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Beltrami Room, Building 5, ground floor, Leonardo Campus
Tuesday 8 May, 15:00

"Concrete under nanoscope: the review of nanotechnology and nano-engineered concrete"

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This presentation reviews recent developments in the field of nanotechnology applied to concrete. Specifically, the aspects of development and fine tuning of nano-seed products for nano-engineered concrete are discussed. Various pathways for effective production of nano-SiO2 and CSH seeds are discussed. It is demonstrated that the mechano-chemical activation of portland cement or fly ash systems with superplasticizer and nano-SiO2 in aqueous solution enables the formation of CSH seed product capable of considerable enhancement of strength performance of portland cement and blended binders with activated fly ash. Experimental results demonstrate an increase in the compressive and flexural strength of mortars with developed nanoparticles. Furthermore, the boost of performance of cementitious systems including self-consolidating concrete with activated fly ash is due to the presence of ultrafine super-reactive particles of fly ash and nano-SiO2.

Reference: **Prof. Liberato Ferrara** (liberato.ferrara@polimi.it)

Bio-sketch

Dr. Konstantin Sobolev is a Professor and Chairman, Department of Civil and Environmental Engineering, College of Engineering & Applied Science, University of Wisconsin-Milwaukee, WI (USA). After receiving his B.S./M.S. degree from the Moscow State Civil Engineering University (Russia), he earned a Ph.D. in 1993 from the Research Institute of Concrete and Reinforced Concrete (Russia). Since then Dr. Sobolev has been developing innovative and effective technologies for advanced materials including high-performance cement and concrete. Dr. Sobolev has published more than 180 articles in research journals and proceedings of scientific conferences, in Russian, Turkish, Spanish and English. He has presented scientific papers in the Americas, Middle East, Europe and Asia. Dr. Sobolev is a member of Mexican Academy of Sciences (AMC). Dr. Sobolev's current research interests are in application of nano-admixtures and nanotechnology in cement and concrete; modeling of dense packings of particulate materials; application of evolutionary algorithms, design, modeling and application of high-strength and high-performance materials; materials with photocatalytic properties; super-hydrophobic materials; smart stress-sensing materials. Dr. Sobolev is an active member of the American Concrete Institute (ACI), a member of Task Force on Nanotechnology-Based Concrete Materials of TRB - Transportation Research Board of National *Academies (USA) and a founding chair of ACI 241/236D "Nanotechnology of Concrete."*