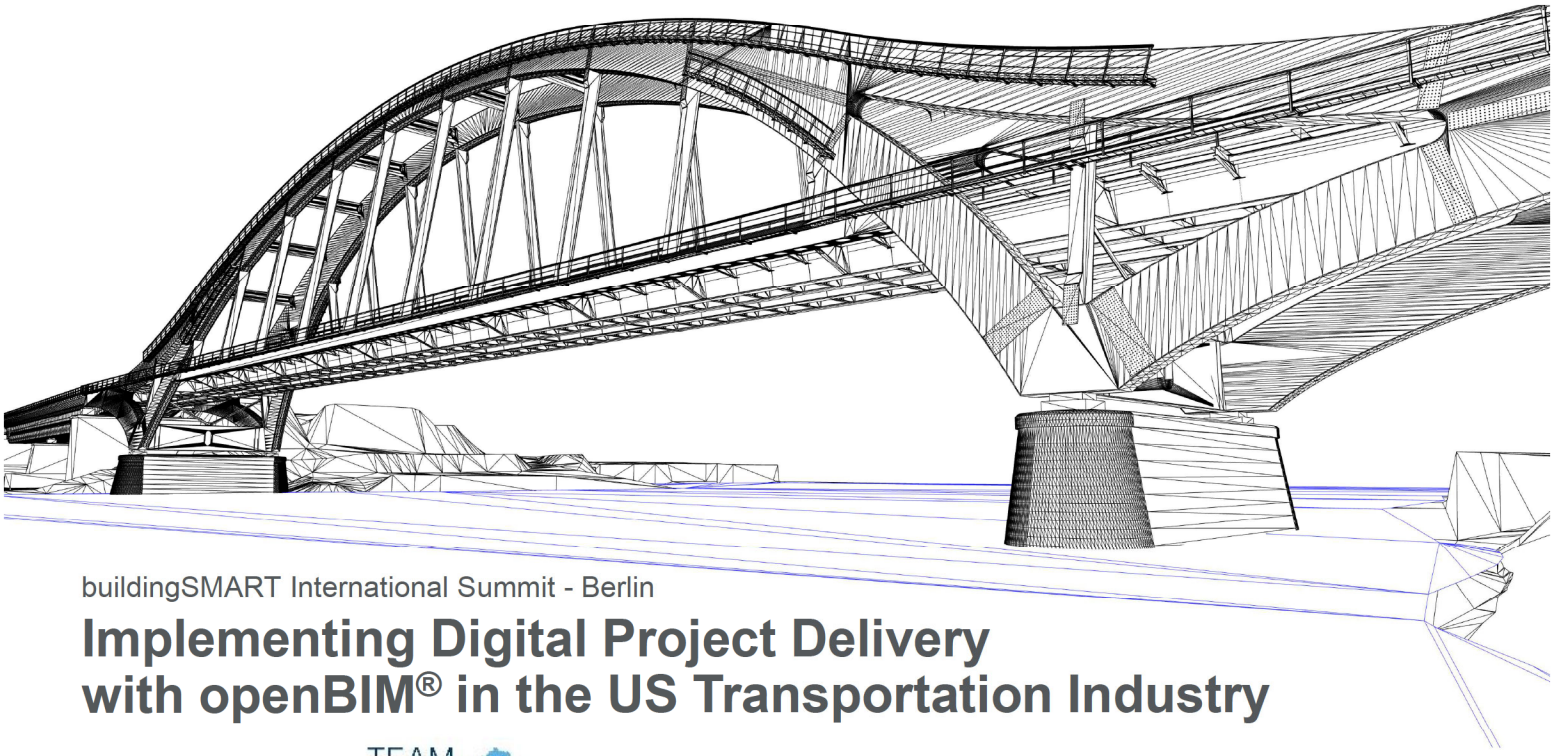
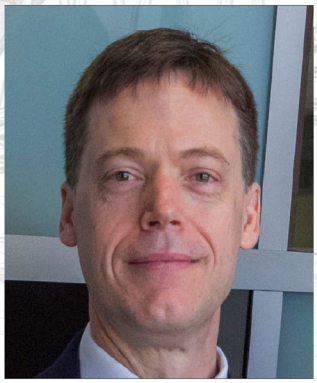


buildingSMART International Summit - Berlin

Implementing Digital Project Delivery with openBIM® in the US Transportation Industry

