

# What is e-Ticketing?

September 2020

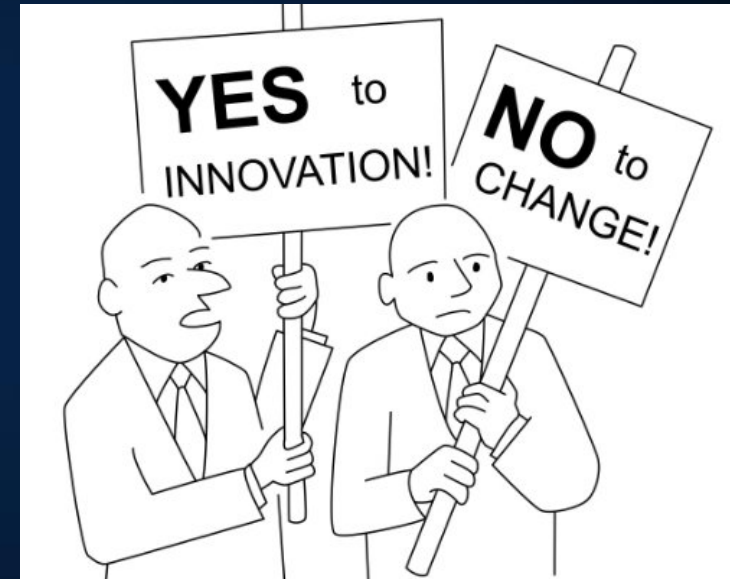


U.S. Department of Transportation  
**Federal Highway Administration**



# Outline

- What is e-Ticketing?
  - Typical ticketing practice
  - Attributes
  - Advantages
  - Examples
  - Related laws and policies
- Deployment activities
  - EDC-3 and EDC-4 accomplishments
  - Current DOT deployment status
  - EDC-6 goals and challenges



Source: FHWA

# What is the typical material ticketing practice?

## *A “Day in the Life” of a Ticket* – Paper Ticket Handlers –



Supplier

Driver /  
Hauler

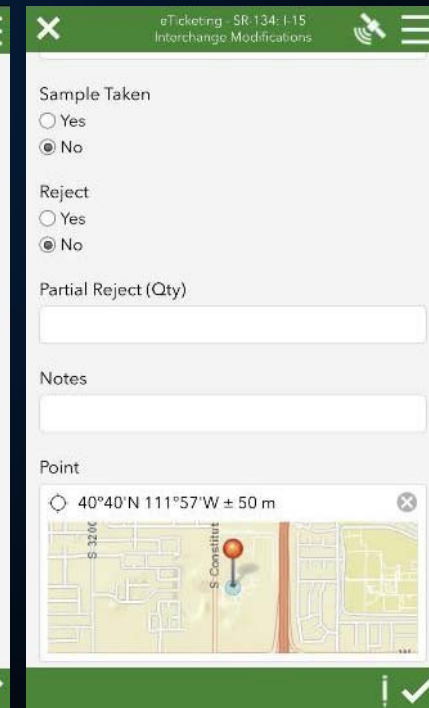
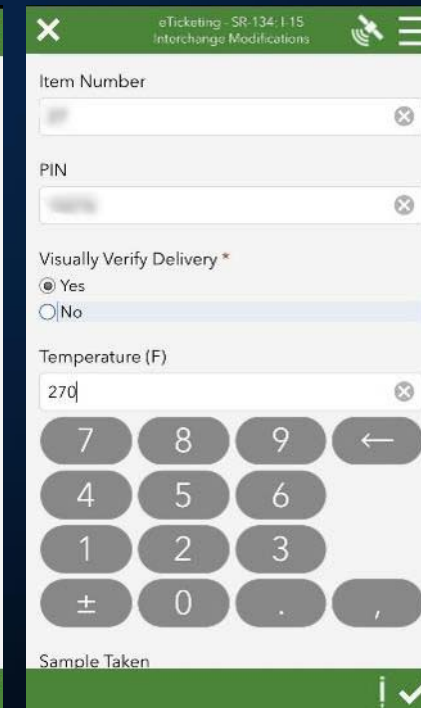
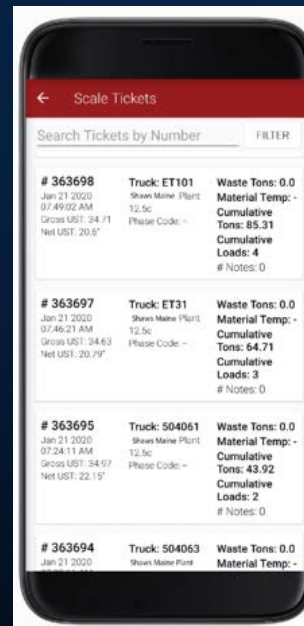
Contractor

