



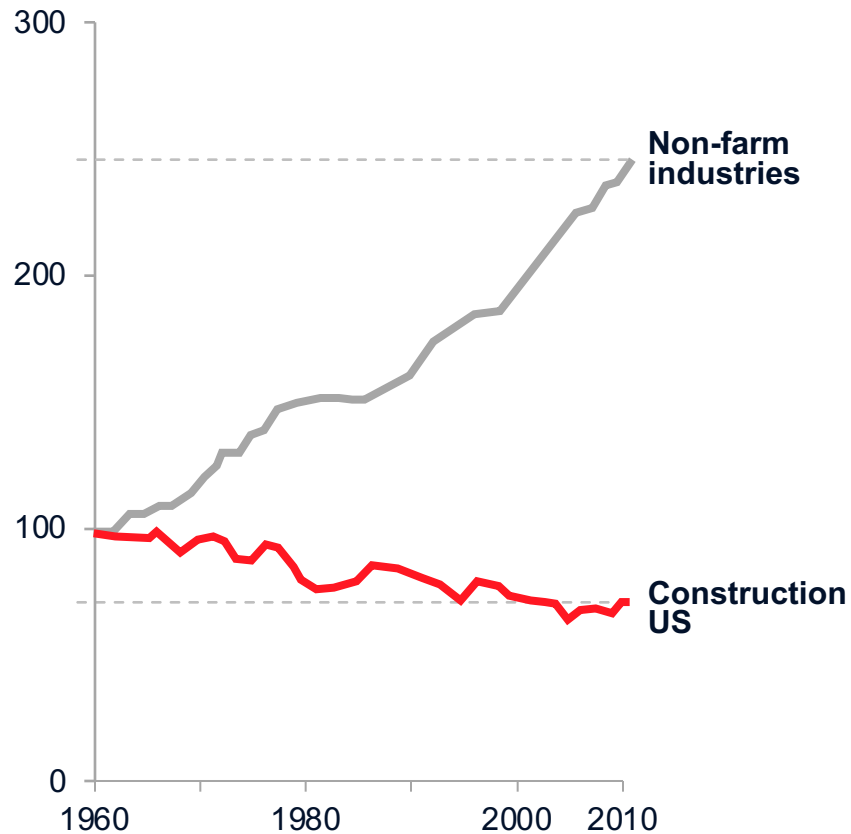
e-Ticketing: The Digital Road Ahead

**The New Jersey Asphalt Pavement Association
65th Annual Meeting
Matthew Valle, VP Industry Relations HaulHub Technologies**











Construction Has Some Catching Up to Do

Labor Productivity Index



Source: Stanford University

¹ Cumulative real growth in the United States, %, 1947–2010

	~1940s	~2016	Key Advances
Agriculture			Land assembly and automation for scale Advanced bioengineering to increase yields
Manufacturing			Entirely new concepts of flow Modularized and standardized designs Aggressively automated to increase production
Retail			Utilized scale advantages and cutting-edge logistics to provide affordable goods to the masses
Construction			Limited improvements in technological capabilities, production methods, and scale

