

Hello, welcome to the Info Talk podcast brought to you by Infrastructure Ventures. Come listen in as we talk with policy experts on how we can advance the use of innovative technologies in the infrastructure and transportation industry. Why? Because we know we can do better. So, sit back or walk the dog. Go for a run. Or grab a cup of coffee and join us for this episode of the InfraTalk Podcast.

GREG:

Hi, I'm Greg Nadeau, publisher of Infra Talk America. Join me for a conversation with Kat Weisner from the Federal Highway Administration's Office of Innovation and Resource Center, who served as staff lead for the EDC 6 e-Ticketing initiative. This is the InfraTalk America podcast.

Kat Weisner. Thanks for doing this for the National E-Ticketing Task Force.

KAT:

Thank you for having me.

GREG:

The National E-Ticketing Task Force was really formed at the urging of a couple of business leaders in Massachusetts. And I originally became involved as an advisor to the Massachusetts Task Force on e-Ticketing. And the interest in that approach was so significant that the rest of New England, given it's such a tight knit community and DOTs know each other, we really began getting a lot of interest from other states and then beyond New England. So, the National e-Ticketing task Force was born.

But the real catalyst, I think, to the level of interest, clearly was Federal Highway's Initiative under the Every Day Counts (EDC) 6 initiative on e-Ticketing, coupled with another digital initiative on digital as-builts. So, a real combination that brought a lot of focus to bear on the opportunities that these technologies can bring to project delivery and the Federal Aid Highway Program.

So, can you describe, one, your role in the Everyday Counts initiative and specifically, of course, your leadership role in the E-Ticketing initiative, and just kind of how—what was the impetus behind it and sort of a check on how you think it's going? And just kind of talk about that for a while.

KAT:

Yeah. So, my role— we'll start with that. I work for the Federal Highway Administration's Resource Center, specifically on the E-Construction and Project Management Team. And our role is technology deployment and technology training and innovation deployment for Federal Highway. And specifically in my group, we deal with technologies that are related to and or use during or in e-Construction.

And it actually started with e-E-Construction, which was EDC 3 and EDC 4. That was our first one that we had that was really e-Construction focused and I was a subject matter expert for that team. I was the lead, which means I am the face of that for Federal Highway. As we go around the country talking to State DOTs, local agencies, tribes and industry to encourage them to consider these technologies, these innovations. To explore their possibilities in those technologies and innovations and then hopefully try them out.

We hope that they take some initiative and explore if those technologies are going to work for them. See how they can best fit them into their agency and their uses. And then we provide training. We provide support. We provide an environment where they can interact with peers, and we provide also some research as well that they can use to support the deployments in their states.

And I am part of all of those groups essentially as the lead. I come up with some of those ideas. I often deliver on those concepts as well. Working with the state DOTs to figure out what they need, because a lot of times they can't necessarily go out of their state as easily without having a liaison. And we often, as the Resource Center and Federal Highway, share that role of a liaison to try to help them reach out to other states. To reach out to industry, and just to kind of get all the pieces together so that they can coalesce and learn from others' mistakes and also bounce ideas off of each other. And Federal Highway — and our role is often in that realm of sharing.

As far as my history, I alluded to a little bit. I actually started with EDC 2. I was an EDC 2 for 3D models — I was also a subject matter expert there. I had another peer who was the lead in that case, Mr. David Unkefer. I was working with him and helping him with that deployment because it was a pretty big step. It was something entirely new to EDC, entirely new to a lot of our states and there was a lot of work to be done for 3D models. And 3D models was EDC 2.

EDC 3 we continued 3D models. Added 4D, 5D and XD. I was part of that team. Then I also was handed EA e-Construction as the lead myself. We had e-E-Construction for EDC 3. We also had it for EDC 4. We added partnering because partnering became such a critical element to deploying all of these technologies. There was also some work afoot out in the Western states to craft partnering in a little bit different light, making it informal semi-formal and having some options inside of that.

So, there was an effort to promote these newer ways of doing partnering. EDC 5 took a little bit lesser of a role. I was still part of the — one of the teams. I was part of UAS. I helped them with some of the technologies that they were doing, and as luck would have it — rumor has it, I might get some of that back.

