





Digital Delivery Directive 2025 NEWSLETTER

Spring 2024

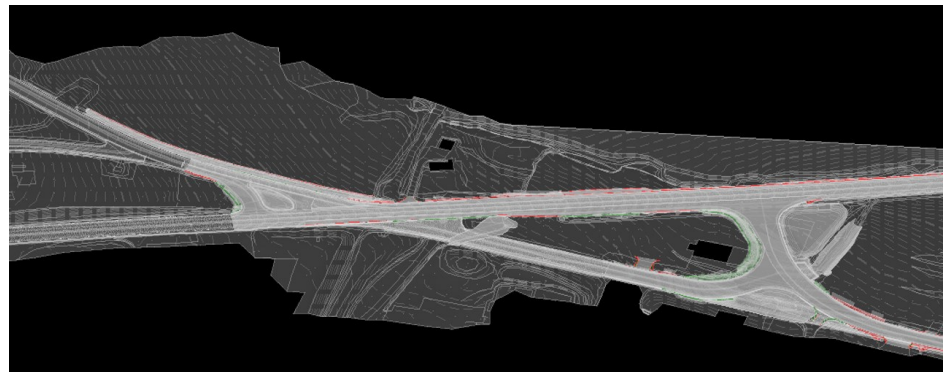
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Roadway Authoring Pilot and Experience with 3D Modeling in the Field

In the fall of 2023, District 3-0 completed a 1.04 mile Roadway Authoring Pilot project to improve safety and sight distances along state routes between Mansfield and Wellsboro in Tioga County. The project included converting a sharply skewed four-leg intersection of Route 6/Route 660/Route 4002 into two T-intersections; constructing a new traffic island on Route 4002 to separate east and westbound traffic and creating a perpendicular connection of eastbound Route 4002 to Route 6; and relocating the Route 660 approach to Route 6 to create a perpendicular T-intersection and a right turn lane on eastbound Route 6 for traffic turning onto the relocated Route 660.



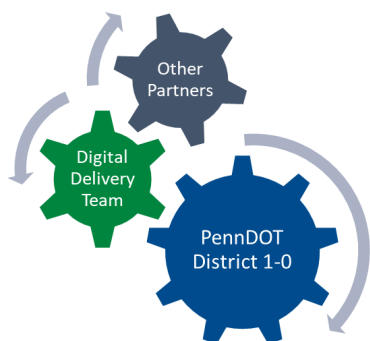
Jay Miller, P.E., District 3-0's Assistant Construction Engineer, explained that the project was also the first time the District's inspection staff used 3D models in the field. "Of course, prior to this project, our inspectors were used to lots of as-built paper documents. The move to the downloaded 3D model—all on the iPads—presented a big shift in how they approached their work."

Miller said that the staff was grateful for the two-day training provided by the Digital Delivery team to familiarize them with the SYNCHRO Field software. Once back on the job, the field staff had to become accustomed to pulling the plan information in the 3D format. "As might be expected, it took longer to find cross sections, cut profiles, and other elements. We also had to consult with the design staff and the Digital Delivery team on how to pull elevations out of the 3D model. All of the information was there, we just had to figure out how to access it—but had the support to guide us." **(continued)**

Miller also observed that most contractors have integrated 3D model guidance elements in their equipment, which may offer them an advantage. “For example, contractors’ survey staff have rovers they can use on the ground anywhere. While we can go into the model and pull the as-built information, we’re still using tape measures and other conventional tools to inspect the work.”

The project was let on March 30, 2023. Even taking into account the learning curve and other challenges, Miller said that the project was completed, as anticipated, within one construction season.

Editor’s note: The Digital Delivery team is looking at how the rover data can be imported into the 3D model. Although the iPads and rovers would not directly connect, there is a means for data exchange that would benefit field staff. PennDOT also noted that some districts might have inspectors who now use rovers and that some projects require contractors to provide them for inspectors, but there is no mandate for their use.