Field Tester  
/ Inspector

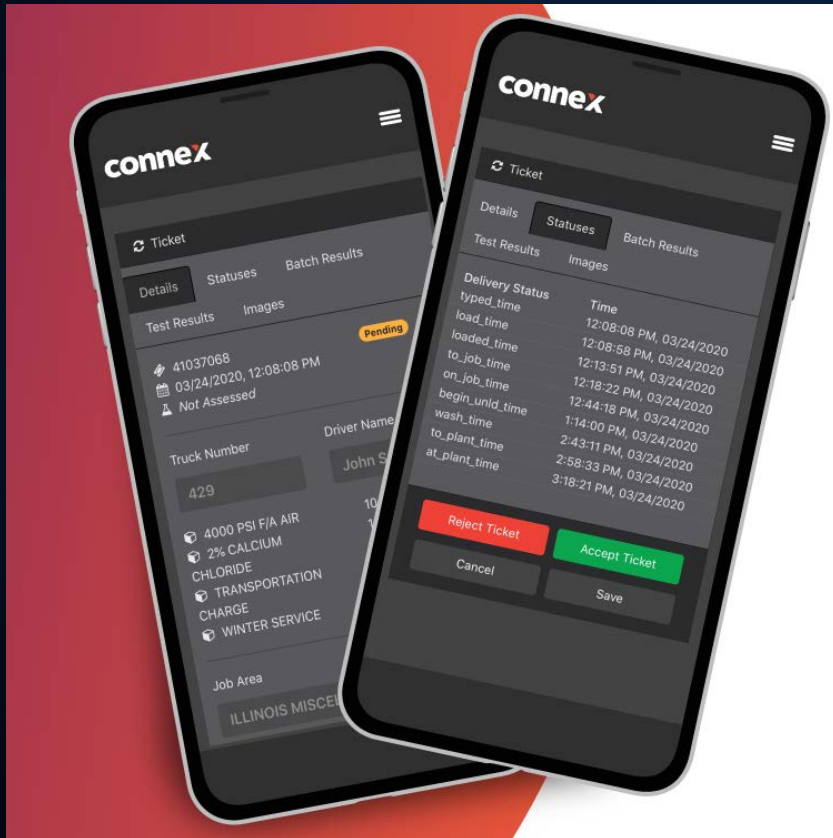


# What is e-Ticketing?

- A paperless process for tracking, documenting, and archiving materials tickets, accessible in real-time via mobile devices.



# What is e-Ticketing?



Real-time information



Potential to automate processes (shifts, payments, estimates, DBE tracking, etc.)



