UNIVERSITY of HOUSTON

CULLEN COLLEGE of ENGINEERING

Department of Civil & Environmental Engineering

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Professor Patrick Bamonte
Politecnico de Milano

Shotcrete Mechanical Behavior at High Temperature and Structural Effects in Fire-Damaged Tunnel Linings

Thursday, March 22, 2012

11:15 a.m. Refreshments
11:30 – 1:00 p.m. Seminar
Room W102-D Engineering Bldg. 1, UH

Abstract

Shotcrete has been known for almost a century as a reliable and effective material well suited for many applications in Civil Engineering. Its structural utilization, however, has been so far very limited, but things are changing, as proposals have been lately put forward to use shotcrete in rather demanding structures, such as the linings of blasted-off tunnels, where fire resistance is a must.
To improve the knowledge on shotcrete fire behavior, an experimental campaign has been carried out recently at the Politecnico di Milano on the thermo-mechanical behavior of three shotcrete mixes (with alkaline or alkali-free accelerating agents, with or without steel fibers). The results show that shotcrete behavior in compression is rather similar to that of ordinary concrete, while its thermal diffusivity is definitely lower at any temperature (150-800°C). To have an insight into the structural effects of the different properties of shotcrete and ordinary concrete in fire, a circular tunnel lining bound by an infinite space and subjected to uniform heating, is studied as well, by means of finite elements, and the role of the various parameters (thermal and mechanical properties of the lining, stiffness of the soil) is investigated.

About the Speaker:

Patrick Bamonte is an Assistant Professor at Politecnico di Milano, Italy, where he earned his MS in Civil Engineering (majoring in structures) in 2001 and his PhD in Structural Engineering in 2006. His research interests include reinforced- and prestressed-concrete structures; reinforced-concrete slabs; high-performance and ultra-high-performance concretes; structural fire engineering. He is a member of fib Task Group 4.3, Fire Design of Concrete Structures, and of ACI Committee 237 "Self-Consolidating Concrete".

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