We'll see how that shakes out for long term. And then under EDC 6, we were still promoting e-E-Construction. E-Ticketing was a technology under EDC 3 and 4 under e-E-Construction. We covered it in almost every agenda that we held. Almost every event we did included at least one

session or one element on e-Ticketing. E-Ticketing got its legs in 2015 with Iowa DOT and it was growing.

It was growing by little steps here, little steps there. Industry was in favor of it in certain parts of the country or certain types of materials. We had some buy-in in pockets, but we didn't have nationwide buy-in. And then in 2020, the world changed.

GREG:

The world changed

KAT:

It most certainly did.

Greg

The impact of COVID on the expansion of the use of the technology. And that story can be told in a number of disciplines, but you're going to tell e-Ticketing story.

KAT:

Yes. So for us, e-Ticketing was not originally envisioned as part of EDC 6, but through various channels, leadership was made aware of e-Ticketing. They asked for some information. What is it? What are we doing? What have we already done? We did enlighten them and we were already doing some of it under e-E-Construction. This is what it was.

But it was advanced technology. It was commercial ready. It was ready to go. There was no research really needed to make it work. It was just a matter of getting buy-in from the industries and from the state DOTs to take that leap on that specific technology. And COVID pushed that leap. It took the guy standing on the cliff and just gave him that extra push.

And it didn't just push him. It gave him the parachute and the airplane and everything else that's going to catch him at the bottom with the trampoline. We essentially — COVID gave us, the pandemic gave us the impetus we needed for the entire country to say we needed this yesterday.

GREG:

Evidenced by the fact that 43 states signed on to this initiative, which was a record for Every Day Counts.

KAT:

Yes, it is. And I can— so we got the highest level of buy-in upfront. The few couple of states that aren't able to do it or aren't signing up— even with the some of the ones that aren't signing up, they're still doing it. They're just not doing it under EDC. So, if we actually count the number of states that could actually add two more states in there on top of that. know that they're doing work on it. They just didn't choose to advance under EDC 6.

GREG:

It's virtually nationwide.

KAT:

It is.

GREG:

Tell me this in the context. I mean, we understand the impetus and what catapulted it to this sort of nationwide interest. And what I found, because my education on e-Ticketing, of course, I have this history with Every Day Counts going back to 2009 when we first began developing it. And the team at Federal Highway were masterful in how they engaged and developed it.

And it really has become, you know, the program itself is a property of— is certainly the leadership of Federal Highway. But states— state DOTs, the nationwide network of State Transportation Innovation Councils really have ownership of it now.

KAT:

Correct.

GREG:

So that partnership has been so strengthened. Then the work, the AASHTO part of the leadership of that initiative over the last several years. So it's—talk about how Every Day Counts

as a tool to advance and accelerate the adoption of innovation has been particularly useful in this case.

I'll make one last observation. In—for a couple of years now, I've really become immersed in e-Ticketing and understand it far more than I did before, to say the least. And what its leading to, what it leverages, what it's making, how it's making other benefits of having that technology employed. Where does it lead? What are the one of the opportunities that it will leverage at this juncture? Or that you've learned or experienced or gotten feedback from states about?

KAT:

So, the first one, EDC, what does it provide? The way they roll it out, it's stepped. We do the summits first. The summits are outreach to state executives, state CEOs, state appointed individuals, leadership. We start with the leadership because leadership buy-in is critical, especially with items like e-Ticketing or e-E-Construction and also the digital as-builts and BIM.

They're not free. There is a cost and it's not a nominal cost. There is an expense to deploying I.T. infrastructure and to maintaining that infrastructure. So, getting the cost as far as money and time agreed to upfront by leadership is huge. And when EDC rolls out the summits, they get leadership buy-in. They educate the leaders on what these technologies are, why they are important to consider and get that leadership buy in on the technologies. The leaders then take those technologies and that information back to their states.

The states then consider. They might have a selection that I think the first time we had 14 innovations. I think the last round we had six or seven, and we've had various numbers in between over the various rounds of EDC. And the states pick and choose which innovations are best suited for their state DOT and their environment at that given time.

Once they do that, they let us know and then it becomes my responsibility to help them. How we put together different activities that allow us to reach out to the states, the locals, the tribes and to industry and bring those parties together to explore these technologies. Specific ones that we do and often use quite often is webinars. Number one, we've always done webinars to reach out to people.

