

MICHIGAN INFRASTRUCTURE CONFERENCE

May 12 & 13

Session Descriptions

GENERAL SESSIONS

Opening General Session (May 12)

ACEC National President & CEO Linda Darr and ASCE National Executive Director Thomas Smith to provide an update on current initiatives of the National Associations.

ACEC & ASCE Michigan Awards Presentation (May 12)

Presentation of Project and Individual awards for ACEC and ASCE Michigan

General Session (May 13)

Tactics for Building a Dynamic, Cohesive Team by Professional Leadership Coach Doug Cartland.

State Agency Updates on Infrastructure Projects: (May 13)

EGLE – Liesl Clark, EGLE Director

GLWA – Suzanne Coffey, PE, GLWA Chief Planning Officer

MDOT – Patrick McCarthy, MDOT Director of Financial Services Bureau

DTMB – Timothy Hall, DTMB Project Director Services Manager

EDUCATIONAL BREAKOUT SESSIONS

Innovative Building Information Modelling for Off-site Construction

In this presentation, Dr. Liu will describe his research into the development of innovative BIM technologies to improve construction practice. Some of these projects include: automated manufacturing-centric BIM to facilitate building panel prefabrication; an ontology-based semantic approach for construction-oriented quantity take-off from BIM models; in-depth integration of BIM and simulation for panelized construction scheduling under resource constraints; automated production planning in panelized construction enabled by integrating discrete-event simulation and BIM; and development of cloud-based collaborative BIM modeling software. **Presenter:** *Dr. Hexu Liu (Western Michigan University)*

Composite Materials – Manholes and Handholes

Composite materials continue to become a larger part of our lives (automotive components, airplane components, bicycle frames, decking material, patio furniture). This is also true in infrastructure applications (bridge decks, storage tanks, wind turbines, rebar, manholes, handholes). This presentation will cover some composite manhole and handhole products and explain what applications they are best suited for. **Presenters:** *John Snyder, P.E., James Cassel (EJ)*

Compacted Concrete Pavements

Compacted concrete pavements are a newer technology that is starting to catch on in Michigan and across the country. Over 15 projects have been built to date in Michigan. The technique involves a zero-slump concrete mixture that is paved with a high-density asphalt paver to typically achieve 98% density right behind the screed, oftentimes negating the need for additional rolling and compaction. The surface

can be floated and textured similar to traditional concrete, resulting in a long-lasting and durable concrete pavement, with the speed and constructability of asphalt. **Presenter:** *Steve Waalkes, P.E. (Michigan Concrete Association)*

Innovative Funding – Case Study

Presentation basics for those individuals that address City Commissions/Councils and other public agencies. How one consulting engineering firm was able to fund \$15M in infrastructure improvements in the City of Benton Harbor, particularly through a City Income Tax. **Presenter:** *Chris Cook, P.E. (Abonmarche)*

The Resilience of Infrastructure Damage Prevention: The Vital Role of One Call Centers in the U.S

The management of subsurface utilities contributes significantly to the resilience of modern cities. Damages to subsurface utilities greatly impact our daily lives and have severe consequences, including property damages, scheduling delays, and fatal and non-fatal injuries. One call centers are the cornerstone for preventing subsurface utility damages in the United States. Construction contractors and subcontractors rely on one call centers to notify utility owners about their excavation plans. The shared responsibility approach, which calls for teamwork between excavators and utility owners, is a crucial element of the one call system. This study aims to benchmark one call centers' current practices to improve the overall communication among stakeholders and enhance damage prevention efforts. The provided benchmarking suggests the dire need for better strategies to collect and analyze the data of damages. In addition, the practical outcomes of the North Carolina Locate Resolution Partnership Committee (NC Resolution Committee), which serves as a communication channel among stakeholders, were assessed. The assessment of the NC Resolution Committee's performance suggests that using data from one call centers could lead to a resilient damage prevention process. Thus, this study delivers a better understanding of the current practices of one call centers and a new approach to improving damage prevention efforts beyond the traditional role of one call centers. Accordingly, this study edifies the resilience of damage prevention efforts. **Presenter:** *Ahmed Al-Bayati, Lawrence Technological University*

Testing Street Configurations to Promote Safe and Equitable Connectivity in Response to COVID-19

SmithGroup worked with the City of Ann Arbor and the DDA to identify 6 Healthy Street Pilot Projects to temporarily provide safe physical distancing for bicycle and pedestrian travel. Vehicle lanes were temporarily designated as bicycle and pedestrian spaces with cones, lane markings and signs. These street projects were previously identified as critical gaps in the connectivity of the downtown bicycle network and the city wide non-motorized network.

Pilot projects were in place for up to 90 days. During this time, traffic counts of the project area pre and post pilot project were performed to compare bike and vehicle traffic to provide a data set to evaluate the pilot project with 67 field observations and volume, speed and crash data collected. A public feedback survey was another method of evaluating the results of the pilot study with over 1,300 comments collected.

The presentation will highlight the goals, key findings and long-term considerations that were the result of 3 of the 6 pilot projects (Division Street/Broadway Bikeway, Miller/Catherine Bikeway, and State and North University Bikeways. The Healthy Streets Pilot Projects found that a strong majority of survey responders found that their biking experience and access was improved which matched overall

increases in bicycle trips. Traffic volumes were not significantly impacted by the implementation of the pilot projects and speed/crash data showed that the pilot projects provided additional physical distance space and reduced vehicle speeds. **Presenters:** *Steven Thomas (SmithGroup)*

Build It and They Will Come

In 2013, the City of Ann Arbor began the planning stages for a major flood control project made possible by a FEMA Hazard Mitigation Grant. A low-lying area of the city, along an enclosed drainageway named Allen Creek, had an existing FEMA 100-year flood depth of ten feet. Nearby property owners and businesses paid expensive flood insurance premiums, not to mention frequent roadway, parking lot, and residential flooding. A nearby railroad berm prevented floodwaters from accessing the nearby Huron River floodplain. This project included the design of a secondary flood conveyance for the Allen Creek by way of a proposed railroad culvert, requiring extensive stormwater modeling, FEMA approval of floodplain revisions, and coordination with the railroad. The construction required a 36-hour temporary railroad closure at which point the contractor worked around the clock to install the culverts and a new pedestrian tunnel. The project cost \$7.4 million and was completed in November 2020.