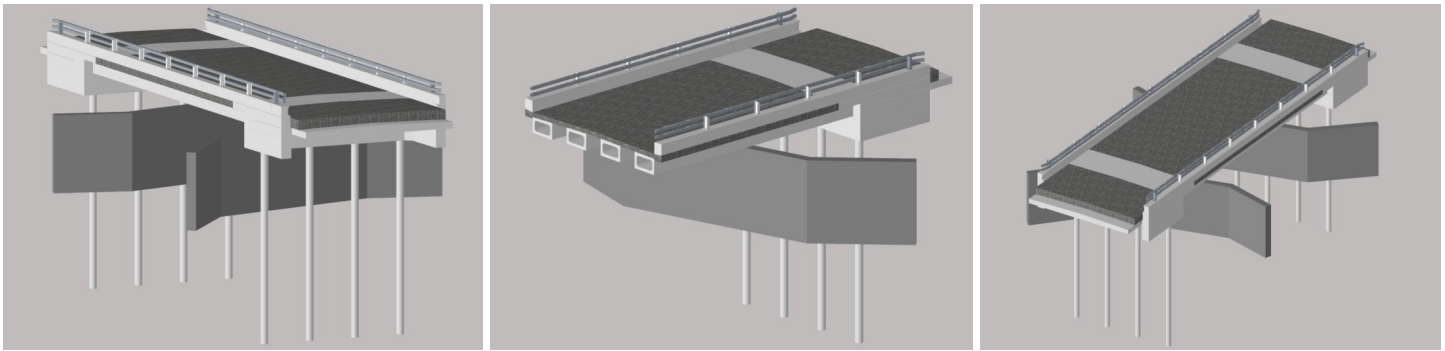


Extraordinary Teamwork Integral to District 1-0 Bridge Authoring Pilot Let

District 1-0 let the first 3D bridge authoring pilot project completed by in-house design bridge and roadway staff in late 2023. The project, located in Crawford County on S.R. 1032 over Shirley Run, serves as an example of how coordination and teamwork among District staff, PennDOT’s Digital Delivery team, and other partners leads to a successful project launch.

Mitchell A. Fabry, the District’s Bridge & Structural Design Supervisor, explained that the structure is a steel stringer constructed in 1950. “The scope of work includes removing the existing superstructure, cutting off the abutments (leaving them in place as scour protection), then placing R-7 from the rear face of the existing structure to the front face of the new structure. An integral abutment will be built on piles, with a new spread box beam superstructure, deck and barriers, and approach slabs,” he said. A waterproof membrane will be placed on the deck and approaches, then overlaid with asphalt. **(continued)**





In this pilot, all projects workflows and design processes had to be adapted to the 3D model. The District worked in tandem with PennDOT's Digital Delivery team and Michael Baker International to refine the capacity of Bentley's Open Bridge Modeler (OBM), ensure the software aligned with PennDOT design standards, and develop and implement training.

Fabry said, "Everything was in development while we were trying to complete a production job. The in-time training was demanding, as we had to get all of the parties involved with the design field view, safety, and constructability to understand how to access and review the files, then train the bridge folks to review the design. This major change to the way we had been approaching projects was a little overwhelming, but by working together, we were able to figure it out."

He noted that once the project was designed, the District worked with contract management staff about what was needed for the advertising process, such as loading files into ECMS and helping contractors download digital files. The team also had to make changes to the digital signature process and address how to create plan revisions. Fabry pointed out that, overall, the project entailed only a 30% increase in design hours over conventional processes. "This was remarkable, given that we were concurrently designing the project, training staff, and modifying the software," he said.

Fabry added that District staff is committed to getting contractors on board in understanding the 3D models and how they can access the information needed in the field. "The digital team will be meeting biweekly with contractors to help them navigate the review software, as well as the model, and get the information to the workers in the field," he said.

Moving forward, Fabry recognized that one of the biggest challenges will be getting people used to the change. "In doing so, we also need to develop discipline-specific training so that folks understand what the benefits are and to help them understand how it impacts them. I believe the in-house pilot is going to be successful. From the design standpoint, it actually helped to identify some areas that may have been looked at incorrectly or missed completely when using 2D because you just couldn't visualize it properly."

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PennDOT Awarded ADCMS Grant

In November 2023, PennDOT was awarded one of ten Advanced Digital Construction Management Systems (ADCMS) grants from The U.S. Department of Transportation's Federal Highway Administration (FHWA). According to FHWA Administrator Shailen Bhatt, "The ten projects selected for funding will help advance digital construction nationwide because they will serve as models for other state and local transportation agencies to adopt these best practices."

The ADCMS program is one aspect of FHWA's multifaceted Technology and Innovation Deployment Program (TIDP) and provides funding as an incentive for state departments of transportation. It promotes construction professionals with access to more meaningful,

accurate, and easy-to-use data with enhanced software modeling tools and features. Better and more consistent modeling allows the seamless sharing of design and construction plans.

