



Department of Civil Engineering

FALL 2021 SEMINAR SERIES

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Monday, October 18, 1:00 – 1:55 PM, Frey Hall 309

ZOOM LINK: Meeting ID: 950 8981 9867; Passcode: 860265
<https://stonybrook.zoom.us/j/95089819867?pwd=NzdKQUJXU3J3NFN4VlpBUlp4bDFhUT09>

Low-Carbon Concrete Solutions: Macro- and Micro-Structure Evaluations of Concrete with Ground Glass Pozzolan

Abstract

The production of Portland cement (PC) is energy intensive and it has raised significant environmental concerns since one ton of cement generates almost a ton of CO₂. Most contemporary concrete applications for buildings and infrastructure use high-performance concrete (HPC) mixtures which are produced by replacing a percentage of cement with supplementary cementitious materials (SCMs), consisting mainly of fly-ash and ground granulated blast furnace slag (GGBS or Slag). The addition of SCMs is necessary to achieve high strength, increased durability, and lower permeability of deleterious substances such as salt solutions. The added benefit of SCMs is the production of “Low-Carbon Concrete” by reducing CO₂ footprint. The inconsistent supply of fly-ash and relatively high cost of slag as SCMs in the Northeastern USA is of concern to the concrete industry. Fly-ash is a byproduct from coal burning plants which are shutting down or converting to natural gas, and Slag is a residue from steel production mainly outside of the USA. Thus, in response to the urgent need for an effective, sustainable and economical SCM to support the concrete construction, this work is focused on the macro- and microstructure evaluations of a new ground glass pozzolan (GGP) from recycled post-consumer glass. With the goal of contributing significantly to the implementation of low-carbon concrete, this research concentrates on the development of mixture designs for various applications, characterization of a new material and concrete with different percentages of cement replacement by GGP. Recent studies have shown a good potential of using GGP as an alternative SCM.

About the Speaker: Dr. Marija Krstic joined the Department of Civil Engineering at Stony Brook University as an Assistant Professor of Practice in September 2021. Prior to joining SBU she was a Postdoctoral Fellow at the City University of New York (City College), where she also completed her Ph.D. in Civil Engineering (Structural and Materials Engineering). She was a recipient of scholarship from the Environmental Research and Education Foundation (EREF) during her doctorate research and upon graduating she received the Great Grads 2020 award from CCNY, and the ACI Construction Award (2021) for her research. Her research interests include advanced construction materials, systems and structures. She is passionate about development and characterization of sustainable concrete solutions using various recycled materials as alternatives in concrete structures. Her work contributed to the approval of ASTM C1866, Standard Specification for Ground-Glass Pozzolan for Use in Concrete, ASTM 2020. Dr. Krstic is a member of American Concrete Institute (ACI) Committee 240, Pozzolans, and the American Society and Testing of Materials (ASTM) Committee 09, Concrete and Concrete Aggregates.