Quick and easy set-up



Web-based and interfaces to 3<sup>rd</sup> parties



Mobile apps, Excel, and emailed PDFs



Works with company or brokered trucks



Captures test data, notes, and photos

# Q: e-Ticketing - - >> WHY?

#1: Improve worker **safety**

#2: Simplify ticket **handling** using electronic and digital exchanges

#3: Facilitate **integration** of data into AASHTOWare (or other Construction Management System)

#4: Manage test results with **mobile devices**

#5: **Access** data before (and after) trucks arrive at jobsite



# What is e-Ticketing?

- Real-time information via web or app

**Load Cycle Analysis** [Export to PDF](#)

**Grand Totals** This report expects the column LoadTime in the data, but it was not present

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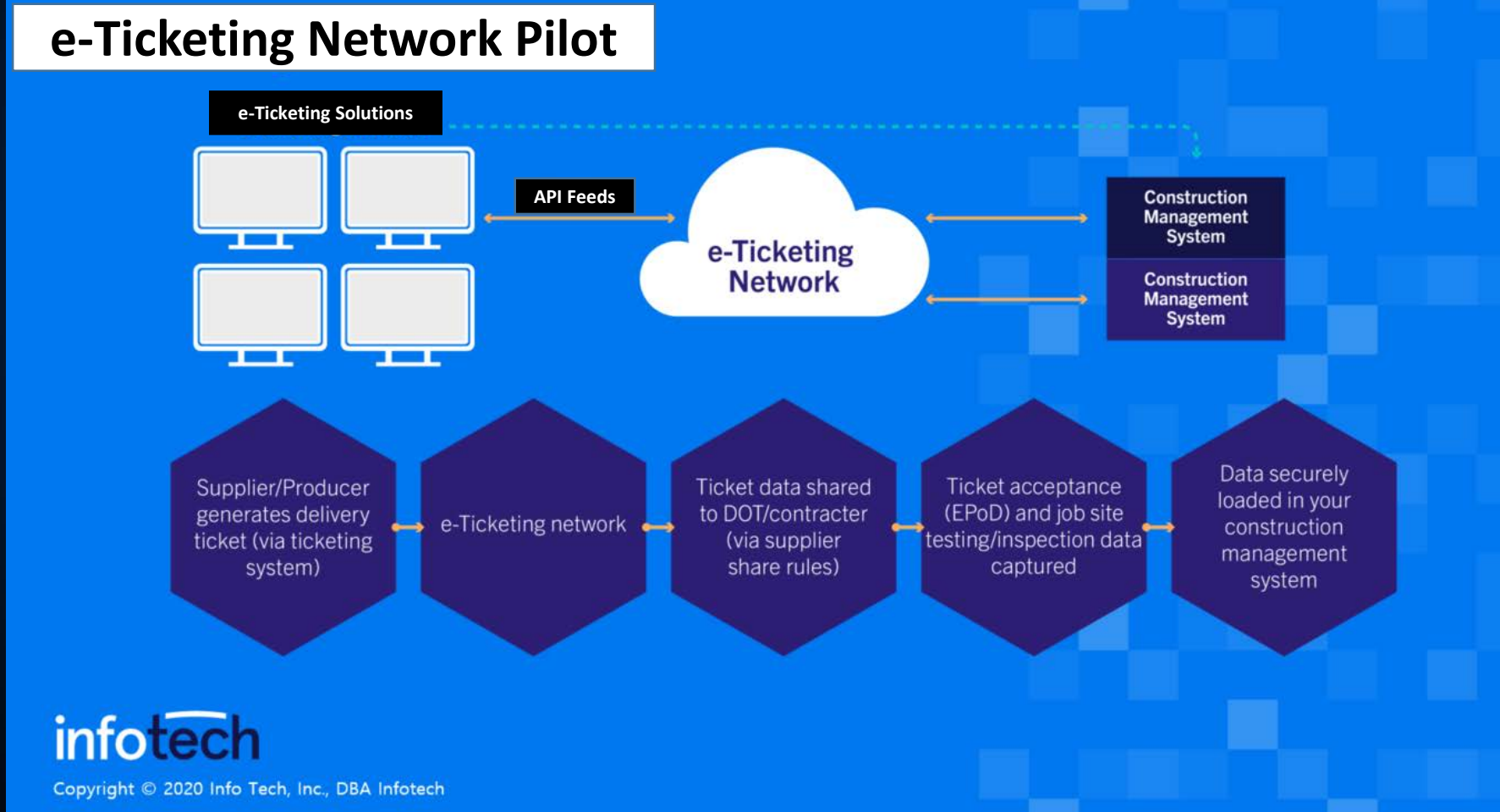
| Cycle Start Time    | Load Time           | Tons         | Source Geo-zone   | Dest Geo-zone | Time in Source | Time to Dest | Time in Dest | Time to Next Source | Total Time |
|---------------------|---------------------|--------------|-------------------|---------------|----------------|--------------|--------------|---------------------|------------|
| 2015-11-20 06:01:06 | 2015-11-20 06:48:17 | 23.61        | Bourbonnais Plant | BASF Kankakee | 52             | 25           | 40           | 29                  | 146        |
| 2015-11-20 08:28:05 | 2015-11-20 08:31:41 | 23.62        | Bourbonnais Plant | BASF Kankakee | 15             | 23           | 44           | -                   | 82         |
| -                   | -                   | -            | -                 | BASF Kankakee | -              | -            | 51           | 25                  | 76         |
| 2015-11-20 11:09:07 | 2015-11-20 11:11:15 | 23.74        | Bourbonnais Plant | BASF Kankakee | 6              | 23           | 52           | 25                  | 106        |
| 2015-11-20 12:55:07 | 2015-11-20 12:58:08 | 23.56        | Bourbonnais Plant | BASF Kankakee | 10             | 28           | 52           | 31                  | 121        |
| 2015-11-20 14:56:07 | 2015-11-20 14:59:18 | 23.87        | Bourbonnais Plant | BASF Kankakee | 9              | 22           | 20           | 32                  | 83         |
| 2015-11-20 16:19:07 | 2015-11-20 16:22:01 | 23.8         | Bourbonnais Plant | BASF Kankakee | 8              | 23           | 4            | -                   | 35         |
| -                   | -                   | -            | -                 | BASF Kankakee | -              | -            | 17           | 37                  | 54         |
| 2015-11-20 17:50:07 | -                   | -            | Bourbonnais Plant | -             | 8              | -            | -            | -                   | 8          |
| <b>Totals</b>       | -                   | <b>142.2</b> | -                 | -             | <b>108</b>     | <b>144</b>   | <b>280</b>   | <b>179</b>          | <b>711</b> |
| <b>Averages</b>     | -                   | <b>23.7</b>  | -                 | -             | <b>15</b>      | <b>24</b>    | <b>35</b>    | <b>29</b>           | <b>79</b>  |

