a structural consultant, he applies his expertise to deliver practical, resilient, and performance-based solutions for complex concrete structures, bridging advanced analysis with real-world engineering practice.

Academic Credentials & Professional Honors

Ph.D., Civil Engineering, Purdue University, 2025

M.S., Civil Engineering, University of Stuttgart, 2018

B.S., Civil Engineering, University of Stuttgart, 2015

1st Place Award – 5th Annual CEGSAC Research Symposium at Purdue University, 2024

Best Reviewer 2022 Award in the Journal of Materials and Structures

Professional Affiliations

fib Model Code for Concrete Structures – Task Group 2.5 Bond and material models (member)

fib Model Code for Concrete Structures – Task Group 2.9 Fastenings to structural concrete and masonry (member)

American Concrete Institute (ACI) member

Publications

Tonidis M. Seismic assessment and retrofitting of non-seismically designed reinforced concrete structures – consideration of realistic joint behavior. Ph.D. Dissertation, Lyles School of Civil and Construction Engineering, Purdue University, 2025.

Tonidis, M., Sharma A, Birtel V. Seismic retrofit of non-seismically designed 3D beam-column joints with post-installed steel haunches. Earthquake Engineering & Structural Dynamics 54, no. 13, 2025.

Tonidis, M., Sharma A, Birtel V. Experimental and numerical investigations on the influence of transverse beams and slab on the seismic behavior of non-seismically designed exterior beam-column joints. Earthquake Engineering & Structural Dynamics; 53: 4451-4476., 2024.

Tonidis, M., Sharma A. Detailed 3D FE modeling approach for 2D and 3D beam-column joints retrofitted with fully fastened haunch retrofit solution including anchor behavior. Journal of Engineering Structures. Vol. 294: 116769, 2023.

Tonidis, M., Sharma, A. Numerical investigations on the influence of transverse beams and slab on the seismic behavior of substandard beam-column joints. Journal of Engineering Structures. Vol. 247: 113-123, 2021.

Tonidis, M., Bosnjak, J., Sharma, A. Post-fire performance of RC beams with critical lap splices – Numerical parametric study. Journal of Building Engineering, Vol. 44: 102367, 2021.

Sharma A., Bosnjak J., Tonidis, M. 2021. Post-fire performance of RC beams with critical lap splices – Experimental investigation and numerical validation. Journal of Building Engineering, Vol. 34: 102045, 2021.

Tonidis, M., Sharma, A. and Bosnjak, J. Influence of the aspect ratio on the shear strength of 3D beam-column joints. Otto-Graf-Journal. Vol.19, 2020.

Presentations

Tonidis, M. Sharma A. Seismic assessment and retrofitting of 3D beam-column connections – experimental results. Presentation in ACI Committee 352 meeting. ACI Concrete Convention, Spring 2025, Toronto, Canada.

Tonidis, M. Behavior and modelling of as-built and retrofitted reinforced concrete beam-column joints considering transverse beams and slab. fib PhD Symposium 2024, Budapest, Hungary.

Tonidis, M., Birtel, V., Sharma, A. An experimental study on 2D and 3D beam-column joints retrofitted with post-installed haunches. 18th World Conference on Earthquake Engineering, Milan, Italy, 2024.

Tonidis, M., Birtel, V., Sharma, A. Experimental investigations on the influence of transverse beams and slab on the seismic behavior of non-seismically designed beam-column joints. International Conference on Condition Assessment, Rehabilitation & Retrofitting of Structures. IIT Hyderabad, India, 2023.

Tonidis, M., Sharma A. Numerical analysis of beams with lap splices under cyclic loads. Bond in Concrete 2022, Bond, Anchorage and Detailing, Stuttgart, Germany, 2022.

Tonidis, M., Sharma, A., Bosnjak, J. Numerical modeling of 3D beam-column joints. 17th World Conference on Earthquake Engineering, 17WCEE, Sendai, Japan, 2020.

Peer Reviews

Materials and Structures – A RILEM journal

Structural Concrete – Journal of the fib

ASCE Journal of Bridge Engineering

Canadian Journal of Civil Engineering

Journal of Engineering Structures