We try to limit them to an hour or two at the most. We record them if we're able. We post them on the Federal Highway website so people can use them again and again. We bring to the table lots of different state DOTs that we call our leaders. So, the leaders in that innovation. Who has tried it? Who are the trailblazers for that technology? Who did kind of the proof of concept for us and have the growing pains, so to speak, to share? And the benefits and the rewards also that they can share with the peers who may not know enough about it yet to explore it.

So, we usually have a handful of lead state DOTs and we're able to have them come in and share their experiences and share their technologies for others to learn from. And we usually

start that off with webinars. That gets the word out, gets the word out to people. They kind of understand what we have. We typically have a website that is a Resource with informational documents.

The webinar that we— recordings will have any research projects that were related either through TRB or NCHRP or Federal Highway or even our state DOTs. Sometimes they've done research and we either post the link or are able to post the document itself. And that gives people some resources to look at. Another thing that we do is hold workshops or peer exchanges.

They have a little different connotation depending on different groups, but the idea there is to get a group in person. So, we typically do one- or two-day events where we bring a small group of lead states and some exploring states into a room together and they share one-on-one. They start with this is where we're at in e-E-Construction and or e-Ticketing. Then this is where we'd like to go and we need to go through some steps to get there.

What is your journey XYZ state DOT so that my state doesn't repeat your errors and can learn from your mistakes and take off running? We've held, I think, under e-E-Construction we held over 30 peer exchange. For E-Ticketing, so far to date, I think we've done two and that was in Puerto Rico and in North Dakota.

And we have, I believe, five or six more in the pipeline right now with other states that we're getting those ready and we'll be delivering those here in the near future.

GREG:

It's kind of the secret sauce as to how this really works and it's hard work and it's the willingness of players on the front lines for project delivery engaging. So, you've got a dynamic I call it the top-down bottom-up. You've got to have that leadership buy-in and that leadership encouragement. But that frontline, you know, the grassroots troops who know the technology, who have who have the experience, who have the ideas, need to be encouraged and invited to share those and implement.

But without that leadership buy-in it's a very difficult thing to do.

KAT:

It is.

GREG:

And so I think, you know, does those Federal Highway's role open up those possibilities at the state level? Does it give the, I call them champions of change, you know, at that state and local

level? Does it give them a tool that they can use to help persuade their leadership that this is a priority?

KAT

Yes, it does. And we really saw that with E-Ticketing, as I mentioned before, E-Ticketing was actually a technology under e-Construction, but it was kind of buried in the shadows. And they didn't necessarily get the support from industry and from their leadership to deploy e-Ticketing because there really was a very huge need to have industry involved in e-Ticketing. E-Construction was something the states could do almost in a vacuum, so to speak, for things that they deal with.

But for E-Ticketing they were forced to not only work in their state bubble, but they had to reach out to the suppliers and their contractors and get everybody on board. So, these people that were working on it in the early stages really did struggle to get buy in from their leadership and their industry and to get everybody in the room together to get these technology— this specific technology up and running.

When E-Ticketing became an EDC 6 initiative, it gave it the support that it needed for those grassroots roots level efforts to get the support they needed to take it to the next step. Instead of being something we did in just one little town or one little district, it became something we're going to do in every district in our entire state or every region in our entire state, because the benefits were immediately recognized by our leadership executives in the different states and locals.

And they learned about it, They knew about it, and they started asking questions. And then they quickly found out that their employees were already doing it, but kind of in the shadows. And EDC 6 definitely brought it out of the shadows, brought it out of something we're doing as an extra and made it a primary focus. And made it something that they were interested in supporting and bringing those different groups together and showing their support for it and working towards those common goals to get it deployed.

E-Ticketing really did need the support from industry and from the vendors in order to make it work. And that was where a lot of our states were, again, not necessarily having a large deployment because they didn't have the industry support. They didn't have a large group of HMA or concrete or aggregate or other vendors who were willing to do this.

And by having the EDC 6 support, it gave it daylight. It gave it the, I guess, face time that it needed. And it started knocking on doors or— to open doors.