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| Cycle Start Time    | Load Time           | Tons  | Source Geo-zone   | Dest Geo-zone | Time in Source | Time to Dest | Time in Dest | Time to Next Source | Total Time |
|---------------------|---------------------|-------|-------------------|---------------|----------------|--------------|--------------|---------------------|------------|
| 2015-11-20 06:06:02 | 2015-11-20 06:52:02 | 23.67 | Bourbonnais Plant | BASF Kankakee | 49             | 25           | 73           | 22                  | 169        |
| 2015-11-20 08:55:02 | 2015-11-20 08:58:30 | 23.61 | Bourbonnais Plant | BASF Kankakee | 7              | 20           | 28           | -                   | 55         |
| -                   | -                   | -     | -                 | BASF Kankakee | -              | -            | 54           | 22                  | 76         |
| 2015-11-20 11:10:02 | 2015-11-20 11:14:36 | 23.55 | Bourbonnais Plant | BASF Kankakee | 8              | 21           | 79           | 24                  | 132        |
| 2015-11-20 13:22:02 | 2015-11-20 13:25:11 | 23.69 | Bourbonnais Plant | BASF Kankakee | 5              | 22           | 39           | 30                  | 96         |
| 2015-11-20 14:58:02 | 2015-11-20 15:02:22 | 23.65 | Bourbonnais Plant | BASF Kankakee | 8              | 23           | 3            | -                   | 34         |
| -                   | -                   | -     | -                 | BASF Kankakee | -              | -            | 15           | 31                  | 46         |
| 2015-11-20 16:22:02 | 2015-11-20 16:26:25 | 23.88 | Bourbonnais Plant | BASF Kankakee | 7              | 23           | 2            | -                   | 32         |

