GEO-INSTITUTE
8th ANNUAL LIVE STREAMING WEB CONFERENCE
December 4-8, 2023

The Geo-Institute Innovative Technologies & Tools in Geotechnical Engineering Board Committee will live-stream the session **"The Present and Future of 3D and 4D geotechnical data in BIM and Digital Twins"** on Monday, December 4, at 11 AM EST. The topics include:

"BIM for Bridges and Infrastructure Pooled Fund Studies: AASHTO and other Industry Drivers toward Digital Workflow" **Thomas Saad,** P.E., M.ASCE

Two Transportation Pooled Fund Studies are helping State Departments of Transportation develop their digital workflow for design and construction of projects. AASHTO has adopted Industry Foundation Classes (IFC) for the exchange of digital engineering data. Progress of the pooled funds and the AASHTO administrative resolution will be discussed with attention to the role of digital plan contributions from various sources and contributors.

"Digital As-Builts and Digital Delivery- Progress in Design and Construction toward BIM and Digital Twins"

R. David Unkefer, P.E.

This presentation describes the current practice and future outlook of digital transportation project workflow. 3D design is becoming more common for design and delivery of transportation projects. FHWA has been supporting the move to digital delivery and several states are on aggressive timelines to pilot projects and programs using the Model as the Legal Document (MALD) to transition from paper plans to a fully digital bidding and construction process. Evolution toward digital twins, which contain regularly updated information for operations and maintenance activities, will also be described.

"BIM for Agency Transportation Projects- Caltrans Pilot Efforts" **Soroush Mavandadi,** P.E., M.ASCE

California DOT shares their experiences with pilot BIM projects: providing digital plans for contractor bidding, construction, and as-builts with thoughts on evolution towards including geotechnical information.

"Using Mobile Devices to Create and Interact with Digital Twins," **Nick Machairas,** Ph.D. A.M. ASCE

Mobile devices (phones and tablets) are becoming increasingly powerful and versatile with LiDAR, stereo photography and many more data capture features. We are basically carrying an XR-ready (mixed reality) device in our pocket! While dedicated devices (i.e., goggles) offer an immersive experience, scalable technologies such as mobile devices can play an important role in creating and interacting with digital twins. This presentation will cover case studies in which soil and rock samples were digitized as 3D models using mobile devices, often on the field. The process allowed for staff to remotely evaluate the samples in much greater detail, producing a better 3D site conceptual model. This model was then sent back to the mobile devices and projected through augmented reality.

*"Getting the Most Knowledge from Your Data Through Use of Visualizations Available Today," **Brian Collins, P.E.***

This presentation showcases project examples of visualization of earth science data integrated into both the pre-construction and post-construction phases of transportation projects. The session begins with presentations of notable 3-dimensional geology and bridge project site models, illustrating application of models to geotechnical design. These models, similar to the Building Information Modeling (BIM) representations used in building and facility design, can be delivered in 3-dimensional augmented reality across design and construction disciplines to understand terrain and geology conditions and visualize proposed project elements for stakeholder buy-in. Digital Twins of constructed infrastructure can be included in the geoscience model to better understand the impacts of geohazards on the infrastructure and monitor asset performance. In addition, near real time instrumentation data can be introduced into these models to provide a 4-dimensional model which has been successfully used to improve interpretations of complex landslides.