September 24, 2025

Today's Presenters



Will Holmes
IT GIS / BIG DATA BRANCH MANAGER

Will Sharp
SENIOR VICE PRESIDENT

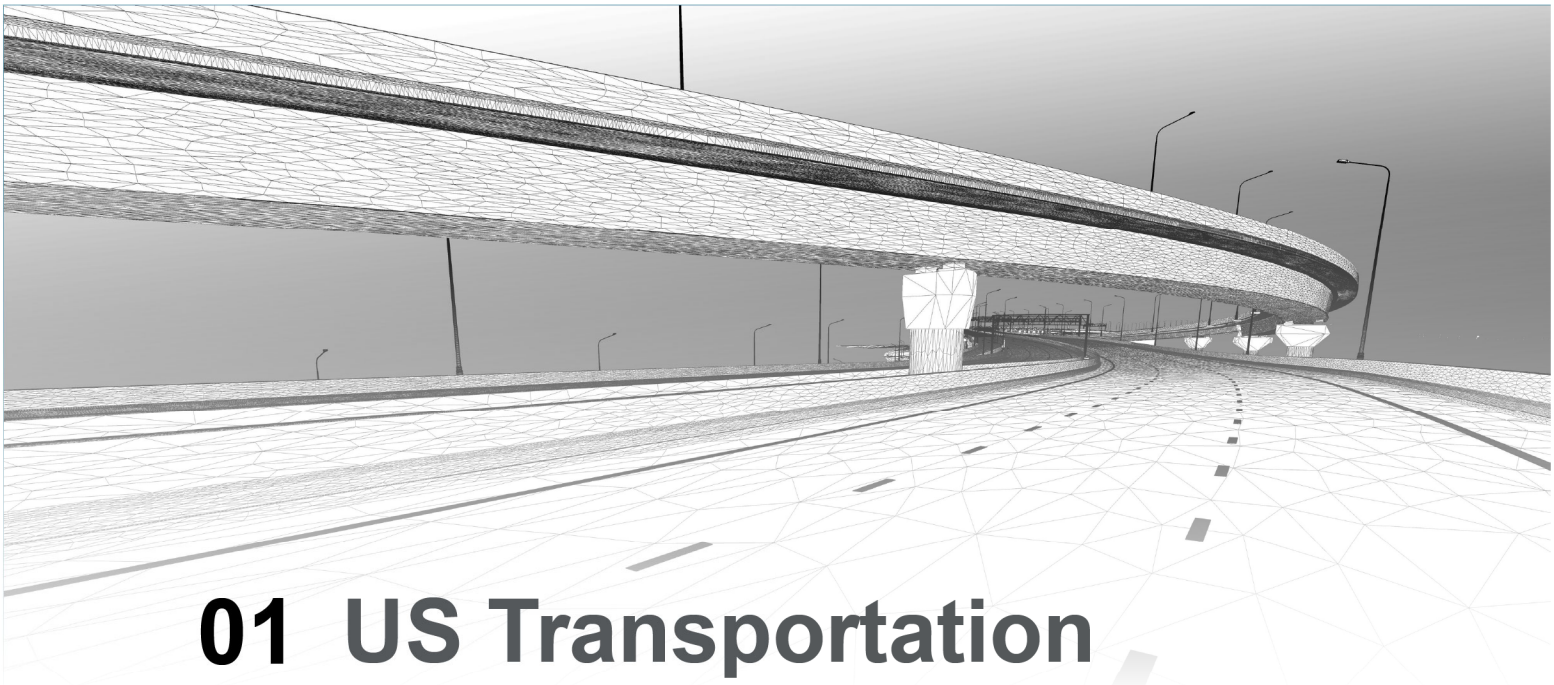
Today's Agenda

01 US Transportation Industry Vision

02 US National Efforts

03 openBIM in Action with the State DOT's

04 Critical Next Steps to Implement openBIM

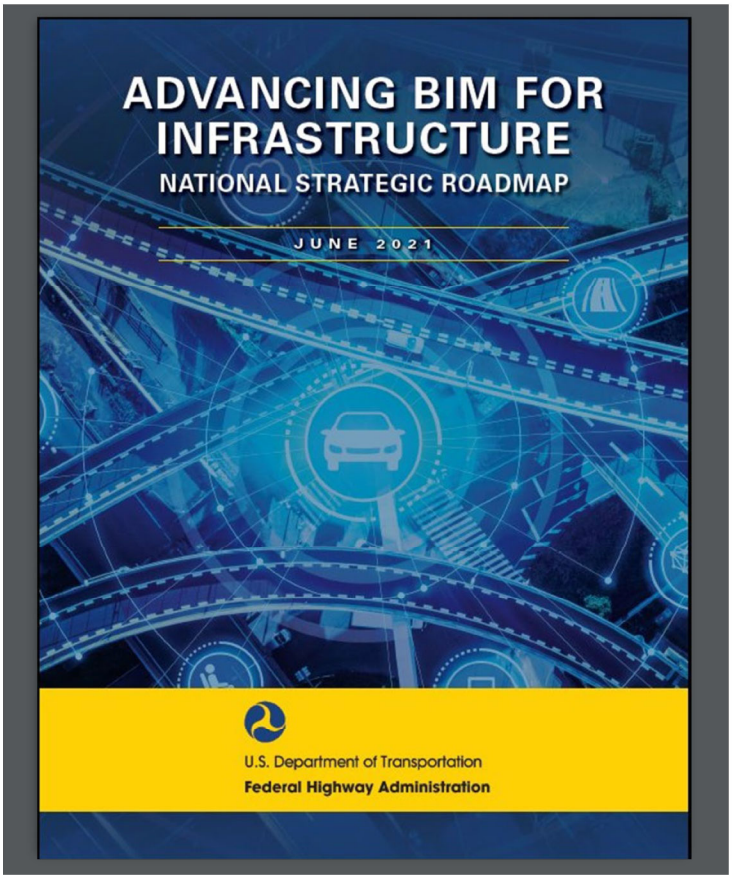


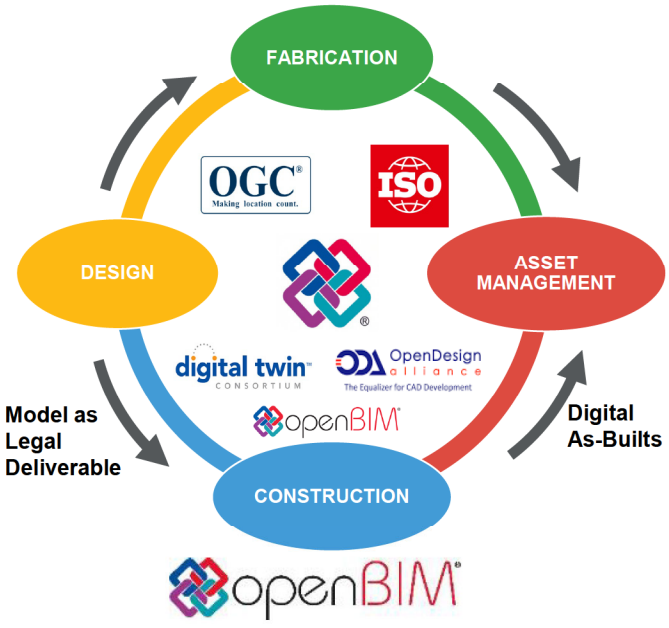
01 US Transportation Industry Vision

FHWA's BIM Vision, Goal, and Objective

- **VISION:** To digitalize project delivery, operations, and maintenance for the Nation's highway infrastructure.
  - *To make information available to anyone who needs it and when they need it.*

  This requires a shift from a PROJECT-centric approach to an ASSET-centric mindset.
- **GOAL:** For State DOTs to adopt BIM for Infrastructure as a standard practice.
- **OBJECTIVE:** For FHWA and State DOTs to develop and implement a set of activities to *incentivize achieving progressively higher degrees of BIM maturity over time.*