# What is e-Ticketing?

## – Data management, transfer and usage



# What is e-Ticketing?

## Types of e-Tickets:

- The Big 3
  - Hot Mix Asphalt (HMA)
  - Portland Cement Concrete (PCC)
  - Aggregate
- Other
  - Structural Steel
  - Rebar
  - Precast PCC: pipe, inlets, box culverts
  - Guardrail
  - Signs
  - Millings
  - Soil
  - Liquid asphalt/emulsions



|                                                                                                   |          |                      |                                      |              |        |
|---------------------------------------------------------------------------------------------------|----------|----------------------|--------------------------------------|--------------|--------|
|                                                                                                   |          |                      | TICKET                               | DATE         |        |
|                                                                                                   |          |                      |                                      | Sep 11, 2017 |        |
| PLANT                                                                                             | TRUCK    | DRIVER               |                                      |              |        |
| N                                                                                                 | 01       | Lutz, Brett          |                                      |              |        |
| ORDER                                                                                             | PO#      | JO#                  |                                      |              |        |
| 4                                                                                                 | 035      |                      |                                      |              |        |
| CUSTOMER                                                                                          | PROJECT# | PROJECT NAME         |                                      |              |        |
|                                                                                                   |          | Des Moines, IO 50319 |                                      |              |        |
|                                                                                                   |          | Pave Ave             |                                      |              |        |
| SOLD TO: [REDACTED]                                                                               |          |                      |                                      |              |        |
| DELIVER TO: [REDACTED]                                                                            |          |                      |                                      |              |        |
| PRODUCT NO.                                                                                       | QTY      | UNIT                 | DESCRIPTION                          | UNIT PRICE   | AMOUNT |
| 00000000                                                                                          | 10       | cy                   | C-150 3 Agg, 5% Air, 5% WHT, 10% Bit |              |        |
| 200                                                                                               | 10       | cy                   | Hauling Charge                       |              |        |
|                                                                                                   |          |                      |                                      | SUB TOTAL    |        |
|                                                                                                   |          |                      |                                      | TAX          |        |
|                                                                                                   |          |                      |                                      | TOTAL        |        |
| ORDERED: 12/06/06 DELIVERED: 20/07/07 SLUMP: 2.50                                                 |          |                      |                                      |              |        |
| LOAD TIME: 07:32:59 MAX WATER ALLOWED: 0.03 WATER ADDED @ PLANT: 0.03 WATER ADDED @ JOBSITE: 0.03 |          |                      |                                      |              |        |
| WIC RATIO @ PLANT: 0.57 WIC RATIO @ JOBSITE: 0.57                                                 |          |                      |                                      |              |        |
|                                                                                                   | ACTUAL   | MOISTURE             | TARGET                               | UNIT         |        |
| 100% DRY                                                                                          | 14.00    | 20.00 (1.25%)        | 14.00                                | LB           |        |
| SAND                                                                                              | 1200     | 3.0% (0.03%)         | 1200                                 | LB           |        |
| LS 3/4" CHIPS                                                                                     | 3500     | 3.0% (0.03%)         | 3500                                 | LB           |        |
| CEMENT                                                                                            | 3500     |                      | 3500                                 | LB           |        |
| FLUX                                                                                              | 1500     |                      | 1500                                 | LB           |        |
| RETARDER                                                                                          | 120      |                      | 120                                  | OZ           |        |
| POLYMER SA                                                                                        | 10       |                      | 10                                   | OZ           |        |
| WATER                                                                                             | 100      |                      | 100                                  | QT           |        |

