



POLITECNICO
MILANO 1863

SEMINAR ANNOUNCEMENT

Room S.1.4, Building 3, first floor, Leonardo Campus
Department of Civil and Environmental Engineering

26 June 2018 – 12:15

SHEAR BEHAVIOR OF SFRC BEAMS USING FULL-FIELD DISPLACEMENTS FROM DIGITAL IMAGE CORRELATION

Prof. Kolluru V. L. Subramaniam
Indian Institute of Technology Hyderabad

Experimental results from steel fiber reinforced concrete (SFRC) beams without shear reinforcement are presented. Digital image analysis technique is used to obtain the full-field displacements from the beams during the load response. Cracking leading up to the peak load is evaluated and the critical shear cracks is identified from the full-field measurements on the surface of the beam obtained using Digital Image Correlation (DIC). The in-situ movements across the shear crack show a dilatant behavior with a continuous increase in the crack opening and slip across the crack faces. The dilatant behavior from the measured crack opening and crack slip displacements obtained from the control and the SFRC beams is identical. The fiber reinforced concrete beams exhibit post peak load carrying capacity even after the continued opening of the dominant shear crack. The increased resistance to crack opening provided by the fibers resulting in significant increase post-peak ductility of the beam. Dilatancy across the shear crack increases with an increase in the slenderness due to the increased contribution of flexure to crack opening. The efficiency of the fibers in increasing shear capacity decreases with an increase in the slenderness and is related to the μ_v/v_{ud} ratio at the critical shear crack. Improvements in shear behavior are related to the increase in the post-peak fracture energy. The fracture energy using UNI 11039-2 procedure for crack opening up to 1.0 mm provide a good indication of shear capacity enhancement obtained with fibers.

Prof. Pietro Gambarova (pietro.gambarova@polimi.it); **Prof. Liberato Ferrara** (liberato.ferrara@polimi.it)

Prof. Kolluru V.L. Subramaniam is currently the Dean (Planning and Development) and Professor in the Department of Civil Engineering at Indian Institute of Technology Hyderabad (IITH). Prior to joining IITH, he was Professor and Catell Fellow in Department of Civil Engineering at the Grove School of Engineering, the City College of New York (CCNY). Dr. Subramaniam obtained a B.Tech. in Civil Engineering from IIT Delhi and Ph.D. in Structural Engineering and Materials from Northwestern University, Evanston. After graduation, Dr. Subramaniam worked as Research Associate at the NSF Center for Advanced Cement Based Materials. Dr. Subramaniam was awarded the Early Career Award from the National Science Foundation of USA for investigating the early-age changes in cementitious materials. He received the James Instrument Award from the American Concrete Institute (ACI) in 1999 for his research on nondestructive evaluation of concrete. He is the recipient of the outstanding young researcher award at the Grove School of Engineering in 2006. He was the Chairman, committee 215 on Fatigue of Concrete of the ACI. In 2009, he was elected Fellow of the American Concrete Institute for notable contribution in the area of fracture and fatigue of concrete. He has served on the Editorial Boards of the Journal of Materials in Civil Engineering and the Journal of Bridge Engineering of the American Society of Civil Engineers. He is a life member of the Indian Concrete Institute. Prof. Subramaniam is currently the Director of the Center of Excellence in Sustainable Urban Development of the Ministry of Human Resource Development at IIT Hyderabad. He is Program leader for the Sustainable Development thrust in the Friendship program of the Japan International Cooperation Agency. He was the recipient of excellence in teaching award at IIT Hyderabad in 2011 and 2015.