The Journey to Digitize Construction is Long and Hard

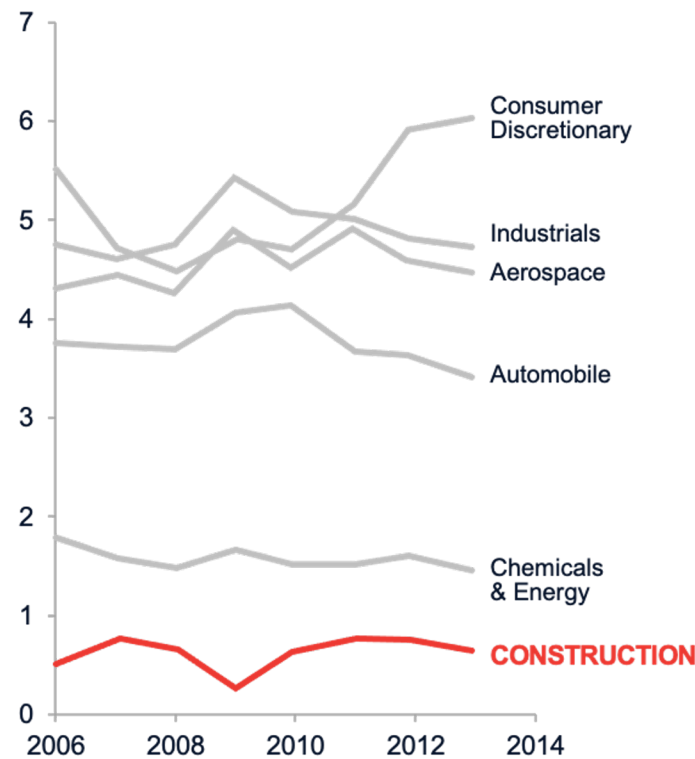
Level of Digitization

MGI industry digitization index, 2015 or latest available data



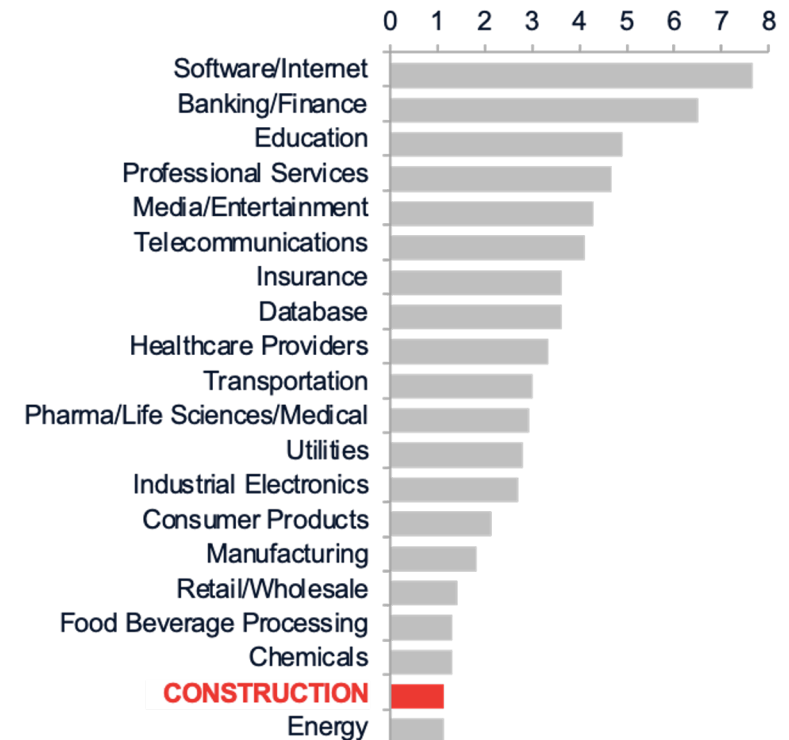
R&D Investment

% of revenue spent on R&D



IT Spending

% of revenue spent on IT



¹ Based on data of top 20 E&C companies by market value globally. ² Top 20 companies by market value

Quickly Growing Ecosystem of Solutions



Created by Lauren Weston

Read more at blog.thomvest.com

Industry Rally for e-Ticketing

Top 5 Asphalt Pavement Industry Issues



WORKFORCE
RECRUITMENT



FUNDING



WORK ZONE
SAFETY



COVID
MANDATES



E-TICKETING/
BMD



Federal Support for Digital Delivery

11 “(5) ACCELERATED IMPLEMENTATION AND DE-
12 PLOYMENT OF ADVANCED DIGITAL CONSTRUCTION
13 MANAGEMENT SYSTEMS.—

14 “(A) IN GENERAL.—The Secretary shall
15 establish and implement a program under the
16 technology and innovation deployment program
17 established under paragraph (1) to promote,
18 implement, deploy, demonstrate, showcase, sup-
19 port, and document the application of advanced
20 digital construction management systems, prac-
21 tices, performance, and benefits.

- Infrastructure Investment and Jobs Act (IIJA) - H.R. 3684

- Section 5113



Current EDC Round

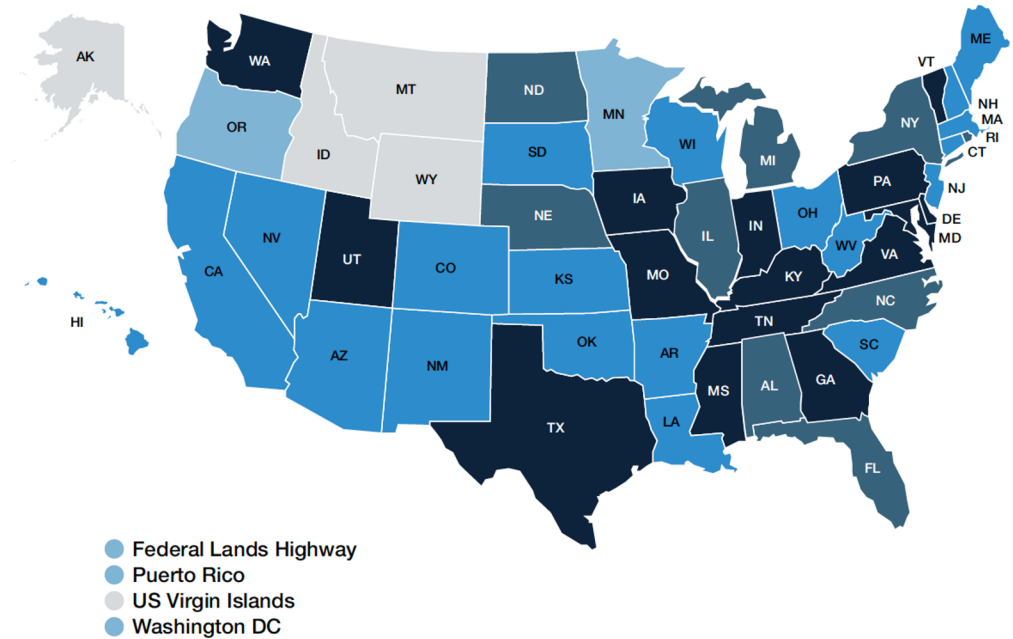
43+ State DOTs Moving ahead with e-Ticketing as an initiative in 2021

- **THE** most adopted EDC Initiatives EVER
- Everybody agrees, paper is a real pain

Immediate value in:

- Transparency Across Stakeholders
- Risk Reduction from Engineers Moving Around Construction Operations to Collect Paper Slips
- Data standardization to build future e-Construction efforts

Goal (December 2022)



Innovation Implementation Stages

Not Implementing	The State is not using the innovation anywhere in the State and is not interested in pursuing the innovation.
Development Stage	The State is collecting guidance and best practices, building support with partners and stakeholders, and developing an implementation process.
Demonstration Stage	The State is testing and piloting the innovation.
Assessment Stage	The State is assessing the performance of and process for carrying out the innovation and making adjustments to prepare for full deployment.
Institutionalized	The State has adopted the innovation as a standard process or practice and uses it regularly on projects.

