



Digital Delivery Directive 2025 NEWSLETTER

Summer 2023

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PennDOT Digital Delivery Directive Meets with Korean Delegation

On March 21, 2023 a PennDOT contingent met with members of the Korean Expressway Corporation, an organization that operates South Korea’s tolled expressways, to share information about the PennDOT Digital Delivery Directive 2025 Initiative.

Allen Melley, Chief of the PennDOT Digital Delivery Section, provided an overview of PennDOT’s efforts to date and the vision of the initiative moving forward. In turn, the delegation from the Korean Expressway Corporation gave a summary of their efforts related to digital delivery of projects. This, and similar peer exchanges with other DOTs, continue to inform the industry of PennDOT’s efforts to redefine how infrastructure projects will be delivered in the Commonwealth.

PennDOT Digital Delivery Directive meeting with Korean delegation and similar peer exchanges continue to inform the industry of PennDOT’s efforts to redefine delivery of infrastructure projects.





Inspector-in-Charge Shares Experiences with Digital Delivery Pilot

In District 1-0, staff are in the process of executing one of the Existing Ground Confidence Level (EGCL)/Roadway Authoring digital delivery pilots. For Inspector-in-Charge Kenneth Engstrom, the transition to digital delivery has been both challenging and rewarding.

The project, which was the first to incorporate a Model as a Legal Document (MALD) component, involves resurfacing and improving intersection site-distances along SR 173 in Sandy Lake Township, Mercer County. Engstrom notes that he and his staff were trained in the SYNCHRO Field software and had continuing access to the training modules but did not receive the actual 3D model until the day the project started. “We discovered that the model required changes, so we had to wait a few days for the revised version. Ideally, it would have been better to have the 3D model after the bid date, but we recognized that we would have to hit the ground running in reviewing the plans and incorporating the software in our work,” he said.

Engstrom adds that it took some time to figure out how to navigate the software, but “like anything, the more you use it, the more familiar you become with it.” Nevertheless, inspection staff members were initially uneasy with certain program elements, such as the lack of visibility in stations, zooming in and out of cross-sections in the 3D model, and selecting the properties of an individual line. He also points out that much of the nomenclature is in design and survey terms, which were less familiar to the inspectors.

“We raised our concerns with PennDOT and Bentley (the software provider) and they are working with us toward a resolution. Further, the Construction Unit has requested that the nomenclature be changed to item numbers for the project or for general terms, such as milling, leveling, wearing courses, and widening. The goal is to easily make your own saved views, without accidentally turning off some element of the software,” he added.

As he and his staff continue to work through these issues, Engstrom has found a number of benefits within the software. Among these are its ability to measure and use cross sections at any location; its use of color that makes it easier for inspection staff to see the changes from the existing area; and the interactivity of SYNCHRO Field. “For example, the request for information (RFI) function will be helpful. You can make an exact mark on the plan, insert the questions you have, and send it directly to the designer or Assistant Construction Engineer for clarification.”

“As we become more accustomed to using the software—and once we establish how it can best work for those of us in the field—the more we will appreciate it, particularly in capturing real-time data, and enhancing efficiency and communication in the inspection process,” Engstrom concluded.



After college, I began my career building digital models for land development projects. The tools were impressive and fascinating to me. Even back then, I felt like it was a waste of time and information to translate the full digital 3D surface into 2D plan sheets, having to go into the field just to help “fill in the gaps” of surface elevation data that were not visible on the 2D plan sheets but immediately obvious in my 3D model.

Now, we are in the midst of a revolutionary change in the way that projects are designed, communicated, and constructed. This is a watershed moment, similar to other technological advancements in our past, like GPS surveying equipment or the emergence of CADD.

It took people with vision, boldness, and patience to lead those changes. Even the advent of powered heavy equipment was fought at times by those who thought that moving mountains by mules pulling carts full of dirt would never be obsolete! We, however, should be proud to be part of the team that’s leading the transportation industry forward in Pennsylvania through Digital Delivery.”

