

# Field Evaluation of E-Ticketing Technologies for Efficient Asphalt Delivery Ticket Collection and Quantity Calculation

**Project Number:**

21SAUNM01

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Tran-SET

University of New Mexico

**Total Project Cost:**

\$ 130,000

*Developing a guidebook for the implementation of E-Ticketing technologies*

Every year state departments of transportation (DOTs) collect thousands of paper tickets for delivering hot mix asphalt, warm mix asphalt, concrete, base course, embankment, and other construction materials. Collecting paper load tickets is an antiquated practice that exposes inspectors to substantial risk of death or personal injury by assigning them adjacent to traffic or moving or backing equipment. In addition, paper-based load tickets may be lost, and in some cases, it is difficult to decipher the information on the ticket due to poor printing. Under the current system, paper-based load tickets are taken back to the project office where they are summed and entered into an Excel spreadsheet for reporting and payment purposes, which is time-consuming, labor-intensive, and error-prone. In recent years, new e-Ticketing (i.e., electronic-ticketing) technologies enable the collection of this information electronically, allowing for safer and more efficient inspection, rapid project delivery and payment, reduced effort for ticket management, and near real-time comparisons of theoretical tonnages and temperatures to actual tonnages and temperatures. This research will conduct field evaluations of an e-Ticketing system on several New Mexico Department of Transportation (NMDOT) paving projects throughout the state of New Mexico. This project will also develop a guidebook for the implementation of the tested e-Ticketing system to assist NMDOT with workforce development and professional training.

expose inspectors to substantial risk of death or personal injury. In addition, a paper-based ticketing system requires the allocation of human resources to collect, organize, store, and archive load delivery tickets for project management and documentation purposes. Under a paper-based ticketing system, load tickets are taken back to the project office where they are summed and entered into an Excel spreadsheet for haul summary, reporting, and payment purposes. Due to human errors, paper load tickets may be lost during transmission, and in some cases, it is difficult to decipher the information on the ticket due to poor printing. In recent years, transportation agencies have begun improving these paper-based ticketing systems by transforming and integrating them into electronic, digital, and paperless workflows which are known as e-Ticketing systems. An e-Ticketing (i.e., electronic-ticketing) system enables the collection of load delivery information electronically, allowing for much safer and more efficient inspection, rapid project delivery and payment, reduced effort for ticket management, and near real-time comparisons of theoretical tonnages and temperatures to actual tonnages and temperatures. Due to its great potential in meaningful impact on construction practices, many state DOTs are interested in use of e-ticketing. However, all of them have various concerns and knowledge gaps, and the top three are lack of software selection processes, lack of implementation guidance, and lack of performance evaluation criteria. Without these processes and guidance, districts in a state DOT may use different e-Ticketing systems, leading inspectors to end up having to learn how to use a variety of systems, depending on where the project is located at and who are managing the project.

**Problem Statement**

State departments of transportation (DOTs) collect thousands of paper tickets for delivering hot mix asphalt, warm mix asphalt, concrete, base course, embankment, and other construction materials. Historically, load delivery tickets for roadway construction projects were collected, distributed, stored, and chived via paper. However, collecting paper load tickets is an outdated practice because it exposes construction inspectors to many safety hazards. Inspection activities such as working in close proximity to moving or back equipment, climbing on the side of a truck, and walking in high-traffic volume areas

**Objectives**

The proposed project includes two objectives: (1) perform complete and thorough field evaluations of an e-Ticketing system on three NMDOT asphalt delivery projects throughout the State of New Mexico; and (2) develop a guidebook for the implementation of the selected e-Ticketing



system to assist transportation agencies at all levels (federal, state, local, or tribal) with e-Ticketing technology implementation, workforce development, and professional training.



**Figure 1. Hand-off of paper load tickets at job site**

## Intended Implementation of Research

Research findings will be distributed through: (1) scientific peer-reviewed publications; (2) training workshops; and (3) technology transfer to state DOTs, specifically state DOTs in the Tran-SET region. The proposing institution serves a majority of minority populations, including both Hispanics and Native Americans and the PIs will seek to engage students from these populations in the proposed research.

## Anticipated Impacts/Benefits of Implementation

The proposed project will identify and evaluate an e-Ticketing software package which can assist transportation agencies in collecting and managing electronic asphalt delivery tickets, conducting asphalt inspection, completing projects and making payments, conducting near real-time comparisons of theoretical tonnages and temperatures to actual tonnages and temperatures, improving jobsite safety, and improving operational efficiencies.

## Web links

- Tran-SET's website  
<https://transet.lsu.edu/research-in-progress/>

## Tran-SET

Tran-SET is Region 6's University Transportation Center. It is a collaborative partnership between 11 institutions (see below) across 5 states (AR, LA, NM, OK, and TX). Tran-SET is led by Louisiana State University. It was established in late November 2016 "to address the accelerated deterioration of transportation infrastructure through the development, evaluation, and implementation of cutting-edge technologies, novel materials, and innovative construction management processes".

## Learn More

For more information about Tran-SET, please visit [our website](#), LinkedIn, Twitter, Facebook, and YouTube pages. Also, please feel free to contact Dr. Momen Mousa (Tran-SET Program Manager) directly at [transet@lsu.edu](mailto:transet@lsu.edu).