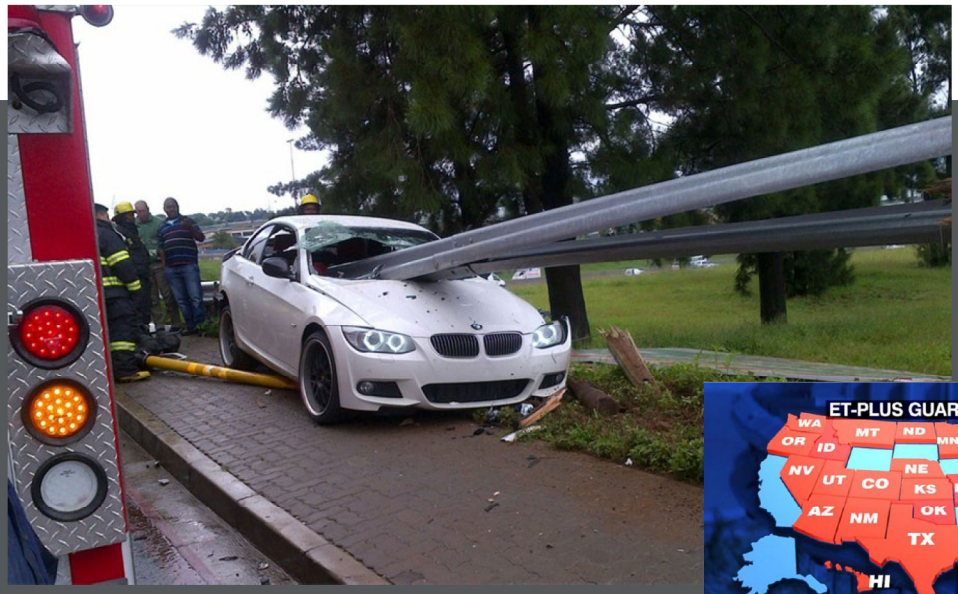




Transportation Industry Vision

Manage and sustain a safe, efficient system by embracing asset lifecycle management, digital project delivery, and open digital workflows.

Why do we need open standards?

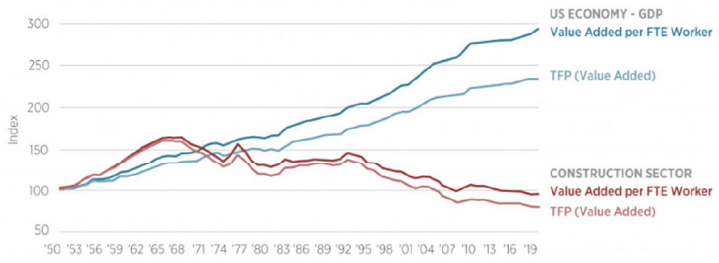


- Solve safety issues faster– *it's about helping PEOPLE.*
- More cost & time efficient.

Open Data Standards Speed Up Digital Delivery

- Construction productivity has lagged...
- The workforce is aging...
- We MUST adapt!

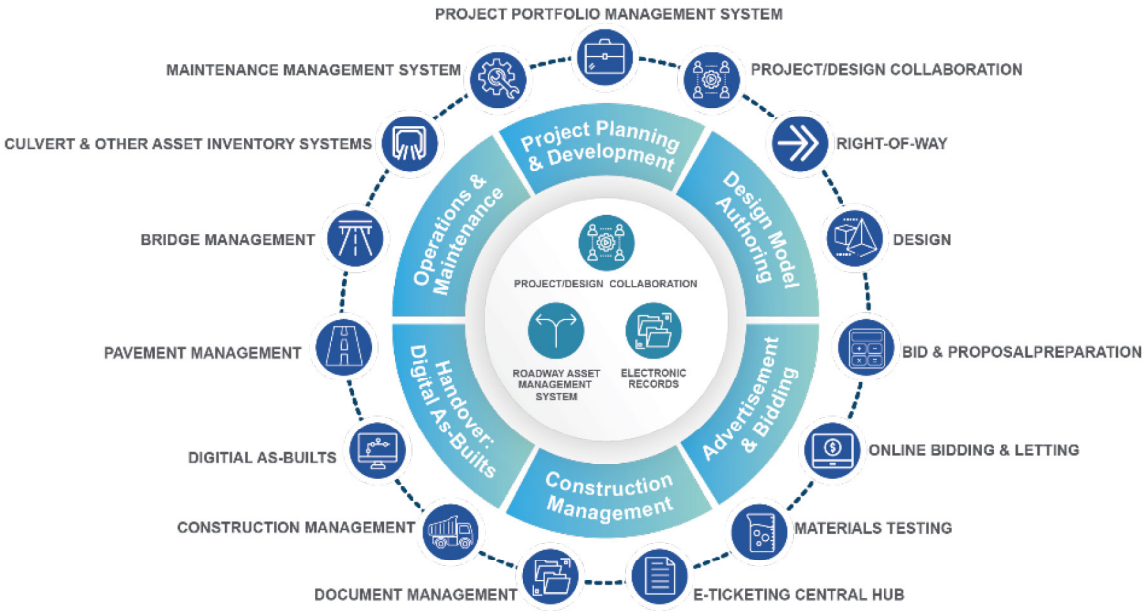
Indexes of Value Added Per Full-Time-Equivalent (FTE) Worker and Total Factor Productivity (TFP), Overall US Economy and Construction Sector (BEA Data)