GREG:

And it also provides, and you know, your organization, the Resource Center, which I always thought was aptly named because it is a resource. It's a Resource obviously for Federal Highway, but it's also been up for years as a resource for states. I remember when I, you know, back in the day when I first arrived at Federal Highway and Amy Lucero was briefing me on the Resource Center and its role. And immediately I said, well, that's brilliant.

Having a core group of individuals who bring that level of expertise. Who can work directly with states and help them navigate their way through these complex challenges across the board. And obviously the Resource Center covers a wide range of topics and provides a wide range of experts. And of course, Amy Lucero is now the associate administrator of the Office of Innovative Program Delivery...

KAT:

Correct.

GREG:

...oversees the Every Day Counts program. So, you see how the Resource Center has sort of always been at the center of this and was the resource that was needed to help the teams that were formed around each initiative engage with the states and provide them with the kind of technical assistance they need. So that the Resource Center really becomes kind of the core of Every Day Counts. Is that, you know, can you just sort of— your observations on the role of the Resource Center in executing these strategies?

KAT:

Yeah. For a majority of the innovations that have been under EDC, there is a direct link to the Resource Center and to the different groups within the Resource Center. I can't say for all of them. Some of them do still reside in Headquarters or in Turner Fairbanks or another entity, but the vast majority of EDC technologies do have a very strong Resource Center component.

They are often led by Resource Center employees and deployed by Resource Center employees. And again, it goes back to our— that's our job: innovation, technology, deployment and training. But the idea is a lot of, you know, the people in the Resource Center we lived the job. My career started as an inspector for Maryland State Highway Administration.

I was the one doing the concrete tests on the side of the road. I was the one jumping up on the

side of a dump truck at three in the morning on the interstate in the dark to grab that ticket. And I'm not unusual most and a lot of our Resource Center employees, as their careers have advanced or, you know, back in the day, that's what they used to do. Many of us came from the state DOTs or from a consultant or from a contractor where we worked in those jobs that we are now helping those same people.

We were those people. And now we're in an opportunity where we can help the people we used to be and advance these technologies. And the Resource Center has a lot of different groups in different disciplines and all of those disciplines almost always have a connection to several of the EDC initiatives. And we take our experience and we take our expertise and we're able to bring it back to who we were. We're able to personalize the message because we were those people.

GREG:

Thanks for that. It's important, I think. One of the objectives of InfraTalk America frankly, and why we put this team together to collect this kind of— what we think is insightful analysis, is to really— we want to become— we want to translate the technical to the policy. And we want to advance and engage. We want to we want to engage with policy level folks who are not necessarily— who do not necessarily understand the inner workings of the Federal Aid Highway program or our state DOT, but have a strong level of interest and commitment to advancing infrastructure.

And that's, you know, whether it's a governor's office or staff or legislators or obviously people on Capitol Hill, members and staff who aren't part of the committees of jurisdiction and don't have a real keen understanding of this. So, this— I've always thought the Federal Highway and the Federal Aid Highway program itself was a was a unique and effective way to deliver infrastructure projects to states because we don't deliver them.

The states do. And the closer you get to the action, the more effective you can be. So they obviously have a partnership with local government to administer the Federal Aid Highway program. So having this asset and having this ability is just something I'd like more. Sort of general policy practitioners with a direct, you know, interest and responsibility for advancing infrastructure policy and or resources should understand what's going on behind the scenes.

So, the Resource Center isn't something that's kind of a high-profile organization. But the resource that it is, obviously to Federal Highway, but to states and local agencies responsible for implementing infrastructure programs is huge. And it's been around forever. So, 22 years, one of those unsung, you know, resources and you know, unsung heroes of what it takes to advance innovation in a very conservative environment.

Engineers, by their nature, are conservative but innovative. It's just that, you know, they want to cross a lot of T's and dot a lot of I's. They've got to stamp those plans. So, I've always understood that reluctance to do something that might be considered change or even radical. But frankly, they're the ones that drive it over time. So, an important conversation about an

organization that that has never really gotten the recognition it deserves. But they don't strive for that either.

KAT:

We do not. I don't know that if you go around the country— a lot of people know the people in the Resource Center, right. They know our names and who we are. But if you go to a leadership person or a state DOT and say the Research Center, they just they don't know. They might, but if you throw the name, like you throw my name out there, Kat or David Unkefer or James Gray, they know who we are, but they don't necessarily know where we come from.

