NORTHEASTERN UNIVERSITY
College of Engineering

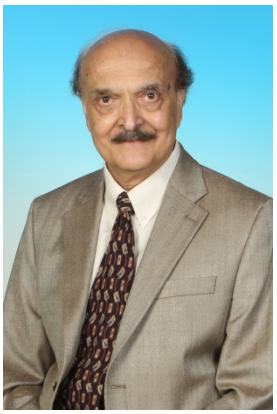
Distinguished Lecture
Civil & Environmental Engineering

Nanoscale Modification of Cementitious Materials

Surendra P. Shah, Ph.D.
Walter P. Murphy Professor of Civil Engineering (Emeritus)
Center for Advanced Cement-Based Materials, Northwestern University

ABSTRACT

This presentation provides an overview of recent research in the field of nanoscale modification of cementitious materials with the use of nano-particles and nano-fibers conducted at the Center for Advanced Cement-Based Materials (ACBM), Northwestern University. In last decades, a considerable progress has been made in developing improved materials. These include high strength concrete, high performance concrete and ultra high performance concrete. These developments have been possible as a result of better understanding and modification of microstructure of concrete. The next step forward is the characterization and manipulation of nanostructure of concrete. There are three broad areas where the current emphasis on nanotechnology and nanoscience can foster new developments: characterization, new materials and sensors. This presentation will give examples in each of these three areas. The presented investigations include the discussion on the reduction of formwork pressure through the use of nano-clay, the development of an improved slip-form paving concrete and the development of cement-based materials reinforced with carbon nano-fibers and nano-tubes. Some of these topics share innovative processing techniques to ensure superior concrete that can further today's growing need for reliable and sustainable high performance concrete.



Surendra P. Shah was the founding director of the pioneering NSF Science and Technology Center for Advanced Cement-Based Materials. His current research interests include: fracture, fiber reinforced composites, non-destructive evaluation, transport properties, processing, rheology, nanotechnology, and use of solid waste materials. He has co-authored two books: Fiber Reinforced Cement Based Composites and Fracture Mechanics of Concrete. He has published more than 500 journal articles and edited more than a twenty books. He is past editor in chief of RILEM's journal Materials and Structures. Professor Shah is a member of the National Academy of Engineering. He is also a foreign member of Chinese Academy of Engineering as well of Indian Academy of Engineering. He has received many awards including the Swedish Concrete Award, ACI Anderson Award, RILEM Gold Medal, ASTM Thompson Award, ASCE Charles Pankow Award, and Engineering News Record's News Maker Award. He spent time as an Honorary Professor at the Indian Institute of Technology, Bombay, under a Fulbright grant, and at Hong Kong University of Science and Technology as a visiting member of Institute of Advanced Studies. Most recently, he was awarded an honorary membership in American Concrete Institute and RILEM (based in Paris). Besides teaching at Northwestern, he has taught at the University of Illinois at Chicago and served as a visiting professor at MIT, University of Sydney, Denmark Technical University, University of Singapore, Darmstadt Technical University, and LCPC, Paris. He has been an honorary professor at the Hong Kong Polytechnic University and L'Aquilla University in Italy, Guest Professor at Southeast University and Honorary Academician at Dalian University.

Wednesday, April 11, 2012
4:00 p.m.
10 Behrakis Health Sciences Center
30 Leon Street

Reception immediately following the lecture.
Open to the public.