Note: This figure shows indexes of US construction sector labor productivity and total factor productivity (TFP) from 1950 to 2020. For comparison, it also plots the same indexes for the overall economy. Throughout the 1950s and well into the 1960s, both measures of construction sector productivity grew steadily. Indeed, they outpaced their whole-economy counterparts during that period. By 1970, however, the construction sector's labor productivity and TFP had both begun to fall. This downturn was not temporary; the decline has continued for the past half-century.

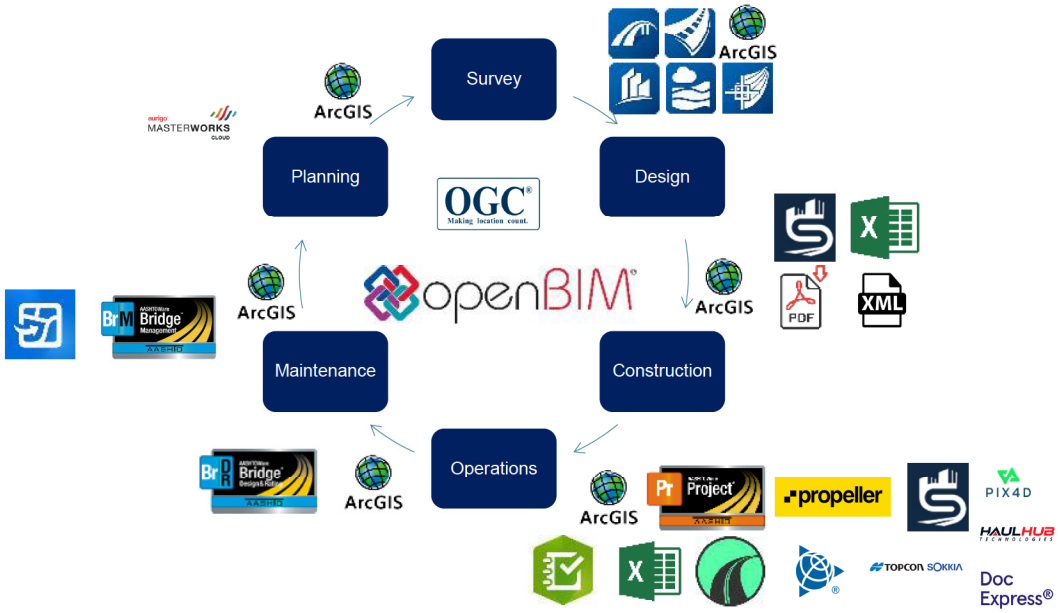
Becker Friedman Institute

Why Do We Need Open Data Standards?



Why Do We Need Open Data Standards?