GREG:

It's— but— you're a face of the hierarchy that is highly appreciated and regarded. So that enables you and your teams to be effective in the task, in the mission of advancing innovation to states. Because, you know, state DOTs have a lot on their plate and sort of a transition to this aspect of the conversation especially after the passage of the long-awaited national infrastructure bill.

The Infrastructure Investment Jobs Act (IIJA) has provided a massive level of resource. And by the way, it's still not enough. In five years, we'll be having the same conversation because a lot of that investment was, you know, catching up on underinvestment in the past. So, it's a great start, but it gives a lot of resources to states to invest in longer, you know, in projects that have been delayed.

One concern I have is that this this infusion of funds will have created an extraordinary commitment of state DOTs to advance more projects. How do we incorporate the innovative solutions into projects that they're trying to get out the door because they now have this big infusion of new money?

KAT:

So, for us, it goes back to the e-Construction concept. And we've talked about that and also for e-Ticketing because we are trying to do more with less. We can't necessarily rely on the old way of doing business. One of the primary things that we encourage and promote as part of e-Ticketing and e-Construction is being able to leverage the technology to do the tasks that technology can take care of, so that our people in the field can do the jobs that do need hands on work.

So, when we have an e-Ticketing system that is operating and functioning and working, that person who normally would have had to go and retrieve every one of those tickets and file it and

collated and submit it and do all the filing that goes with it and processing that paper and ultimately archiving it. That process is now digitized.

It is now automatic on the back end that it doesn't require human manipulation to get that data from the plant to our e-Construction management systems for proper processing and often cases payment. That whole entire human process was hours and hours of work on individuals in the field. Those individuals can now focus on other tasks, and we don't like to say it takes less inspectors to do the job because we still need those inspectors, but they're able to devote more time to the critical elements. The materials testing, the materials placement, traffic control. They can focus on the items that are critical, that need immediate human interaction and allow the digital technology to take care of the less labor-intensive tasks that we can we can do digitally.

And that's something that as more infrastructure gets deployed, we have to be able to do more with less and deploying these e-Construction initiatives and the digital technologies is one way to do that. By digitizing and automating certain processes, we can take our inspectors and use them more efficiently. To deliver those infrastructure investment and job projects, to deliver those needs that the states have.

We're not changing the number of people because I unfortunately, I don't know where they're going to come from. We are struggling to get employees. We are struggling to get people into the industry, not just on the state side, but on the consultant inspection side and on the contractor side. And even if we don't have an inspector to pull tickets, we'll ask the contractor.

KAT:

The contractor doesn't have anybody just to sit there and pull tickets all day either. They need every one of their men working on the project, doing the things that they need to do. And ticket taker isn't on the list.

GREG:

The National e-Ticketing Task Force was really born out of the initiative of some of these companies. The private sector has really embraced it by and large, and these are institutions that are pretty conservative by nature as well. They understand the business benefits, They understand that it's coming and they have been encouraging it in a big way. So, we have a number of companies that are part of the task force that have been working in their states and just making a contribution in a number of ways.

GREG:

One thing you just said that I want to follow up on is the workforce and two elements of that. But before I get to that, I also wanted to follow up on when we produced what we call an Info Doc, a documentary style video, trying to explain what E-Ticketing was. And we did that essentially by doing a case study approach with a particular project and in the context of, you know, producing that video, I was interviewed in it and I was sort of making observations.

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And one observation I made is that paper tickets, which are antiquated and inefficient and you'll want to help us explain and understand why, but I said the paper ticket is where data go to die. And just by an absolute coincidence, our brilliant videographer was capturing various elements of a of a producer's site. And there were these large freight trailers, you know, on the edge of the property.

And they went open the doors and they took some footage of that. And it was rows and rows, ten high of boxes and came in close to one of the boxes and said, Destroy 2025. It was literally the visual manifestation of where data go to die. Explain what's going to happen with those millions of pieces of paper that are going to be stored somewhere only to be destroyed later. And what the value of the digitization of that data is going to mean.

KAT:

So, it already has value, quite honestly. So yes, the paper tickets that we generated for decades, that information lived only on that piece of paper. And at the end of the project, after all, the payments were made and all the checks were cashed and everybody was happy with what they got and everybody signed off, they were literally all that paperwork was put in a box and put in storage in a building or put in storage in a trailer, never to be seen again.