Under this four-year grant award, PennDOT plans to use the nearly \$5 million in funding to develop an open-data standard that would eliminate the need for paper plans and make it easier to exchange information digitally between design and construction teams. Training for PennDOT personnel and contractors will ensure that transportation officials and those in related industries develop knowledge and skills on advanced technology and cutting-edge computer systems together.



In November 2023, the Associated Pennsylvania Constructors (APC), in partnership with PennDOT and the Pennsylvania Turnpike Commission, held its three-day, 45th Annual Fall Seminar at the Hershey Lodge. The seminar provided the perfect opportunity for PennDOT's Digital Delivery team to actively engage with a diverse audience through its booth exhibit, including showcasing 3D virtual model-based project design and model-based construction inspection.

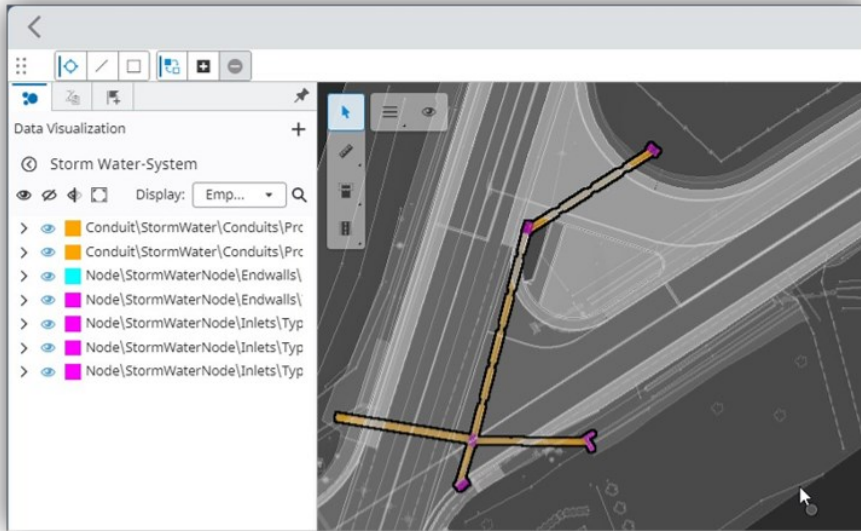
Through this interaction, the team was able to encourage attendees to share their insights and experiences, creating a dynamic exchange of ideas that helped to bridge the gap between technology and practical application. The open atmosphere led to meaningful discussions, fostering connections between digital innovators and those integral to the hands-on aspects of highway and bridge construction.

The forum proved instrumental in providing seminar attendees with a deeper insight into PennDOT's approach to digital delivery, illuminating the benefits and strategies associated with the directive. The collaborative spirit among host partners and participants also established the event as a nexus for knowledge-sharing, reinforcing the commitment of the industry to stay at the forefront of technological advancements in highway infrastructure development.



Software Enhances Data Visualization

ProjectWise 365 Design Review and SYNCHRO Control® is an online model review and construction application that offers a unique element identification function. The function allows the user to colorize, emphasize, and isolate model elements. This data visualization capacity makes it simpler to identify objects of interest for validation, inspection, and quantification.



Emphasized Data Visualization

The setup is user friendly and provides numerous ways to select, group, and colorize objects. The user can select a specific class of objects, then refine the search by a particular property, such as feature definition. The software's search function also allows for further filtering, so that only desired elements are selected.

The user can retain the edited model or his or her continuing activities—or easily share the model with others on the design, inspection, and construction teams.

For example, through visualized model sharing, the inspector is able to quickly identify the elements ready for inspection and use the software's civil and measurement tools to validate their location and size. Project model elements are to scale and correctly geolocated to one of the two Pennsylvania coordinate systems, North Zone or South Zone. With this feature, the project's quality control and assurance program provides the inspector and contractor with an accurate representation of project features and their location in the real world.

Upcoming Events

- **Monthly PennDOT Digital Delivery Workspace Open Discussion and Update**, 4th Tuesday of every month, 11 am to noon
- [Digital Delivery Quarterly Webinar, June 27, 1 pm](#)
- **IHEEP**, September 15-19, Des Moines, IA

Resources

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Interested in exploring the construction model and cloud-based environment? Sign up for the Synchro Control Sandbox, using the QR code. Sandbox participants will have access to additional training opportunities and information developed throughout the year.

PennDOT Synchro Sandbox