What Exactly is an e-Ticket?

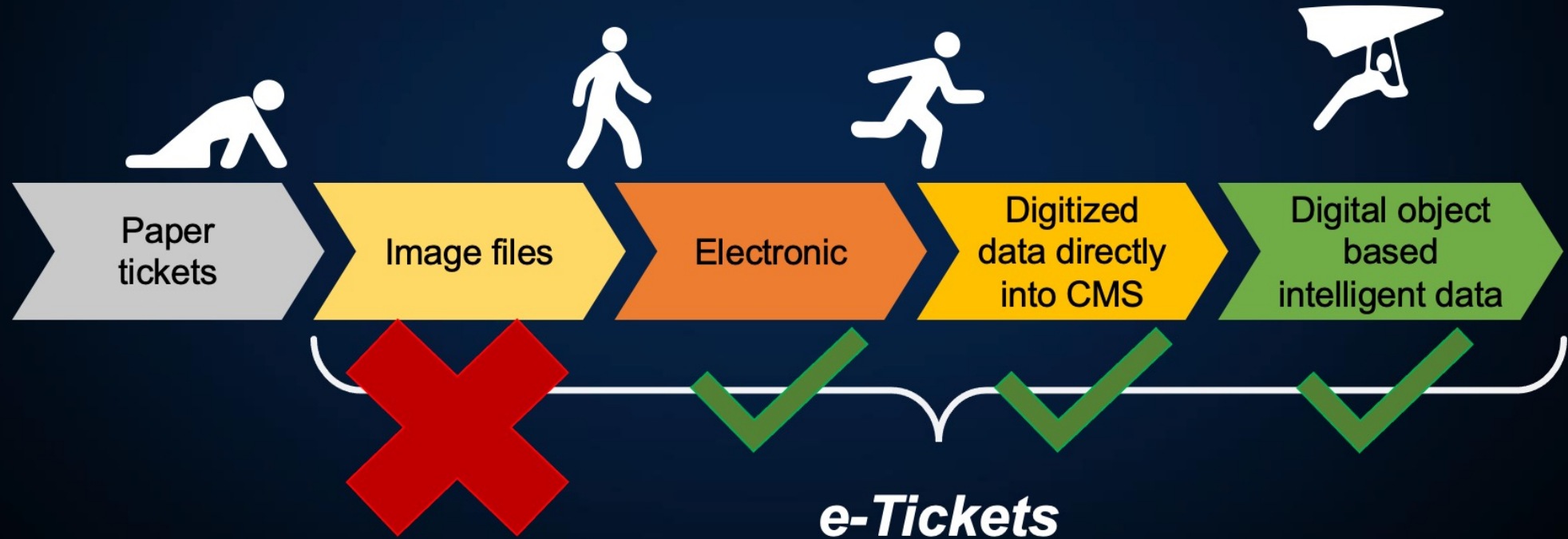
- [From FHWA's website:](#)

Providing all stakeholders with an electronic means to produce, transmit, and share materials data and track and verify materials deliveries enhances safety, streamlines inspections, and improves contract administration processing. 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.