In most cases, there might be a one in a million shot that you would need to go back or have some reason to go back to that data and try to find something. But then the question is, could you find it? If you had to find a ticket collection from one day on a project that was two years long, what's the chances you could find the right box with that piece of paper in it for those that day?

Pretty slim. And while you might find it, it might take you weeks to find that data. When we take the electronic ticket information. So, when batch plant creates the data, and that data is put into the systems, that data is in a digital world. It is now able to be saved, transmitted and mined. Saved in that for our projects and our states and our contractors, we hopefully don't have as much paper.

I don't know that we'll ever get rid of all of it. I don't think that's possible, at least in my lifetime. We'll never get rid of every sheet of paper, but we can get rid of a lot of it. We're talking large, large volumes and reams of boxes of paper. We can get rid of a lot of that.

So where does it go? It goes into either the cloud or some sort of server or some sort of data warehouse. The key for that data though, is to have it structured in a way that it's usable well beyond the immediate use. So right now, for E-Ticketing, we're just using it. We receive the material. We know enough information about the material we may have testing or placement information.

And ultimately, we're trying to certify that project for that material. But what the hope in the future is, is to take that data and link it to asset management. Asset management on the project and going beyond asset management to hopefully the next project that comes around. And also for forensics. What happens if something fails on that project?

Can we go back and pull that data? Because it is now digitized and it's in an electronic format, as long as we are collecting it and saving it in a uniform format that it's retrievable, searchable, we can now go back in a database and find that information. There are several states working on something called Veda, and Veda is a system that links intelligent compaction, thermal profiling, e-Ticketing and GPS data on a project all into one database.

So, if you have an area of a project where you have a failure or you have a concern of any type or sort, essentially in perpetuity, you can now go back to the construction project and look at what was the compaction information, what was the batch plant information, what was the thermal and intelligent compaction information at that immediate location?

And now I say immediate location, it's within a reasonable distance.

GREG:

Within a reasonable distance.

KAT:

GPS is getting better.

GREG:

You know where it is on the face of the earth.

KAT:

We generally do within a meter. In most cases, we can identify within a meter where we're at. And for forensic purposes, that's way closer than we've ever been.

GREG:

So, you've got this sort of grand application that will yield tremendous benefit in the future in the context of asset management and other applications and probably use of the data that we haven't even figured out yet as a practical matter. But the immediate benefit becomes what, to the contractor, to the to the batch plant, to the producer, to the owner?

That data becomes available for the business exchange. So, for billing purposes and others and, you know, stories I've heard about tickets getting destroyed, you know, damaged or lost. So, you've done a great job helping us understand sort of the long-term benefits of digitizing that data. What about the literally the immediate benefit to those players?

KAT:

So I'll use myself as an example. I probably wasn't the best at this, and this is probably why I'm such a good example. I was a 22-year-old college student and one of the first jobs I was handed is go pick tickets. Okay, so when you have those tickets, you use them for taking notes. You have a pen, you need a place to write something.

You might scribble something that has nothing to do with that ticket. On that ticket, you're taking a note. It's a piece of paper. It's available. Right. And you might also put testing data on that ticket. Often, you're working 12 hour shifts overnight. You start at 7, 8 PM, you work till 5 AM.. Nobody in their right mind is going to process those tickets at 5:00 in the morning.

We're all going home to sleep, right? So that inspector now collected those tickets all night. The next night they come back in at 7 p.m. and now they have all these tickets from the day before

and now they're going to start to process those tickets. Hopefully they didn't lose any. Hopefully they didn't dump any water or coffee or pizza or something on them.

Hopefully they didn't lose them, and they collate all those tickets. And now—

GREG:

Or asphalt or tack.

KAT:

Or asphalt or tac! Yes, tack tack. I will say that tickets get dropped and get tack on them a lot. But they now have to take this collection of maybe— if it's a low night, you might have 20 tickets. If it's a busy night, if you're out on the interstate on a paving train, it's no doubt that you would have hundreds of tickets for a night and now you sit there with an adding machine and you have to add all these tickets up and you have to figure out what your numbers are.

