

**Department of Structural Engineering
University of California, San Diego
SE 290 Seminar**



Assistant Professor Bora Gencturk
Civil and Environmental Engineering
University of Southern California

“Next Generation Bridge Columns for Multi-Hazard Resilience”

Monday, December 3, 2018

12:00 pm - 12:50 pm, Pepper Canyon Hall, Room 122

<https://structures.ucsd.edu/seminars>

Abstract

Past earthquakes have shown the vulnerability of bridge columns to lateral loads induced by earthquakes that have resulted in severe damage to the reinforced concrete (RC) columns in terms of rebar buckling and rupture and concrete spalling and crushing. This is exacerbated by the fact that several of the highway bridges in seismic zones are deteriorated due to environmental aging. The conventional seismic design approach is the underlying reason for these observations where collapse prevention is ensured while limited damage is not satisfied under large earthquake events. This research investigates the use of high-performance materials, specifically, engineered cementitious composites (ECC) and Cu-Al-Mn superelastic alloys (SEAs) to improve the multi-hazard performance (seismic and environmental aging) of RC bridge columns. A novel design approach has been proposed and implemented at the small-scale for laboratory testing. The results have demonstrated that with the use of ECC and Cu-Al-Mn SEAs, the overall performance of the bridge columns could be drastically improved in terms of damage tolerance and post-event permanent deformations, which directly relate to the continued operation of bridges. This presentation will describe the proposed column design, test results from simulated seismic loading, and additional data from numerical modeling and parametric study of such columns to determine the optimal column configuration using these materials.

Biography

Dr. Bora Gencturk is an Assistant Professor in the Sonny Astani Civil and Environmental Engineering Department at the University of Southern California (USC). He obtained his Ph.D. and M.S. degrees from the University of Illinois at Urbana-Champaign and his B.S. degree from Bogazici University (Istanbul, Turkey). Dr. Gencturk's research focuses on the durability and extreme event resilience of reinforced concrete structures with emphasis on application of high-performance materials. He has received the Faculty Early Career Development (CAREER) and Broadening Participation Research Initiation Grant in Engineering (BRIGE) from the NSF. Dr. Gencturk has authored or co-authored over 100 technical publications.

*Sponsored by Professor Benson Shing
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