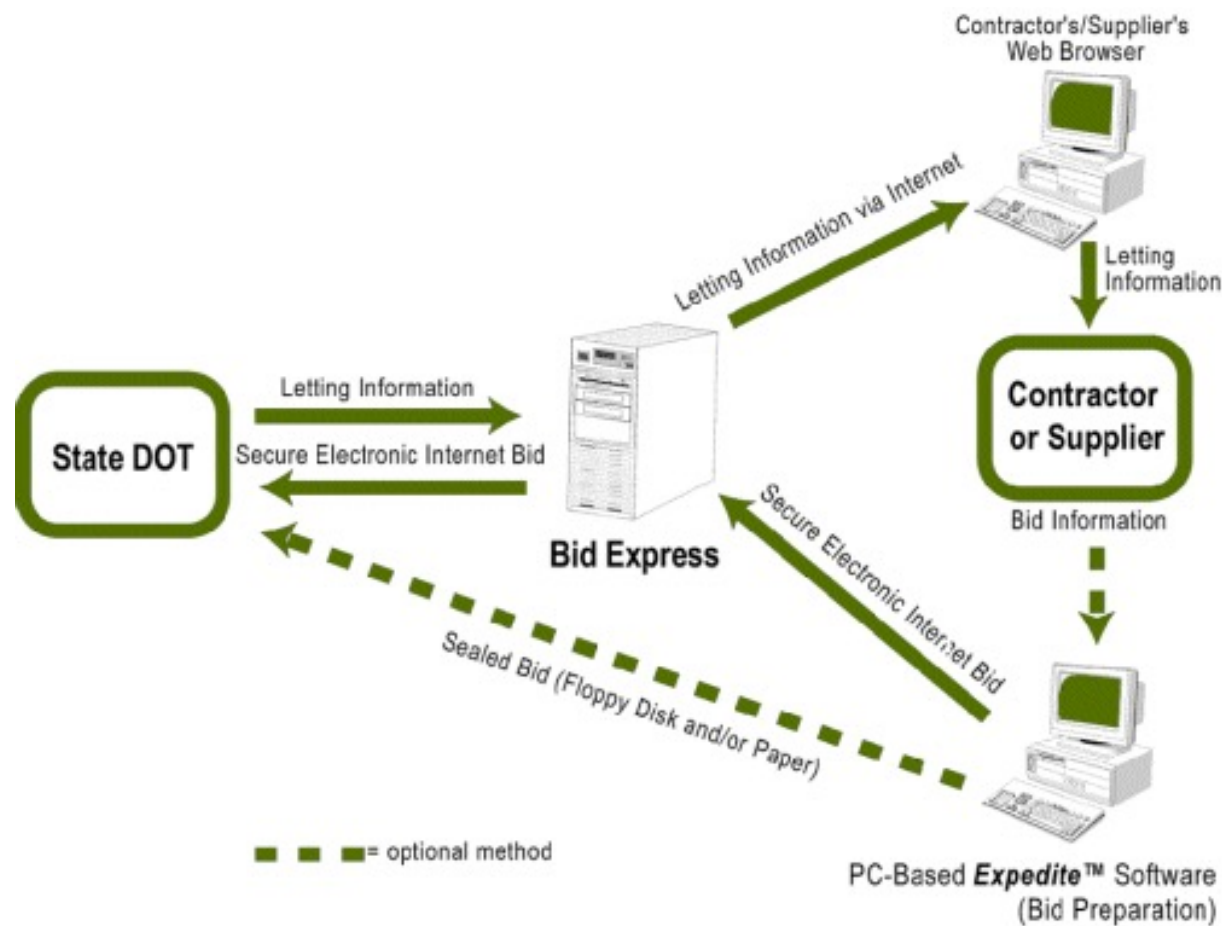


What an e-Ticket Isn't?

Evolution of e-Tickets

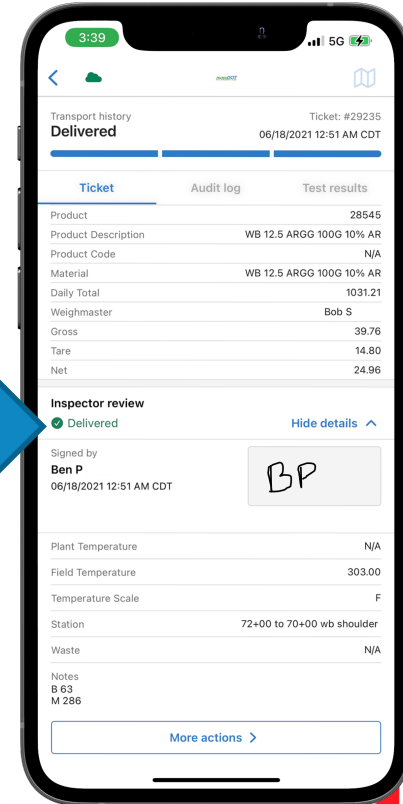


As an Industry, We've Been Here Before...