And then at the same time, the contractor is doing the same thing, right? He's got his own system potentially electronic, potentially by hand, where he is tallying up the same information that the inspector is tallying up. And at some point, in the next day or two, you hope those two individuals get together and compare notes and compare their numbers to see for any given day if their numbers match and that they can come to an agreement on the material and the work that was performed on any given day or any given night most likely.

And that takes a couple of days. And what if what if your numbers don't match? If your numbers don't match and you added wrong or you lost a ticket and you got to get that ticket recreated, re-found or researched, that takes time. It's not uncommon for it to take several days or even a week to process one night's work for payment.

And that process is all manual or was all manual. With e-Ticketing and e-Construction, those processes are now electronic or digital and they're often automated. The number you just the simple task of totaling up tickets. You don't lose any with e-Ticketing because they're all there. You don't have some that are illegible or unreadable because they were damaged or torn.

All the data is there. It's pure. That data then can easily be tallied by an Excel spreadsheet or by the e-Ticketing system. There's no human error in that tallying. Same on the contractor side. They're working with the exact same data and they're pulling that same information. So, the chances that the data is different between the contractor and the state, while it can still happen for different reasons, the likelihood of it being because of a loss or damage ticket or a human math calculation is almost zero.

You've taken that issue out of the equation. You've taken that out of the process. So now you may still have some rejected loads or partial loads or something that you're still dealing with, but the processing of the errors and omissions is gone because you're working off that same data. That compresses the timeline it takes to get the payments approved and processed on the state side.

So, when we can lessen that manual process of rectifying and agreeing to the numbers, we can now pay that in, pay that data are on those quantities faster. That's on the state side. On the contractor side, they also have truck drivers that are potentially not employed by them. They might be from a third party. Same thing on that side.

Those guys might be working on tonnage. They might be working on loads. They might be working on an hourly wage depending on how they are contracted. That is now part of that, often, part of those e-Ticketing systems. That's the vendor's side of the house. The fleet management side of the house of those e-Tickets is something the contractors can also use to pay their subs faster too because that process, again, used to be very paper driven. People had to manually verify their numbers back and forth. Now we're all working off the same numbers. It's electronic, it's digital, the human errors out of it.

GREG:

Which is why the business members of the task force and the industry folks and organizations like the trade groups representing the asphalt producers and the ready-mix folks and aggregates. And they're very much supportive and interested in learning and engaging because the benefits of this transition to a digitized system have this multi-layered set of benefits for all concerned.

So, that was a terrific explanation of exactly why and how that works. I want to go back, you know, and we'll sort of wrap up with the conversation about at the end of the day what's most important? That's workforce. You talked about how the technology isn't going to, you know, we have a— [its] very challenging today in recruiting and retaining folks, particularly who have to have some technology training and ability.

So, one of the things I've asked several of our interviewees about is, is technology like E-Ticketing, BIM for infrastructure, the whole transition, to a digitized project delivery system, ultimately, is that is that going to help leverage more interest from particularly younger people who have who really grew up on technology and wouldn't know how to do it any other way?

Is this going to be— as state DOTs become tech driven? Is that going to help recruit more young people into the workforce and importantly, retain them?

KAT:

So, I don't know that the technology on the surface is why they come to us, but it's definitely a reason they stick around and inquire more and become involved and engaged. I think on the surface, too, our industry has a perception issue that construction is not technology driven, it's dirt and rocks and shovels, and that perception exists.

But the idea is when we show them, when we can get them in the door— we have to get them in the door first. I don't know that technology is going to get them in the door, but once they're in the door and we show them the technologies, that's when the light bulbs go on. When we show them, hey, we are using electronic tablets. We are using electronic tickets. We are using 3D models. We are using augmented reality. We are using unmanned aerial systems.

And these are the technologies that we are deploying and using. We keep them and they don't run away to somewhere else. I don't know that the technology brings them in the door, but once they are in the door and we can show them that it, it opens their eyes to the possibility. It keeps them there longer and it definitely engages their interest and keeps their interests.

One of the things I use in some of my discussions and training is a slide that shows the generations and how they treat technology, and a story I often share. My son just went away to college this year. My son went through kindergarten through 12th grade and never had a single textbook. He was handed a Google Chromebook in fourth grade and now that one I'm sure died an awful death.

