e-Ticketing in Iowa

tech transfer summary

The implementation of e-ticketing in Iowa has the potential to improve jobsite safety, save time, improve project documentation, and standardize data collection.

Background

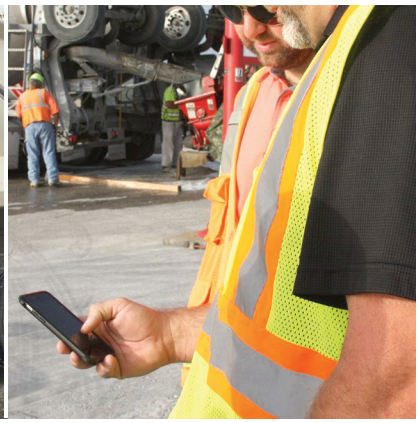
The traditional method of tracking material deliveries to roadway and bridge construction sites has been for inspectors to collect paper tickets from haul truck operators. The Iowa Department of Transportation (DOT), however, is a national leader in the innovative alternative to this method: e-ticketing.

As defined by the Federal Highway Administration's (FHWA's) Every Day Counts, Round 6 (EDC-6) initiative, e-ticketing is the provision of "an electronic means to produce, transmit, and share materials data and track and verify materials deliveries" (FHWA 2024).

The digitization of this data collection and processing procedure has numerous benefits (FHWA 2024):

- Increased safety for job site construction inspectors through a reduction in their exposure to work zone vehicles
- Time savings through real-time access to data and reduced processing times
- Higher-quality project paperwork through more consistent and efficient project documentation
- Standardization of the data collected, allowing for easier access and analysis that might define future improvements and/or quantification of program impacts

Collection of a paper ticket from a haul truck operator



Use of a mobile device to manage e-tickets at a job site

December 2024

RESEARCH PROJECT TITLE
Iowa LTAP E-Ticketing: Training and Loan Equipment Assistance

SPONSOR
Iowa Department of Transportation (InTrans Project 23-865)
Federal Highway Administration (STP-000T(220)-2C-00)

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The Iowa Local Technical Assistance Program (LTAP) is dedicated to providing technical and management assistance to Iowa's local governments through a variety of programs and resources.

The mission of the Institute for Transportation (InTrans) at Iowa State University is to save lives and improve economic vitality through discovery, research innovation, outreach, and the implementation of bold ideas.

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Part of Federal SPR Part II, CFDA 20.205

Purpose

This technical brief summarizes the development and implementation of e-ticketing in Iowa under the Iowa DOT's e-ticketing initiative.

Timeline of e-Ticketing in Iowa

The Iowa DOT's commitment to e-ticketing began almost 10 years ago. In 2015, a pilot e-ticketing process was introduced as a proof of concept project by Greg Mulder, the Director of the Iowa DOT's Office of Construction Materials at the time (Iowa DOT 2015). This is believed to have been the first e-ticketing project in the United States.

An additional component of the plan was to pilot the same approach on further projects during the 2016 construction season, and the approach was applied to two projects. It was also recognized that a scale integration of the concept would be needed to demonstrate the benefits of e-ticketing (Iowa DOT 2015).

Since that time, the Iowa DOT has continued to expand its use of e-ticketing. Additional projects were completed in 2017 and 2018. Then in 2019, the Iowa DOT e-ticketing portal was initially introduced as part of an improved approach to e-ticketing that was tested on the largest project in Iowa DOT history—a $322 million bridge project over the Mississippi River. This test was successful, and the e-ticketing portal continues to be improved as needed.

The number of projects and contracts involved with e-ticketing in Iowa has continued to increase since 2019 as the Iowa DOT has continually developed improvements and eased access to the system. Several of these improvements are noted here:

- In 2021, federal funding was acquired through the FHWA's State Transportation Innovation Council (STIC) program for the initiative described below.
- In that same year, the Iowa DOT initially introduced a developmental specification that required e-ticketing, and this was reintroduced in 2023.
- At about the same time, the Iowa DOT also began to use a single vendor for its e-ticketing aggregation and distribution. This decision enabled all of its construction inspectors to see their e-tickets in one place.
- A video about how contractors can connect to the Iowa DOT e-ticketing portal was posted in May 2023.
- The Iowa DOT has purchased and provides its contractors with access to an e-ticketing mobile app called JOBslip.
- In 2024, another development specification was introduced that required contractors to supply portable suitcase-size pop-up network units to provide "reliable, high-speed connectivity to support construction site inspections through digital means" (Iowa DOT 2024).

All of these actions, plus many others, have resulted in or are expected to result in significant growth in the application of e-ticketing within Iowa.

Overall, the use of e-ticketing in Iowa, after only about 10 years, is already quite significant. In fact, the Iowa DOT's vendor for e-ticketing aggregation and distribution indicated that in 2023, Iowa processed more tickets related to cubic yards of concrete than any other state in the vendor's system. In 2024 alone, tracking shows that 29 suppliers were using e-ticketing on 217 projects in Iowa, and these projects produced approximately 88,100 e-tickets that accounted for approximately 214,000 cubic yards of concrete and 1.5 million tons of asphalt.

A recent informal survey of Iowa county engineers also revealed that approximately 20 counties have used e-ticketing in some form in the last two to four years.

STIC Initiative

The use of e-ticketing and digital as-builts was identified as one of seven national innovations of interest by the FHWA as part of its 2021–2022 Every Day Counts program. Funding to advance these innovations has been the focus of the STIC funding available to each state from the FHWA.

