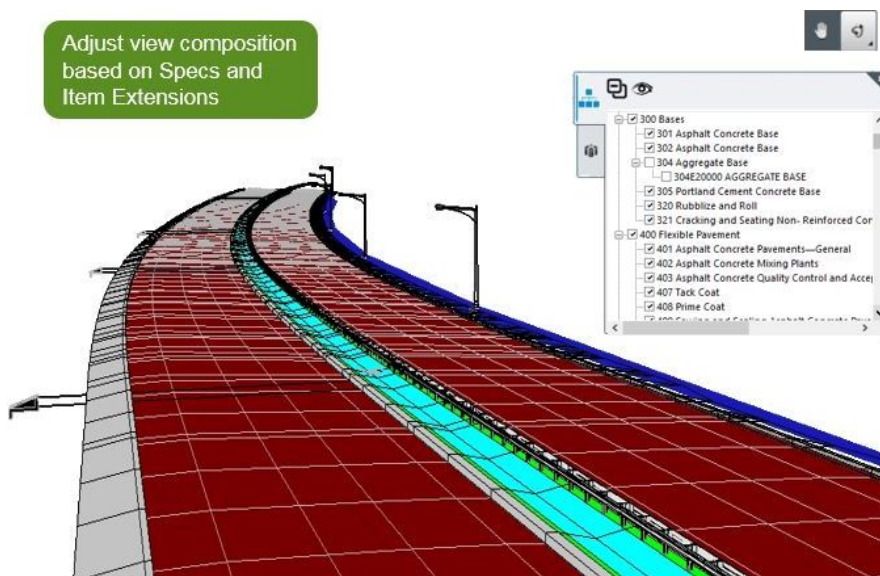


E-Construction Summit Promotes a Paperless, 3D World

3D CAD models or standard plan sets? Electronic files or boxes of paper forms?

It's obvious to most that the first choice in each of these questions is more attractive and effective. INDOT's Management Information Systems (MIS) Highway Applications Department is working with our Design and Construction Management sections to ensure that we reach those levels.

In late August, the department hosted a peer exchange as part of the Federal Highway Administration's (FHWA's) Every Day Counts e-Construction and Partnering initiative. E-Construction is the creation, review, approval, distribution, and storage of highway construction documents in a paperless environment. The two-day event enabled 32 INDOT employees representing 17 departments to learn more about four topics crucial to e-Construction. During each session, INDOT presented its best practices for each topic; more importantly, four different state departments of transportation (DOTs), considered national leaders in each topic, divulged details of their programs to move to paperless systems.



A 3D CAD model (top illustration) allows for better visualization of the design intent and is the basis for automated machine guidance in construction.

Derek Fuller (right) is one of several INDOT employees who made presentations at the peer exchange.



"The peer exchange was a great way to inform the members of a variety of departments here at INDOT about what we're working on and also to learn from the best in the nation as determined by the FHWA," said Computer-Aided Design (CAD) Support/e-Construction Specialist Derek Fuller.

MIS Highway Applications Manager Mike Jenkins kicked off the peer exchange with welcoming remarks, and then Fuller provided the group an overview of the e-Construction initiatives at INDOT.

The first topic — 3D CAD Model as Contract Document — featured Highway Design & Technical Support Director John Wright providing details about INDOT's design practices and final submittal requirements. That

was followed by a presentation from the Utah DOT, which has used 3D CAD models as the contract documents on several projects for transportation work in that state.

"This was a very timely topic for us, as INDOT's current standard is regular PDFs for design submittal of contract documents, but there is a transition to 3D CAD models for better visualization of design

intent, automated machine guidance, and construction inspection,” said Fuller. “One aspect of e-Construction is to create a document-centric approach focused on reducing paper, but we wanted to take this further by adding a data-centric approach with the transfer of data from 3D design models to construction and then onto asset management.”

The second topic — e-Ticketing for Materials Delivery — included Construction & Materials Management Director John Leckie and Field Engineer Andrew Pangallo providing an update on INDOT’s efforts to investigate e-Ticketing for materials delivery, and a presentation by the Pennsylvania DOT on its e-Ticketing pilot projects.

“Currently, we keep paper tickets to verify that materials are delivered to jobsites,” said Leckie. “Regulations mandate that we keep these tickets for 10 years. The result is boxes and boxes of paper tickets stored at each district. A much better option is e-tickets, which are digital tickets stored on a server. Next spring, we will be doing an e-ticketing pilot study on a district project.”

The third topic — Return on Investment (ROI) of e-Construction — included tips from the Oregon DOT on how to financially make the most of e-Construction.

The final topic — ROI of 3D Models — featured the Wisconsin DOT, which has used 3D model visualization and 4D simulations since 2010 for large projects that are difficult to visualize, such as those involving a complex redesigning of an interchange. Besides contributing to higher-quality and more accurate plans, the use of 3D models reduces costs significantly for contract modification (change orders), according to the Wisconsin DOT, which makes it a practice to appoint a dedicated design liaison for such projects.

Jenkins said of the two-day conference, “Not every facet of what the other four state DOTs do applies to us, but we learned a great deal that we can carry forward as we pursue improvements at INDOT.”



Boxes in a file storage room in the Seymour District (left photo) include paper tickets of jobsite materials (right photo) that must be kept for 10 years.