KAT:

My son was not good with keeping them safe. The first couple of years we went through several Google Chromebooks. Thank you to the I.T. group at school and the insurance plan. But he had a Google Chromebook and his textbooks, his homework assignments, his exams, everything was on that device. He went through 12 years of school and never had a textbook.

Now that being said, he got his first textbook in college. He has two classes. He has two physical textbooks, but he has four other classes that are entirely electronic. There are no physical textbooks. In four of his six classes, he has a laptop, he has a desktop computer, and he has an iPad. He has all three, and he carries his laptop and his iPad everywhere he goes.

Now, the desktop obviously is not portable, but he takes those devices and that is how he does all of his work. If I handed him a piece of paper and said, fill this out and turn this in, he's going to roll his eyes at me and walk away. Okay. It's not how he functions.

And I tell people for easy e-Construction and for e-Ticketing, when the first thing we do, when we get a brand-new inspector out of college and hand them a piece of paper in triplicate with copy carbon paper under it, they're going to roll their eyes at us. If we can hand them an iPad

with apps on it and technology and relate to how they had school and now how they're going to use their job. That's one last barrier to keeping that employee.

GREG:

As you know, the Federal Highway Administration published a BIM for infrastructure road map and I very much consider e-Ticketing a part of the whole BIM for infrastructure world, particularly when we consider the potential of what that new found data will be applied to in the future. But the road map estimated, I think is a fair statement because I thought it was well-researched, well-written and an important document to help catalyze the EDC initiatives.

But it estimated that the road map would be ten years and to me that that timeframe is not acceptable. But based on the current state of practice, that's what their judgment and models they applied indicated. When you look at e-Ticketing and the speed at which it has taken off, largely because of a lot of the reasons you talked about the impetus that COVID contributed to accelerating everyone's commitment to making it happen demonstrated one thing: it can happen.

So, it really is a function of how many state DOTs will elevate their commitment, elevate resources committed to accelerating the prospect of utilizing technology that is on the shelf today. So, I'm not just from the standpoint of— as e-Ticketing as an example of how you can accelerate the adoption of such technology. What are your observations?

KAT:

So, from my perspective, e-Construction set the foundation. It set up the basic elements that we needed to start thinking about BIM. E-Ticketing was the gateway to having people have devices in their hands, gateway to having them use the app and use the web to deliver their projects. The gateway to getting industry and the state government together in the room, working on a digital and electronic technology and sharing that information and collaborating on that information.

That is what BIM is. E-Ticketing is a low hanging fruit. It was something easy that was out there that was readily accessible to a vast number of people, and it gets them in the door. It gets them comfortable with using the technology. It gets them comfortable with accepting the technology as some sort of single source of truth. That single source of truth in an electronic or digital environment is what BIM needs to flourish beyond the things like e-Construction and e-Ticketing.

That's where we get into the virtual reality as we get into the augmented realities, the 3D models and all the other things that that encompasses. E-Ticketing being the gateway drug in the door. And now once we have them, we have them comfortable with that technology, comfortable together on both sides of the stakeholder. Now we can start introducing other technologies and that threshold to acceptance is lower because we got them in the door with E-Ticketing.

Now that door is open, and we have our foot in there and we've worked through some of the bugs. Now we can start developing and deploying other technologies to build on those platforms and build on the data we have with E-Ticketing and add more technologies and add more layers and make it more useful in the long run in a BIM world.

GREG:

Brilliant summation and I can't tell you. Kat Weisner, thank you for your service for everything you've done. I had the opportunity to work with you for years and I've seen it firsthand. But the work that you're doing, and Federal Highway is doing, to lead this effort is important and significant. So, thank you again.

KAT:

Thank you for having us. And thank you for your guys' work as well. It's a group effort, so to speak. I'm trying to get this out and to be the disruptors out there.

GREG:

That's what we are.

KAT:

Yes.

GREG:

Thanks again.

Thank you for listening to this episode of the Infra Talk Podcast. We hope this discussion inspires you to ask your own questions and encourages you to have discussions with

policymakers and your peers. If you want to know more about InfraTalk America, visit us at InfraTalkAmerica.com. Follow us on social media at [@InfraTalkUSA](https://twitter.com/InfraTalkUSA) or subscribe to the podcast on your favorite listening platforms to be notified of all new episodes and features. And remember, every innovation starts with a conversation. So, let's start talking.