e-Ticketing and Digital As-Builts

Every Day Counts
Innovation for a Nation on the Move

Implementing e-Ticketing and digital as-builts into project delivery enhances safety, quality, and cost savings by improving the accessibility of project data.

Highway construction projects produce massive amounts of valuable data. Historically, information such as materials tickets and as-built plans were communicated via paper. Today's transportation agencies are improving on these paper processes by integrating them into electronic and digital workflows. Electronic ticketing (e-Ticketing) improves the tracking, exchange, and archiving of materials tickets. Digital information, such as 3D design models and other metadata, can enhance the value of contract documents and the future usability of the as-built plans for operations, maintenance, and asset management. Both can increase project safety and quality through efficient data gathering and sharing.

e-TICKETING

A paperless process for creating, sharing, tracking, documenting, and archiving materials information, accessible in real time via mobile devices, provides all stakeholders with an electronic means to verify materials deliveries while enhancing safety, streamlining inspections, and improving contract administration procedures. Using electronic ticket exchanges enables access via mobile devices and simplifies handling and integration of material data into construction management systems for acceptance, payment, and source documentation.

e-Ticketing uses mobile devices to access electronic ticket exchanges, improving material data handling and integration into construction management systems. Source: FHWA

BENEFITS OF e-TICKETING

- **Safety.** e-Ticketing enhances data collection while reducing exposure to adjacent vehicular traffic and construction equipment for inspectors and work crews while retrieving paper tickets.
- **Time Savings.** Real-time access, via electronic handling of tickets, reduces processing time for quality assurance and payment, decreasing the inherent delays in paper-based project administration.
- **Quality.** Project documentation is more consistent and efficient using e-Ticketing platforms. Standardized data enables archiving for future reference, leading to improved design, construction, maintenance, and operations.

e-TICKETING STATE OF THE PRACTICE

Departments of transportation (DOTs) in 10 States (Alabama, Florida, Iowa, Kentucky, Minnesota, Missouri, North Dakota, Pennsylvania, Utah, and Virginia) are currently applying e-Ticketing to asphalt, concrete, and/or aggregate delivery for construction contracts. Various DOTs have piloted e-Ticketing for liquid asphalt/emulsions, precast products, steel products, and millings. Over a dozen additional State DOTs piloted e-Ticketing for the first time in the 2020 construction season.

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DIGITAL AS-BUILTS

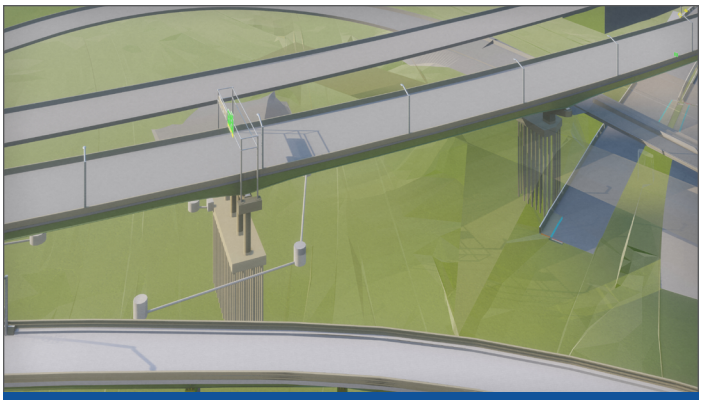
Using digital data such as 3D models to build road projects is becoming an industry standard. Sharing the design model and associated digital project data allows agencies and contractors to streamline project delivery and contract administration and to collaborate on challenges "virtually" before they get to the field. The digital information is further enhanced when the model is updated and augmented with other data to reflect the project's as-built condition for future maintenance, asset management, and rehabilitation activities.

BENEFITS OF DIGITAL AS-BUILTS

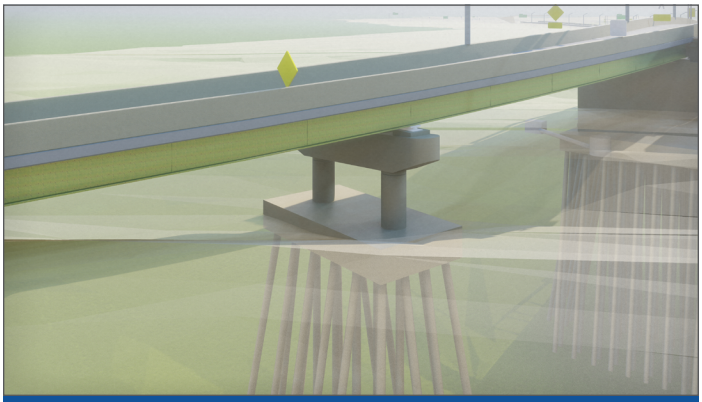
- **Safety.** Construction using digital information can lead to safer projects (e.g., known utility locations reduce life-threatening damages) and shorter work zone traffic impacts.
- **Time Savings.** Digital information provided to construction enhances planning, streamlines project delivery, and leads to better as-constructed data. Digital as-builts including utility locations and other asset information will improve post-construction decisions and shorten future project delivery.
- **Quality.** Digital as-builts can provide enhanced historical data, enabling State DOTs to better maintain the transportation infrastructure and develop future projects.

DIGITAL AS-BUILTS STATE OF THE PRACTICE

The Iowa, Minnesota, and Utah DOTs are recording as-built information on assets during construction. Michigan DOT is developing a digital as-built approach for utilities during permitting. Several States, including Oregon, Indiana, Montana, and California, are working to incorporate digital data into more effective construction delivery and management workflows. DOTs in New York, Iowa, and Utah are providing contractors enhanced contract documents using the 3D model as they consider more integrated and streamlined approaches to project delivery.



The New York State DOT required digital as-builts using 3D models provided in the contract documents for the Kew Gardens Interchange Project. Source: NYSDOT



Images like these from the project's as-built 3D model show the relationship between drainage structures, piles, pile cap, and pier signage structure. Source: NYSDOT

RESOURCES

FHWA e-Ticketing and Digital As-Builts

FHWA Construction: e-Construction

FHWA Construction: 3D Engineered Models

Utah DOT Digital Delivery

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Publication No: FHWA-20-CAI-008