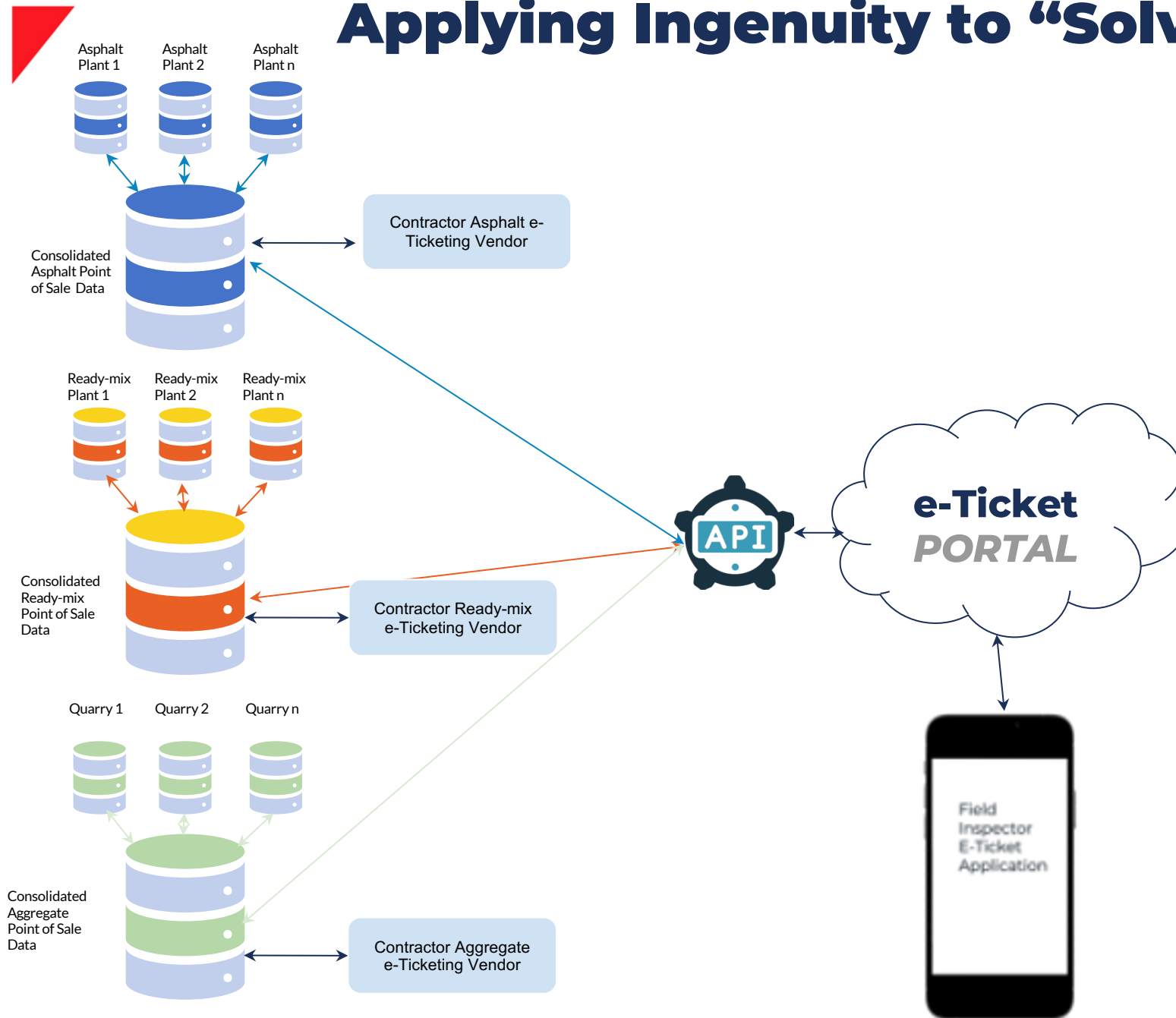
- Electronic Bidding Now the Norm
- Needed to Change Mindset and Perceptions
 - It'll be hard
 - We don't have the software or hardware
 - Our competitors will see our bids
 - We can't teach our estimators how to do this, they've done it the same way for too long
- Most States now thriving with electronic bidding and the benefits it brings

Construction Materials Undergoing a Similar Process...



Look Familiar???

Applying Ingenuity to “Solve” e-Ticketing



- Silicon Valley Doesn't Necessarily Understand Construction
- The best ideas on how to do this come from innovative contractors, producers, and owners
- Everyone in this room has a voice and can help shape the future of construction
- The landscape a connected construction is rapidly changing

States Are Moving Rapidly



DeIDOT Took the Bull by the Horns



Industry Partnering

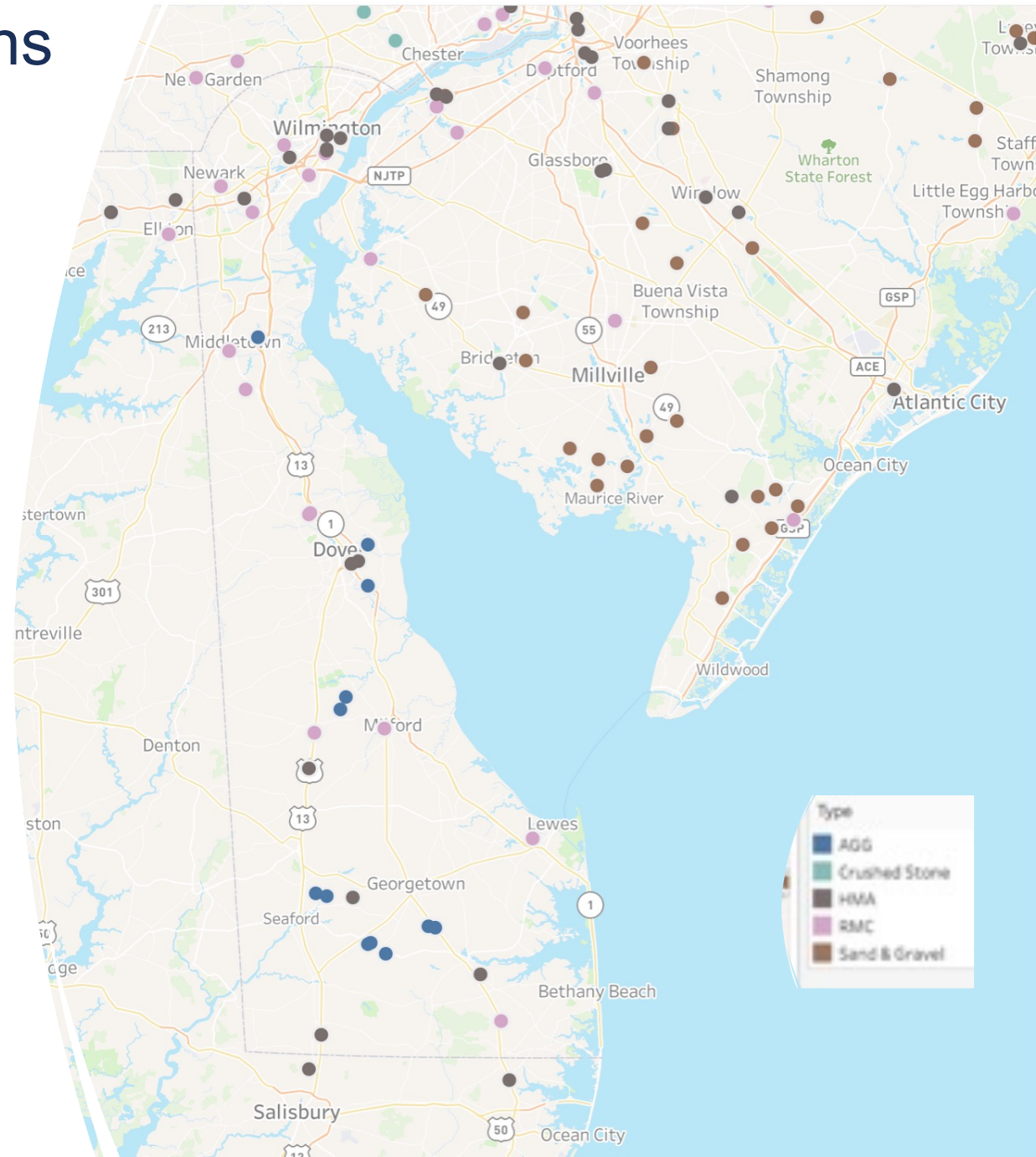
- Keep it Simple
- Weekly Tactical Discussions
- Connection Options by Sophistication

