

UNIVERSITY of HOUSTON

CULLEN COLLEGE of ENGINEERING

Department of Civil & Environmental Engineering

CIVE 6111 Graduate Seminar Series

Mirmiran Amir

Provost and Vice President for Academic Affairs
Chief Academic Officer
The University of Texas at Tyler

Innovative Structural Applications for Ultrahigh Performance Concrete

Friday, March 24, 2016

2:45 pm – 3:45pm

Classroom Business Building, 120

Abstract: Originally developed in the 1990's, ultrahigh performance concrete (UHPC) has prevailed as an effective construction material around the world, primarily for its high compressive and tensile strength as well as ductility and durability. Two innovative structural applications of UHPC have been developed, one for bridges and the other one for buildings. (1) A novel low profile waffle slab made of UHPC with two types of reinforcement, as carbon fiber reinforced polymer bars and high-strength steel bars. The proposed system lends itself to accelerated bridge construction, and has great potential for deck replacement in bridges with load restrictions, and as well for bridge widening. This study confirmed that the proposed deck panel meets the AASHTO LRFD demand load and serviceability criterion. The deck is not susceptible to punching shear of its thin slab, and fails in a ductile manner. The system was also tested under the dynamic impact of wheel load at the Accelerated Pavement Testing facility in Gainesville, Florida using a Heavy Vehicle Simulator. (2) An innovative composite flat roof system for non-residential buildings to resist high wind uplift pressure based on the Florida Building Code requirements, made of UHPC reinforced with high-strength steel bars. Combination of the two advanced materials along with specialty of the cross sectional geometry led to a superlight-weight composite roof system with only 16.5 lb/ft² self-weight and only 4 in. overall depth. The study confirmed that the proposed roof deck has one-way structural performance due to its load distribution of 1/3, with flexural mode of failure and ductile behavior, and meets the code standards.

About the speaker:



Amir Mirmiran is the Provost and Vice President for Academic Affairs, and Sam A. Lindsey Chair Professor of Civil Engineering at The University of Texas at Tyler. Previously, he served as Vasant H. Surti Professor and Dean of Engineering and Computing at Florida International University (FIU), and Vice President of FIU Research Foundation, Inc. Prior to that, he was Chair of Civil and Environmental Engineering at FIU, and had also served on the faculty at the North Carolina State University (NCSU), University of Cincinnati (UC), and University of Central Florida (UCF). He has in the past held positions as Graduate Program Director, Lab Director, Center Director, Department Chair, and College Dean, as well as Vice President for Research Foundation. He is also a licensed professional engineer, and has practiced engineering for nearly a decade prior to his first academic appointment.

Dr. Mirmiran's research in bridge engineering has led to two U.S. patents, over 110 journal publications and twice as many conference papers and technical reports, 15 doctoral and 21 master's graduates. He has served as PI or Co-PI on research projects of over \$15.6M funded by NSF, DOT, NCHRP, and industry. He has delivered keynote addresses on the issues of diversity in engineering education, entrepreneurship and innovation. He has served on the Engineering Deans Council's Public Policy Forum of the American Society for Engineering Education. He received the National Science Foundation prestigious faculty CAREER award. He is a fellow of two major professional organizations, and was named Engineer of the Year in South Florida in 2009.