**- Brian McNulty, P.E.
District Executive
PA Department of
Transportation
Engineering District 1-0**

District 4-0 Launches First Bridge Authoring Pilot

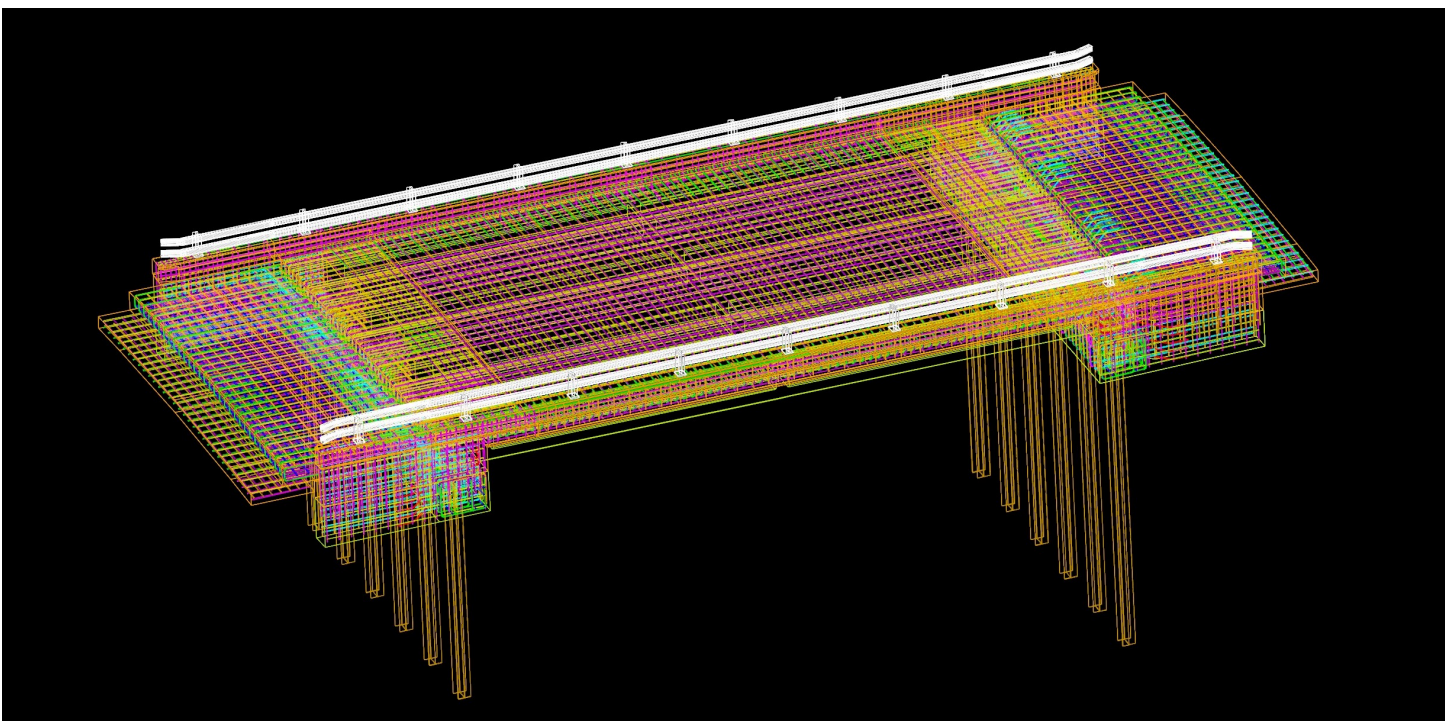
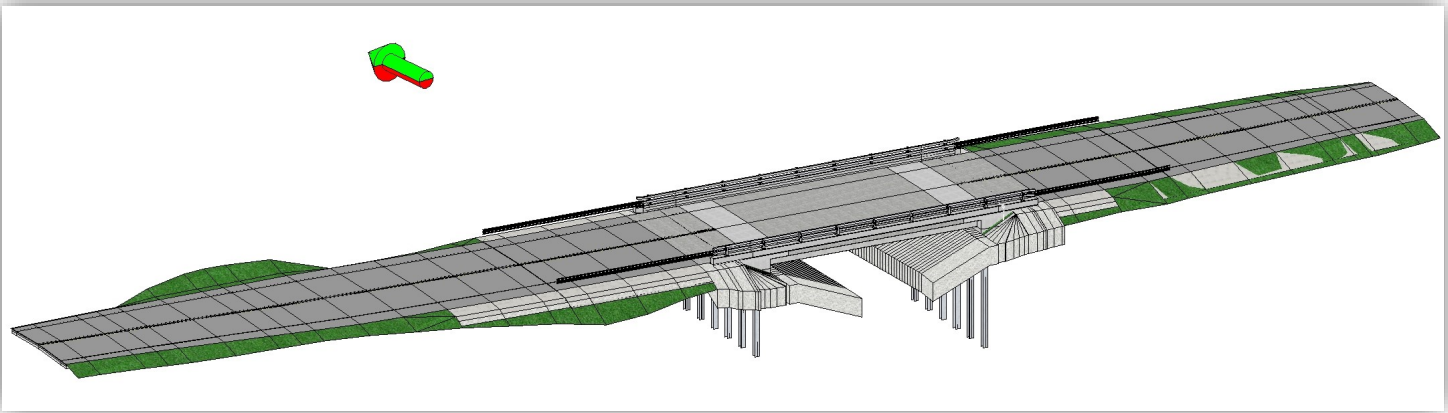
In August of 2023, PennDOT Engineering District 4-0 executed the construction contract for the first of three bridge authoring pilots in the commonwealth using OpenBridge Modeler (OBM) software.