This project provided not only flood relief, but also accommodated a new pedestrian tunnel to link downtown Ann Arbor to a nearby trail system along the Huron River. Ramps, lighting, fencing, a pedestrian bridge, and new pathways provide a safe and appealing alternative for pedestrians who previously needed to cross the railroad right-of-way (illegally).

This presentation will cover the planning, design, and construction phases of the project, including an overview of the analysis required to obtain FEMA funding and obtain regulatory approvals, as well as details on coordination with adjacent property owners and Amtrak (the primary user of the railroad, which is owned by MDOT). **Presenters:** *Jeremy Hedden, P.E. (Bergmann), Greg Kacvinsky (OHM Advisors)*

Southeast Michigan Flooding Study: Assessing Risk & Building Resilience

The Southeast Michigan Council of Governments (SEMCOG) and Michigan DOT (MDOT) conducted a study to understand and manage flood risks to transportation infrastructure in the seven county SEMCOG region. The study includes a flooding risk assessment for roads, bridges, culverts, and pump stations for MDOT and County-owned roadways and integration of the results into day-to-day agency practices, such as asset management, long-range planning, and operations. Integration of results into key agency functions will enable SEMCOG, MDOT, and Counties to proactively manage flooding risks to the transportation system. Finally, the study includes development of a standardized framework for analyzing hydrology and hydraulics associated with highway stormwater runoff.

This project represents a valuable addition to the state-of-the-practice in transportation climate change risk assessment for inland flooding. In addition, it will facilitate coordinated resilience and stormwater management planning across transportation agencies, local jurisdictions and regional MPOs. **Presenter:** *Rachael Barlock (SEMCOG)*

Bundling: An Optimus Prime Approach to Transforming Local Bridge Infrastructure

MDOT is partnering with local agency bridge owners and industry groups in Michigan to champion an innovative approach to addressing the critical needs of the statewide local bridge inventory---bundling bridges into statewide and regional packages to achieve efficiencies of scale and accelerate much

needed improvements. **Presenters:** *Matt Chynoweth, P.E. (MDOT), Roger Safford, P.E. (HNTB), Charles Stein, P.E. (AECOM)*

Using Waste Tires in Roads

Stockpiles of waste tires pose concerns of potential contamination of local groundwater and fire risk from the massive amounts of tires. To properly use the waste tires, tire rubber recycled from waste tires has been used in the pavement industry for decades. However, the function of such recycled tire rubber in the internal structure of asphalt mixtures was not fully understood. This study attempted to establish discrete element models (DEM) to investigate the strength, skeleton structures, and stress distribution of rubber modified asphalt mixtures. Quite a few pilot projects that using recycled tire rubber were constructed as asphalt pavements in Michigan (MI). A recent project used a reacted rubber in Kalamazoo, MI and the other project used a pre-swollen rubber in Dickinson, MI. In general, the test results from the laboratory were favorable regarding moisture damage resistance, low temperature cracking resistance, and noise reduction. In the Kalamazoo project, it was estimated that approximately 5,300 passenger tires been recycled to the road that would otherwise be disposed of in a landfill. In the Dickinson project, the amount of recycled tire is equivalent to about 3,500 passenger tires. **Presenter:** *Zhanping You (Michigan Technological University)*

Contractual Model impacts on Utility Coordination

MDOT is conducting a pilot for Bridge Contractual Digital Model Data or BIM for Infrastructure. The Michael Baker International team is utilizing previous Contractual Model projects to aid MDOT in advancing through the project. Stakeholder involvement is a critical component of this pilot project which includes coordinating with designer, local agencies, utility companies, fabricators and contractors to determine a positive way forward determining what aspects of the traditional 2D plans can be transitioned to 3D data for the purposes of not just construction but all aspects of the project including review. This presentation will cover the aspects of the ongoing efforts to engage utility companies in this transition to model data in lieu of traditional 2D documents and the benefits of this transition. Access to a model will be available to those who preregister for this session, which will allow utility companies and others the opportunity to ask questions to the panel. **Presenters:** *Cathy Cassar, P.E., Daniel Jensen, P.E. (Michael Baker), Marcia Yockey, P.E. (MDOT)*

Ann Arbor to Detroit – CAV

The Michigan Department of Transportation is undertaking a PEL for a 2-mile segment of Michigan Ave (US-12) from Campus Martius through Corktown to address one of Detroit's prominent corridors and Ford's renovation of the Michigan Central Station and relocation of 5000 employees to the area. MDOT is also investigating a first-of-its-kind, world-class Connected, and Automated Vehicle Corridor in Michigan from Detroit to Ann Arbor. The project seeks to catalyze the use of CAVs by implementing pathbreaking physical and digital infrastructure to integrate CAVs into roadways and support the larger cooperative automated transportation landscape. The project builds on existing Southwest Michigan regional transit planning proposals to dedicate lanes to BRT utilizing connected buses and shared mobility. Over time the corridor will involve into a dedicated CAV right-of-way, coordinating physical, digital and operational infrastructure to create a practical model for safe, efficient and sustainable autonomous mobility future.

Presenters: *Collin Castle and Jon Loree (MDOT), Dan Beard (WSP)*