

PREPARING FOR THE INDUSTRY OF TOMORROW





The following CE credits are offered for this session:



1.0 AIC CPD Credit | AGC of America has been approved to offer Continuing Professional Development (CPD) credits for qualifying programs by the <u>American Institute of</u> <u>Constructors</u> (AIC).



1.0 CM-Lean CE Credit | AGC of America recognizes the Annual Convention as qualifying for continuing education hours towards the renewal of AGC's Certificate of Management-Lean Construction (CM-Lean).



How DOT's are Digitizing for the Future of Construction

How to earn CE hours for this session

Participants must:

- 1. Check in with attendance scanner at the door or in the back of the room.
- 2. Attend at least 95% of the session.
- 3. Complete the session and post-program evaluation.

Additional instructions will be emailed to attendees requesting CE credits.

You may contact **Jo-Anne Torres**, Manager of Professional Development and Continuing Education, at **jo-anne.torres@agc.org** or call (703) 837-5360 for questions.



How DOT's are Digitizing for the Future of Construction

Learning Objectives

By the end of this session, participants will be able to:

- 1. Examine the benefits of going digital from mitigating risk to increasing ROI.
- 2. Identify the intricacies of intra-agency bureaucracies to get full standardization on a single system.
- 3. Analyze how current DOT users have implemented Autodesk Construction Solutions as a part of their digital strategy.
- 4. Recommend ideas for making the switch as seamless and worthwhile as possible.



How DOT's are Digitizing for the Future of Construction

AUTODESK.

How DOT's are Digitizing the Future of Construction

Jen Jewett, Innovations Project Manager, Montana DOT

Priscilla Benavides, Technical Support Engineer, New Mexico DOT

Moderated by **Keith Warren**, Industry Strategists - Transportation Solutions, Autodesk

March 11, 2020

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Agenda

State of the Industry, Introductions | Keith Warren

Technological Innovation in Montana DOT | Jen Jewett

Leading Change in New Mexico DOT | Priscilla Benavides

Fireside Chat / Q&A

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Keith Warren

Industry Strategists - Transportation Solutions, Autodesk

30 years in the AEC industry

- Advisory Board Member Autodesk IDEAS - The Innovation + Design
- Advisory Committee
 USACE/Industry CIM
- Affiliate Member of ASCE
- College Professor





Infrastructure construction is set to expand by 6.8% over the next four years



The US, Infrastructure Construction Output (US\$ Million), 2014–2023: GlobalData

The projected **\$18 trillion** gap in investment presents an opportunity for the infrastructure innovators



Global population increase over next 30 years

\$2B

68%

23%

6.8%

Percentage of population living in urban areas by 2050

Increase in annual spend needed to meet \$18 trillion infrastructure investment gap

Expected growth rate of infrastructure construction in the US – an increase of nearly 3% over past four years

Source: World Economic Forum

Successfully transforming the construction industry requires each firm to achieve these key milestones

Digitize

Reimagining construction business for the digital age. Not just moving off paper but enhancing how information is shared.

Buscheller

Connecting data across financial, bidding, project management and maintenance systems, in order to make decisions more effectively



Seizing opportunities that will ensure successful delivery for all projects profitably, safely and on time – in a more predictable way

Digitize

Reimagining construction business for the digital age. Not just moving off paper but enhancing how information is shared.

Meet Your Presenters

Jen Jewett



Priscilla Benavides



Business Analyst / Innovations Project Manager Montana DOT Design Manager, Central Region

New Mexico DOT



Technology & Innovation at Montana DOT

Jen Jewett Innovations Project Manager, Montana DOT



Becoming an Innovation Project Manager



From design to project management



Facilitating organizational change

Collaboration with design & construction

Digital Delivery for Infrastructure Multi-stage Strategy for Success

Phase Four

Data & Standards

Phase Three

Policies & Processes

• Philosophy on the business

• Pilot business process changes

process

Single Source of TruthSOPAsset Data collection & hand-off

Phase Two

Tools & Technology

PilotFunding

Phase One

People & Skills

General vision & goal
EDC / Peer Exchange
As-ls processes
To-Be Recommendations



Improved Decision-Making

Before: Paper plan review <u>without</u> construction input

After: Collaborative electronic plan review at 30-60-90 with constructability review



Realistic Quantities

Before: Average end area using plan typical sections: earthwork, surfacing

After: Surface comparison using Trimble Business Center



Digital Data with Field Technology

Before: PDF plan set printed, taken to the field

After: Mobile devices for electronic inspection and asset collection



Fewer Change Orders

Before: What communication??

After: Communicate design intent with digital data

Montana DOT Innovation to Standard Operating Procedure



Partnering

- Digital Delivery Program
- **3** Survey & Construction Technology
 - CEI Consultant Construction Engineering & Inspection



AUTODESK

Leading Change in New Mexico DOT

Priscilla Benavides

Technical Support Engineer, New Mexico DOT



DESIGN IN 3D BUILD IN 3D



Navigating a Large Agency

With a new construction project, a select group is using BIM 360 Docs.