The 380-foot bridge replacement project is on SR 3006 over Gardner Creek in Newton Township, Lackawanna County. The existing structure is a steel I-beam, open-grid steel deck bridge that will be replaced with a single-span prestressed concrete spread box beam with a composite concrete deck on integral abutments. The project will incorporate earthwork and pavement elements.

Notice to proceed occurred in September 2023 and the project is slated to be completed in late summer 2024.

Joshua Mies, Pennoni Consultant and the project's designer, says that this was his first exposure to OBM. "Prior to the pilot, PennDOT's Digital Delivery team trained us on the software and continued to work with and support us throughout the design process. What became apparent to me is, in essence, we were piloting the software concurrent with piloting the training."

For example, Mies found that the software requires additional capacity to produce a complete 3D model to the required level of detail. "This was the point of having pilot projects, and with the support of the Digital Delivery team and the vendor, we determined which components of the software could be improved or automated to improve usability and efficiency in future projects."



Nevertheless, Mies has found that the software is highly efficient in many areas, such as developing quantities and pulling elevations and coordinates. He also noted that the delivered model additionally contained 2D components, some drafted conventionally and others developed from the 3D model. “The template produces a model that more easily defines details.” He also noted that the bridge project also includes a conventional 2D component. “The software can cut a 2D view or detail out of the 3D model. This capability has allowed me to explore utilizing OBM even intraditional 2D projects, developing a preliminary model from program templates and using it to develop some 2D details. This approach can save time and allow us to make use of some of the other program functionalities that we normally wouldn’t have in traditionally delivered projects.”

Kelley Sartori, Pennoni Consultant, spoke about the project’s contract management and bid package development. “Prior to the pre-bid conference, interested contractors received a certification memo from PennDOT that provided them with links

explaining elements of the 3D model and instructions on how to read the 3D plans,” she said.

Sartori noted that they received very few comments from contractors, and none at the pre-bid session, likely the result of the instructions outlined in the memo. “Almost all of the contractor’s questions were about the conventional 2D segment of the adjacent bridge project that was also bid as part of this project.” She added, “Of the 11 contractors at the pre-bid session, 4 submitted bids based on the 3D model, which was very encouraging.”

