

The Department of Civil and Environmental Engineering at the University of Houston presents...

CIVE 6111 Graduate Seminar

Highly Ductile Concrete Materials in Seismic Applications: Transitioning from Component Behavior to System-Level Performance



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Department of Civil & Environmental Engineering New Jersey
Institute of Technology

Friday, April 7, 2023

2:45pm-3:45pm

Zoom: <https://uh-edu-cougarnet.zoom.us/j/94589160391>

Abstract

Highly ductile concrete materials known as high-performance fiber-reinforced cementitious composites (HPFRCCS) have been developed to improve the resilience and sustainability of civil infrastructure. To date, proof-of-concept studies on seismic structural applications of these materials has shown improvements in the strength, damage tolerance, and ductility of individual structural components and sub-assemblies. Relatively little, however, is known about how HPFRCCs influence the response of structural systems from seismic ground shaking. This presentation will discuss ongoing research related to the seismic response of building systems using highly ductile concrete materials. First, experimental data of reinforced HPFRCC members will be presented to highlight the unique structural response and failure characteristics of HPFRCC components. Then, computational modeling approaches to predict the behavior of HPFRCC elements including collapse. The behavior and design of various archetype structures using these materials will then be presented along with considerations for design of structural systems. Future research directions on developing seismic design criteria for structures utilizing these new materials will be discussed.

Bio

Dr. Bandelt joined the John A. Reif, Jr. Department of Civil and Environmental Engineering at NJIT in July 2015 after serving as a National Science Foundation Graduate Research Fellow at Stanford University. His background and experience are in the behavior and modeling of ductile cement-based materials, performance of recycled aggregate concrete, and durability of reinforced concrete structures. Dr. Bandelt teaches graduate and undergraduate courses in the areas of structural engineering, mechanics, and materials. His research has been supported by the National Science Foundation, the New Jersey Department of Transportation, the Federal Highway Administration, the USDOT Region 2 University Transportation Center, and others. Recent research focus has included: experimental testing and simulation of ductile fiber-reinforced cementitious materials such as ultra-high performance concrete and others, numerical simulation of service life and ultimate limit states of reinforced concrete structures, and behavior of recycled aggregate concrete. Dr. Bandelt is a licensed professional engineer (PE) in New Jersey and Pennsylvania, and is heavily involved in the American Concrete Institute, holding voting positions on numerous committees.