Under a trial period to determine if the agency will move toward e-Construction.

Management is testing to see how successful it can be.



Piloting New Technology

In order to standardize on new technology, teams must typically begin with a pilot.

2 Miles roadway reconstruction on I40 (4 lanes divided highway)



Developing a Culture of Learning

Colleagues enjoy learning new things, challenging each other, the software, and processes.

It's an exciting journey and the team is committed to be hands-on during construction.



Getting Decision Makers on Board

The team must break down barriers within IT and sell or convince them in order to comply with Federal Highway EDC initiatives.

It can take over a year, but it is worth it.

Benefits of FHWA's EDC 4 Long Term Goals/Advantages

Benefits of FHWA's EDC 4 Long Term Goals/Advantages

CHAMPION

PARTNERSHIPS

INVESTMENT

Change In Process

Selling & Signing of MALD

Bidding

Specifications



Exceeding Expectations and Showing Return on Investment

Time & Cost Savings

Example: Construction staking will decrease in costs because it will no longer require surveyors to rebuild identical models from 2D to 3D.



Exceeding Expectations and Showing Return on Investment

Adoption of New Technology

Example: Implementation of iPads in lieu of plan sets along with incorporating Construction Management Software (Site Manager) on a web-based platform . Inspectors can perform their jobs 100% paperless and in the field where the project is being constructed.



Exceeding Expectations and Showing Return on Investment

Recruiting & Retaining Talent

Example: The future generation of workers is joining the workforce and they may not be reading plans; it will all be model based. In addition industry is losing skilled equipment operators but with automotive machine guidance with an electronic model, anyone can steer the equipment



Fireside Chat

Jen Jewett | Innovations Project Manager, Montana DOT

Priscilla Benavides | Technical Support Engineer, New Mexico DOT

Moderated by Keith Warren



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- What in your perspective have been the major changes since you joined your agency?
- In your opinion, what is different/unique about working at your DOTs vs. Other DOTs in the US?
- While there is great pressure around the country to fix or build new infrastructure, what was the catalyst at your DOT that
 made everyone realize the need for change?
- We talk about the need to better connect design and construction for projects, but can we get a little more specific here?
- Is there a certain phase of the project where the pain of this disconnection was felt the most? The more specific we can get the better.
- You mentioned bridge projects were there specific improvements you wanted to make to the design and build process of bridges?
- Other issues you mentioned were around the lack of a good process for QA/QC that facilitates a reliable and accurate 3D model
- Suggest identifying one issue or painpoint and focusing on that as the case study for this presentation. I think the bridge
 project is stronger and is different than road/highway paving. This is what I started to include below.
- Once you identified the problem, what were your next steps? How did you address it?
- Desired outcome: Identify a strategy that allowed for deeper analysis of bridge designs
- Knowing you wanted to solve for bridge design and deeper analysis, what strategy did you create to help alleviate the pain of siloed teams?
- Created a strategy that combined the needs of the bridge engineers (a way to do complete analysis) in a digital form that could be shared with multiple stakeholders on the project.
- How did you determine the role technology played in this strategy?
- Had to be easy to use, meet the technical requirements, fit into current workflows/processes (note these are all suggestions and would want validation from Jen)
- How did you implement this strategy?
- Were there any measurable metrics demonstrating the success or learnings from your strategy implementation?
- What changed? What were the wins? What did you learn?

Successfully transforming the construction industry requires each firm to achieve these key milestones



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Integrate

Connecting data across financial, bidding, project management and maintenance systems, in order to make decisions more effectively



Optimize

Seizing opportunities that will ensure successful delivery for all projects profitably, safely and on time – in a more predictable way

40



Benefits of FHWA's EDC 4

- Long Term Goals/Advantages
 - Increase Transparency
 - Shorten Project Delivery Process
 - Shorten Construction Schedules
 - Save Money in recreating 3D model
 - BIM 360 Streamlines Design Review Process
 - Tracks who made comment and when

- Champion Robert Bency, FHWA Area Engineer
 - Peer Exchange Utah DOT (Spring 2019)
 - Grant for purchace of IPads
- Construction Partnering
 - Collaboration and Innovation
- Investment Period
 - IPad Construction Crew & Design Team
 - Software/Licenses for BIM

Change In Process

Bidding

- Advertisement
 - BidX via FTP Site
- Sealing & Signing of MALD (Model as Legal Document)
 - NTC to verify & adopt MALD
 - NTC Engr. Seal validating model
 - NTC requiring the use of Trimble
- Specifications
 - Digital Delivery Coordination Through Mandary Pre-Construction with Contractors Surveyor