Mies said, “As we move forward, we will continue to work with PennDOT and the Digital Delivery team on how our construction consultation services may need to be adapted. Being a pilot project, many of the standards and methods were developed concurrently as we progressed through various project stages. After each stage, we would go through “lessons learned” to discuss what went right and what went wrong for the sake of future improvements as Digital Delivery becomes the standard.”

“ High Steel Structures is very excited about, supportive of, and eager to collaborate with PennDOT on its digital delivery initiative. It is a transformative step for the transportation industry, creating more efficient processes for data sharing and use between stakeholders throughout the project lifecycle.

It also aligns with the America Institute of Steel Construction's Need For Speed initiative, which is aimed at increasing the speed at which steel projects are delivered to owners.



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This initiative facilitates our use and re-use of digital design data and helps eliminate manual entry of information found in contract plans and documents. Further development of our own software will allow us to directly import data, improving the accuracy and speed with which design data is translated into fabrication. In turn, High Steel's fabrication data can be provided digitally to stakeholders for use during construction and long-term asset management.”

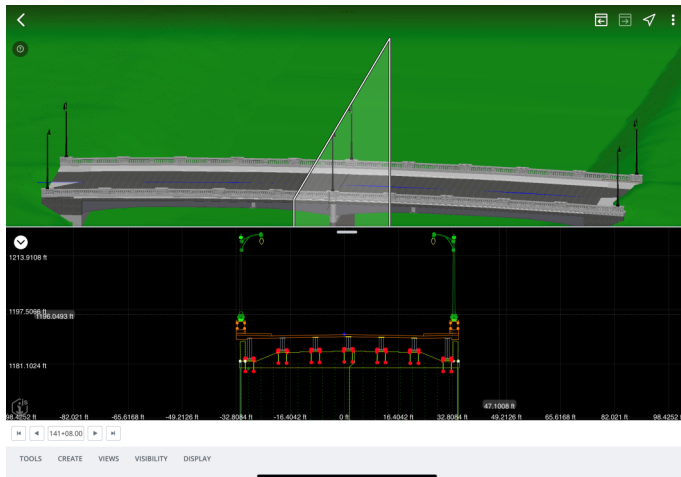
- Bradley J. Dillman, P.E.
VP of Engineering & Estimating
High Steel Structures, LLC

PennDOT Rolls Out SYNCHRO Field

SYNCHRO Field is a mobile solution that allows construction teams to better access data in the field through 2D and 3D models, georeferenced pdfs, and maps. With this application, PennDOT's construction teams have the ability to perform inspections and create forms for model Requests for Information (RFI). These forms provide inspectors with the ability to flag issues directly within the model.

Throughout the Digital Delivery pilot process, the team has identified the needs of our construction teams and allowed us to work hand in hand with the software provider to deliver a better product. The Digital Delivery team continues to compile feedback from these projects, which in turn will be implemented, through product enhancements, for better data acquisition and ease of use in the construction field. One such enhancement has been added to the laptop-based SYNCHRO Control for station and offset on dynamic cross section.

With SYNCHRO Field, digital delivery will improve communication between the office and the field, resulting in a more streamlined workflow based on data-driven information.



Upcoming Events

- **Monthly PennDOT Digital Delivery Workspace Open Discussion and Update**, 4th Tuesday of every month, 11 am to noon
- **Project Managers Meeting**, October 11-12, 2023
- **APC Fall Seminar**, November 15-17, 2023

Resources

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Demystifying the Common Data Environment (CDE)

Simply stated, the CDE is a centralized data repository, usually on a cloud service, where all project files are securely stored and are accessible to authorized project stakeholders. Integrated CDEs allow users to open and edit files in their native software directly from the storage site throughout the lifecycle of the project.

CDEs are termed as “integrated” because they enable access to certain applications through their interface. Some CDEs provide data viewers for a handful of file types, allowing users to markup, tag, assign, and track issues that can later be resolved.

In the infrastructure industry, ProjectWise 365 and Autodesk Construction Cloud are the most popular CDEs. Other environments, such as SharePoint and its user interface MS Teams, could also be considered CDEs.