Data Integration:

Request a list of the Department's naming nomenclature. Include in the request an identification of what system the supplier utilizes for its load read-out weighing system. If necessary, create an Application Programming Interface (API) to integrate with the Department's eTicketing Portal. Utilize the API to provide electronic data from the load read-out weighing system at the material source in a manner that is readable by the Department's eTicketing Portal. Update the load read-out weighing system and API as necessary to maintain connection the Department's eTicketing Portal.

The required data shall include:

1. Contractor name
2. Project number
3. Project name
4. Supplier name



Happening in Indiana...

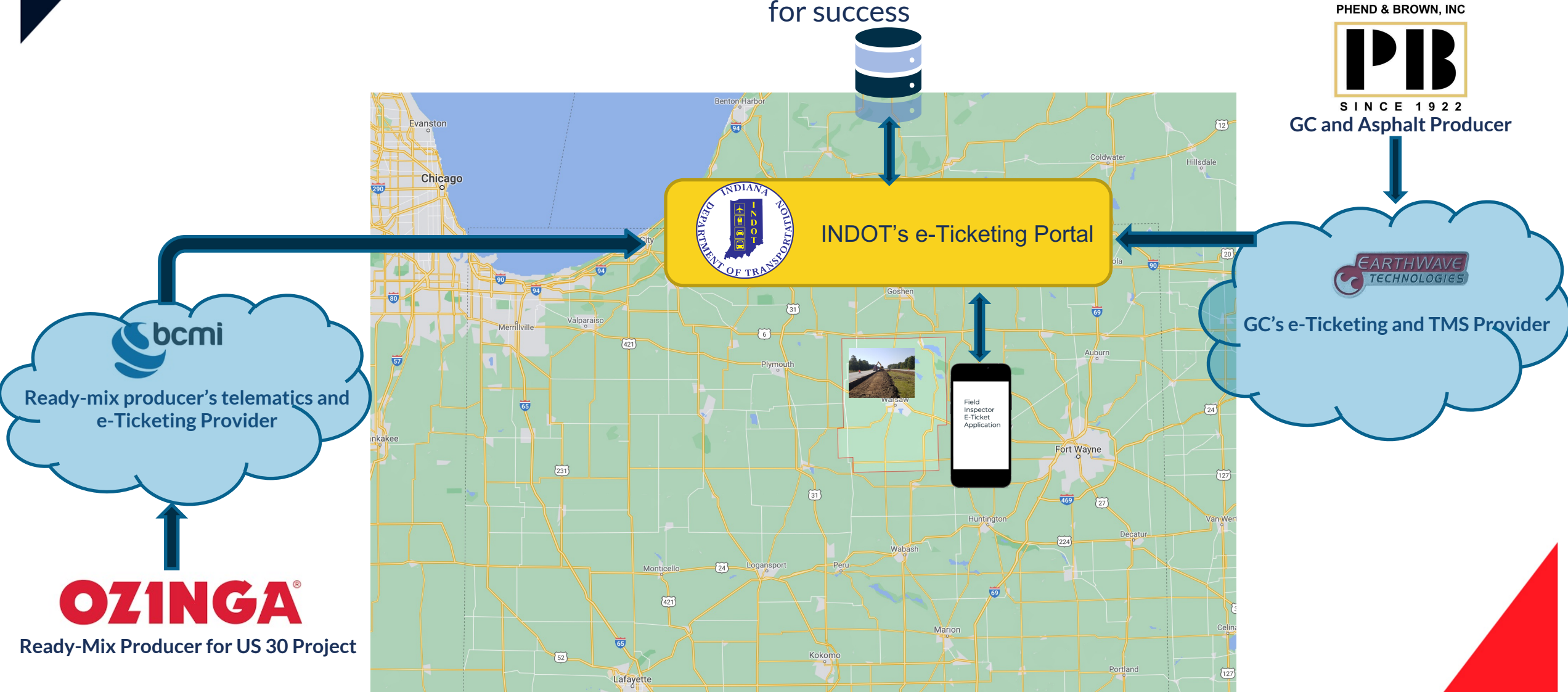


Project Overview:

- **Project Owner:** Indiana DOT
- **General Contractor:** Phend & Brown
- **Completion Date:** May 2023
- **Amount:** \$21.2 M
- **Project Scope:** 13.7 Mile asphalt resurfacing and bridge replacement on US 30 in Kosciusko County Indiana

A Collaborative Effort

Collaboration between producers, contractors, public agencies and technology vendors is paramount for success



Happening in Vermont...



Project Overview:

- **Project Owner:** Vermont Agency of Transportation
- **General Contractor:** Pike Industries
- **Completion Date:** Fall 2022
- **Amount:** \$19.1 M
- **Project Scope:** Resurface VT 113 in Chelsea, Vershire, West Fairlee and Thetford, beginning at the VT 110/113 intersection and extending easterly 14.824 miles to the intersection of VT 113/244

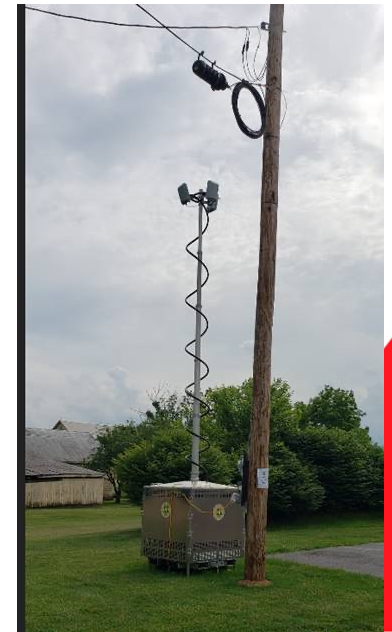
The Challenges and Lessons Learned:

Rural Vermont with Limited to No Cell Coverage

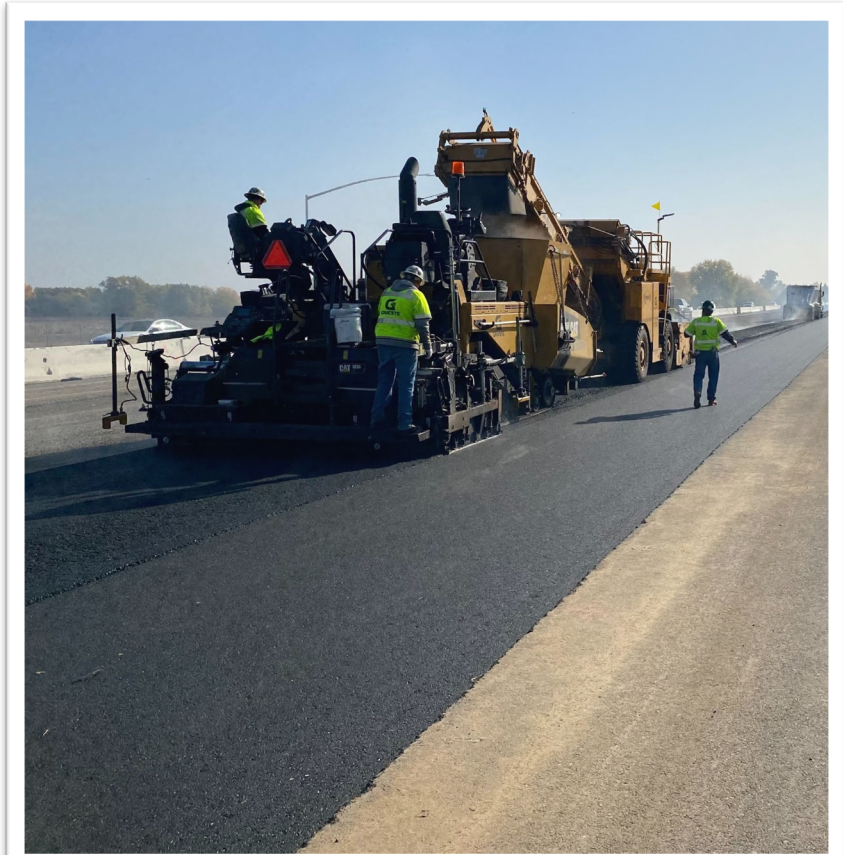
Looked at various connectivity solutions

- WiFi hotspots along corridor
- Starlink

Solution to provide hybrid solution to sync field info to cloud



It Makes Business Sense in California



Project		
SAC_I-5 HOV LANE		
Project Start: 06/9/2020		3445 Tickets
Quantity by Material Type		
3/4"HMA-LL-INT	2198	51,207.11
1/2"HMA64-16R15 B	316	8,096.45
3/4"HMA64-16R15 B	353	7,447.31
3/4"HMA-LL-SUR	184	4,295.77
See More (4)		
Sep 13	155 Tickets	2,879.15
Sep 12	31 Tickets	575.15
Sep 9	1 Ticket	15.50
Sep 4	9 Tickets	208.88
Sep 3	37 Tickets	840.33

