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MSEC SEMINAR AND COMMERCIALIZATION FORUM

INVITED SPEAKER:

DR. FRED AGUAYO

"Cement chemistry, deterioration processes, and field performance in novelty rapid setting cement-based materials"

October 9th, 2020
1:30 – 3:00 PM

Contact MSEC Staff for Zoom link/passcode to attend

Abstract:

Smart structure technologies such as smart materials, advanced sensing, and novel testing will redefine the concept of a traditional structure as a conventional passive system to an active multifunctional system with inherent capability for self-sensing, diagnosis, and control capabilities. However, even with the increasing developments in smart structure technologies, the use of these technologies also requires knowing the chemo-thermo-mechanical behavior in building materials in order to accurately calibrate these devices to detect structural changes and/or damages. Therefore, a major step towards achieving the challenge of designing an optimized "smart structure" is to fully examine the link between the chemistry of these materials and their long-term performance, especially for newer and sustainable concrete materials.

This talk presents an overview of on-going work, funded by the Texas Department of Transportation, aimed at characterizing chemical and physical deteriorations processes in rapid setting hydraulic cements (RSHC) using novel testing methods. These cements, while have been successfully used in niche repair applications for many decades, have far less history of being

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used in new construction, especially in reinforced concrete as a result of limited long-term durability data. These binders comprise a unique cement chemistry and material properties in comparison to traditional Portland cements making them particularly difficult to characterize their performance using traditional durability methods. The durability behavior of these novel materials under a variety of conditions will be presented. Lastly, several other research developments and potential durability related projects will also be shared.

Biography:

Dr. Fred Aguayo is an Assistant Professor in the Department of Engineering Technology at Texas State University in San Marcos, TX. Since his arrival at Texas State in 2016, Dr. Aguayo's primary research interest have been in enhancing concrete durability using emerging technologies and alternative materials. His research group has been active in evaluating the mechanical performance and chemical deterioration processes of various advanced concrete systems, while also working on developing and improving accelerated laboratory methods for predicting their long-term performance in the field. He is a well-established researcher on concrete durability with over 12 years of experience working with private industry and public agencies, especially with the Texas Department of Transportation (TxDOT). He is an active member of the American Concrete Institute and participates in several committees related to concrete durability (ACI 201) and material science of cementitious systems (ACI 236). Dr. Aguayo received his Ph.D. from the University of Texas at Austin in Infrastructure Materials Engineering, where he worked under the supervision of Dr. Kevin J. Folliard

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