In 2020, the Iowa DOT developed a proposal with the goal of increasing the use of e-ticketing in Iowa. Specifically, the proposal focused on activities expected to expand the use of e-ticketing in rural areas with poor cellular signal coverage. The proposal was awarded STIC funding to carry out the tasks described below.

Cellular Signal Boosters

The primary task of the Iowa DOT proposal was to purchase cellular signal boosters and supply them to those in need. These devices enhance signal strength and data transfer speeds.

Cellular signal booster

In November 2022, the Iowa DOT purchased eight cellular signal boosters, six of which were kept at each of the Iowa DOT district offices for use on projects within those districts that had poor cellular signal coverage. The Iowa DOT also distributed some in-vehicle cellular signal boosters for testing.

The other two cellular signal boosters were given to the Iowa Local Technical Assistance Program (LTAP) for the duration of the project to incorporate into its equipment loan program. Iowa LTAP developed a web page describing the equipment and its use with regard to e-ticketing and an online form allowing local agencies to borrow the equipment. An equipment loan user agreement was used, and the boosters were express mailed to agencies when requested.

Iowa LTAP also developed a short and simple user guide for local agencies to reference in the field, including contact information for Iowa LTAP and Iowa DOT personnel available to provide additional help. The inclusion of the cellular signal boosters as part of the Iowa LTAP equipment loan program was also advertised in the January–March 2023 issue of the program's newsletter, *Technology News*.

The cellular signal booster units were available from Iowa LTAP between April 2023 and September 2024. Once agencies were made aware that the units were available, the units began to be used during the primary months of the 2023 and 2024 construction seasons. During the 2023 construction season, the cellular signal boosters were loaned out to three counties between June 15 and September 10, with both units in the field during some of that time period. Similarly, one or both units were in the field between May 1 and August 15 during the 2024 construction season, when they were on loan to three different counties.

In general, the Iowa DOT has noted that cellular signal coverage continues to improve in Iowa and, as noted above, has produced a developmental specification that would ultimately require these units to be provided by the contractor (Iowa DOT 2024).

e-Ticketing Outreach

An additional task in the Iowa DOT proposal was to provide e-ticketing training and outreach to Iowa DOT staff, counties, cities, and consultants.

At the time of the initiative, however, the concept and benefits of e-ticketing were not new within the Iowa DOT or, to a certain extent, within local agencies. By 2023, when funding was provided for the potential training, it was generally concluded that the Iowa DOT was already conducting internal training or outreach efforts on e-ticketing for its staff through various means (e.g., internal meetings, conferences, webinars, one-page flyers, and recordings).

For example, one recent flyer titled *e-Ticketing by Integrations* describes three options for producers or suppliers to transition into e-ticketing. A second flyer titled *IDOT e-Ticketing Portal* includes the steps that contractors and Iowa DOT personnel can take to get started in the portal. The Iowa DOT and its service provider for the portal also offer direct assistance to those joining the system and share information on the steps to join and the ease with which it can be done. They also provide technical assistance and outreach on its use.

In addition, the Iowa DOT e-ticketing team has been presenting information about e-ticketing and the process for joining the system at several local agency or product association conferences and meetings. These presentations and instructional activities have generated interest in e-ticketing to such an extent since 2020 that two counties presented their experience in e-ticketing at the 2023 Iowa County Engineers Association (ICEA) Annual Conference.

Within Iowa, the Iowa DOT has shared its knowledge in the area of e-ticketing through presentations at meetings such as the following:

- Iowa County Engineers Association Annual Conference, 2020 and 2022
- Iowa County Engineers Association Midyear Conference, 2021
- Iowa County Engineers Association Meeting at the Iowa State Association of Counties Spring Conference, 2022
- Peer exchange in Iowa with the Kentucky Transportation Cabinet, 2022
- Iowa Concrete Paving Association (ICPA) Conference, 2022 and 2023
- Iowa DOT webinar for contractors on connecting to the Iowa DOT e-ticketing portal, 2023
- Greater Iowa Asphalt Conference, 2024

Outside Iowa, the Iowa DOT e-ticketing team has also been busy sharing the wealth of information it has acquired on this topic over many years. These activities have included, but are not limited to, the following:

- Peer exchanges with Delaware, Florida, Illinois, New York, North Dakota, Ohio, Washington, Pennsylvania, Tennessee, and Utah
- National peer exchange in Georgia
- National Concrete Consortium Conference
- AASHTO Committee on Construction Conference
- Various panels at the Transportation Research Board Annual Meeting

Future Plans

The Iowa DOT continues to work on several initiatives designed to integrate and increase the use of e-ticketing in the state of Iowa.

One of these is to finalize the two development specifications (noted above), one requiring the use of e-ticketing on all asphalt and concrete projects and the other requiring contractors to provide cellular signal boosters.

The Iowa DOT is also always working to integrate its e-ticketing system with other software (e.g., AASHTOWare Project Construction and Materials modules) and to add useful functions to the JOBslip mobile app.

Additionally, the Iowa DOT is currently working with some vehicle manufacturers to develop methodologies and approaches that can be used to share the locations of haul vehicles. Vehicle location tracking has become much more accepted and, from a technical standpoint, a much easier task in recent years. There are many benefits to tracking the locations of vehicles delivering materials to a project site, including haul route verification.

Finally, the Iowa DOT has been chosen to receive a $1.5 million Advanced Digital Construction Management System grant from the FHWA. The focus of this grant is the development of solutions to "capture, share, and store" digital as-built information for construction materials (FHWA 2023). These activities should have a positive impact on e-ticketing.

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