- Last Part of Granite's Process not Digital
- Initial Pandemic Push
- 700k Ton Sacramento Project
 - 8x8 room with 4' high stack

GRANITE[®]



Keys to Success

Keep it Simple

Collaboration

Iterate and Innovate

Two Way Street



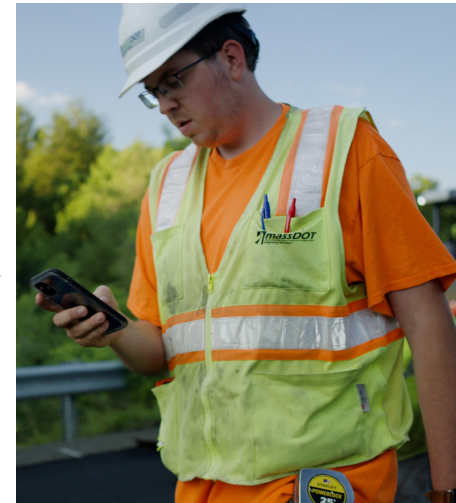
Unlocking the Data

There is a lot of Value to Private Sector:

- Field crews can see live loads off the scale (Paving guys LOVE THIS)
- Cycle Times **WITHOUT GPS**
- Real Time Yield Check
- Project Managers can track materials for estimates w/o tracking down paper slips

The Value to you:

- You're now easier to do business with
- Streamline payments
- Reduced Administrative burden
- Keeping Folks out of Harms Way
- Tap into insights never before available



The Coming Challenge

- 41% of the Construction Workforce set to retire in the next decade
- New Graduates looking to tech companies

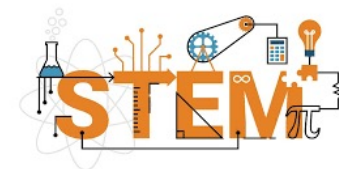
The top 10 jobs new grads are applying for, and what they pay

1. **Software engineer**, \$94,111 per year
2. **Data analyst**, \$60,508 per year
3. **Business analyst**, \$65,267 per year
4. **Data scientist**, \$100,793 per year
5. **Administrative assistant**, \$34,375 per year
6. **Sales representative**, \$28,188 per year
7. **Financial analyst**, \$64,807 per year
8. **Project manager**, \$55,583 per year
9. **Graphic designer**, \$41,347 per year
10. **Software developer**, \$70,000 per year

The top companies new grads are applying to

1. **Amazon**, technology
2. **Microsoft**, information technology
3. **The Goldman Sachs Group**, finance
4. **Apple**, technology
5. **TikTok**, technology
6. **Google**, technology
7. **Ernst & Young**, accounting and legal
8. **Facebook**, technology
9. **Randstad US**, human resources
10. **Salesforce**, technology

- Fortunately, STEM in high school provides a great foundation for success in the era of high-tech construction





e-Ticketing - Digitizing the Construction Supply Chain Delivery System




Watch later



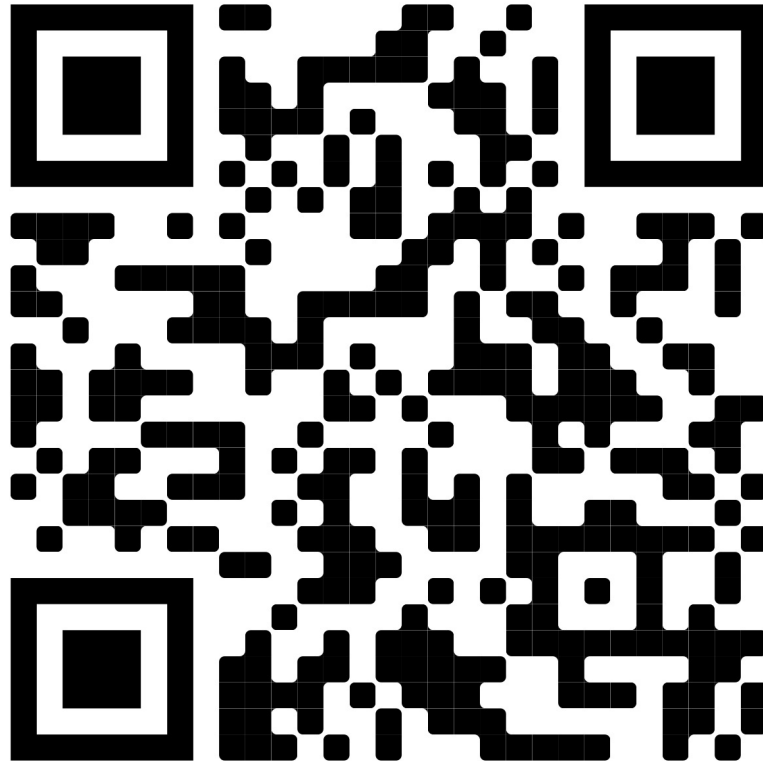
Share

e-Ticketing Digitizing the Supply Chain Delivery System

Watch on  YouTube



Driving Innovation in the Construction Materials Supply Chain



e-TicketingTaskForce.org