# What is e-Ticketing? – GPS units

## Breadcrumb Tracking

- Optional, not required
- Hard-wired, mobile app on smartphones, or cigarette lighter adapter
- Internal battery backup
- Ping every minute on haul vehicles
- Ping every 30 seconds on pavers/mills
- No user fees or special software required
- User-based access to data based on privacy laws and contracts



# e-Ticketing Related Laws and Policies

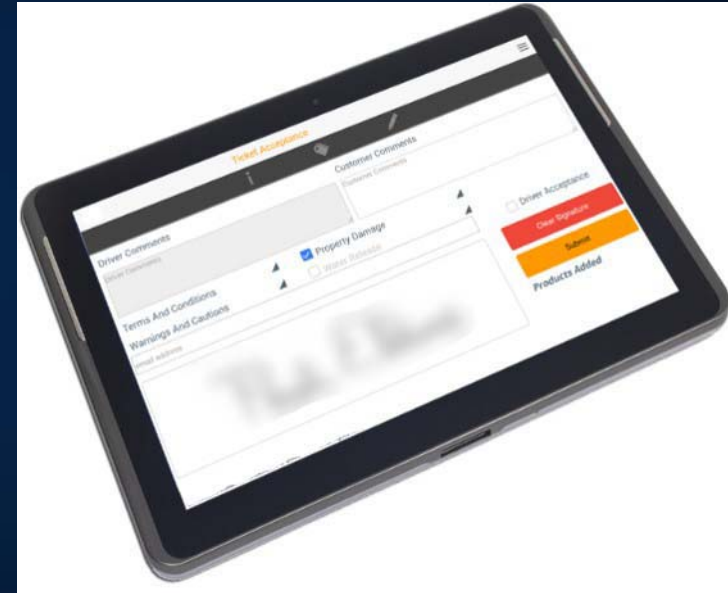
- e-Transaction Laws
  - Government Paperwork Elimination Act (GPEA) 1998
  - Electronic Signatures in Global and National Commerce Act (E-SIGN) 2000
  - Uniform Electronic Transactions Act (UETA) 1999
- 2 CFR 200.335 Methods for Collection, Transmission and Storage of Information
- 23 CFR 635.123 Determination and Documentation of Pay Quantities
- 23 CFR 637 Construction Inspection and Approval
- 2 FHWA Memos
  - Computerization of Construction Records, 09/21/1989
  - Electronic Security, 07/07/1993



# e-Construction's e-Ticketing Deployment

What have we accomplished under EDC-3 and EDC-4?

- Proof of concept
  - State DOT pilots
  - Research projects
- Industry awareness and innovation
- Commercial off-the-shelf (COTS) solutions
  - Batch plant automation systems
  - Supplier systems
  - Private contractor systems
  - State DOT systems
  - 3<sup>rd</sup> party providers
- Private industry usage



# e-Construction's e-Ticketing Deployment

- FHWA e-Ticketing Goals
  - Improve safety and efficiency through technology
  - Allow inspectors to focus on most-demanding tasks
  - Improve data collection, sharing, and usage
- Win-Win
  - DOT: web-based exchange of material information
  - Contractor: fleet management, delivery tracking, faster payments, safety



# e-Construction's e-Ticketing Deployment

- What would we like to see in EDC-6?
  - Expanded institutionalization of e-Ticketing
  - Promotion of best practices of e-Ticket specifications and standardization of ticket content
  - Expanded use beyond 2020 temporary deployments
  - Use of e-Ticket data for source documentation, acceptance, and payment
- Challenges
  - State DOT, Local Agency, Contractor, and Supplier buy-in
  - Privacy
  - 54+ State DOT versions
  - Delivery and data verification
  - Data management and transfer
  - Data usage beyond the construction project
  - 2020 temporary deployments

# CONTACTS

## e-Construction & e-Ticketing

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**[www.fhwa.dot.gov/construction/econstruction](http://www.fhwa.dot.gov/construction/econstruction)**



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