Information Flow Through Project Lifecycle



State Efforts: The Shift to Digital Delivery

For Information Only

MALD

As-Built

LEVEL 1
Transition from 2D to 3D for plan production

LEVEL 2
Deliver 3D model for information only

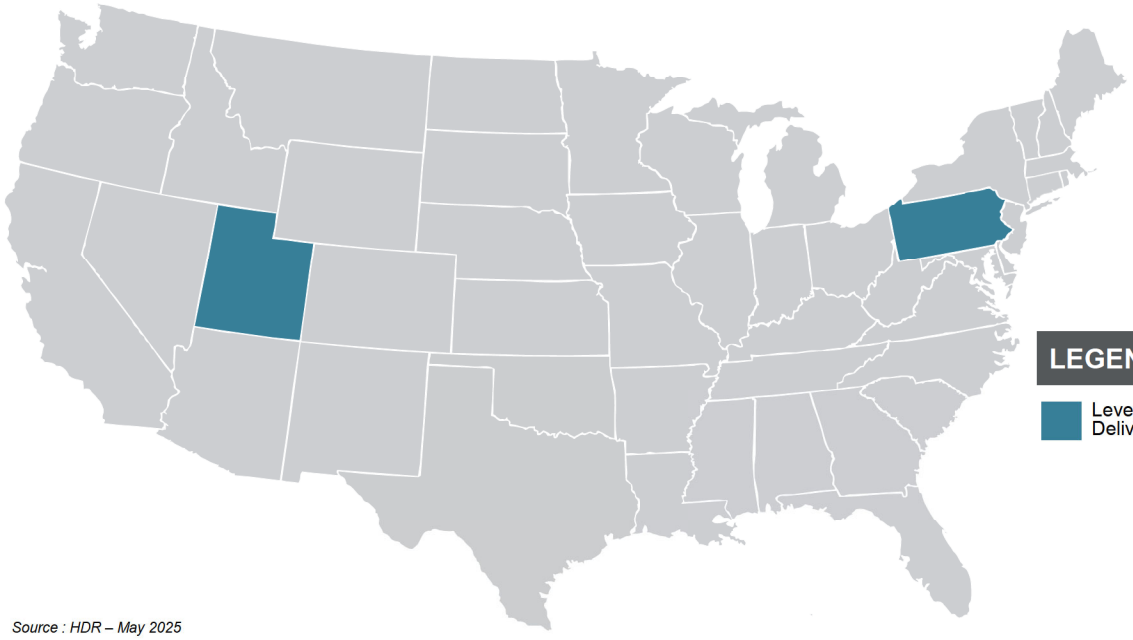
LEVEL 3
Deliver 3D model contractually with conventional plans

LEVEL 4
Deliver 3D model contractually without plans

LEVEL 5
Collect digital as-builts

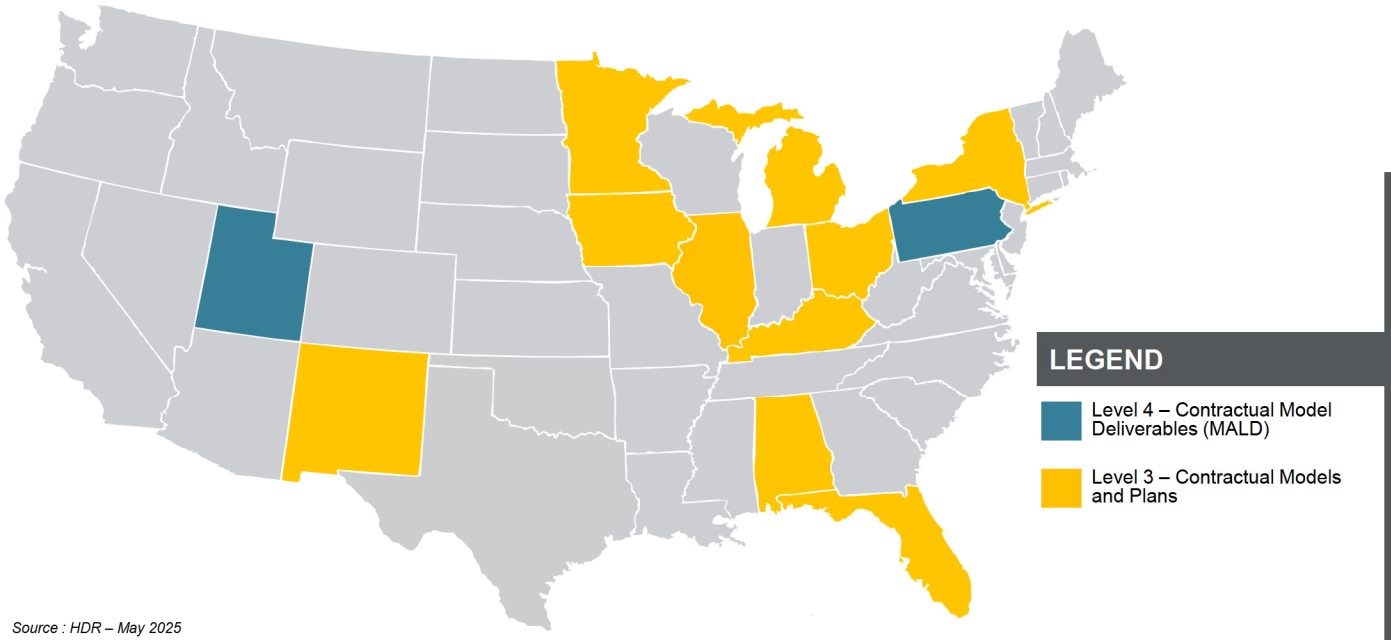
AASHTO JTCEES – August 2022

State Efforts: The Shift to Digital Delivery



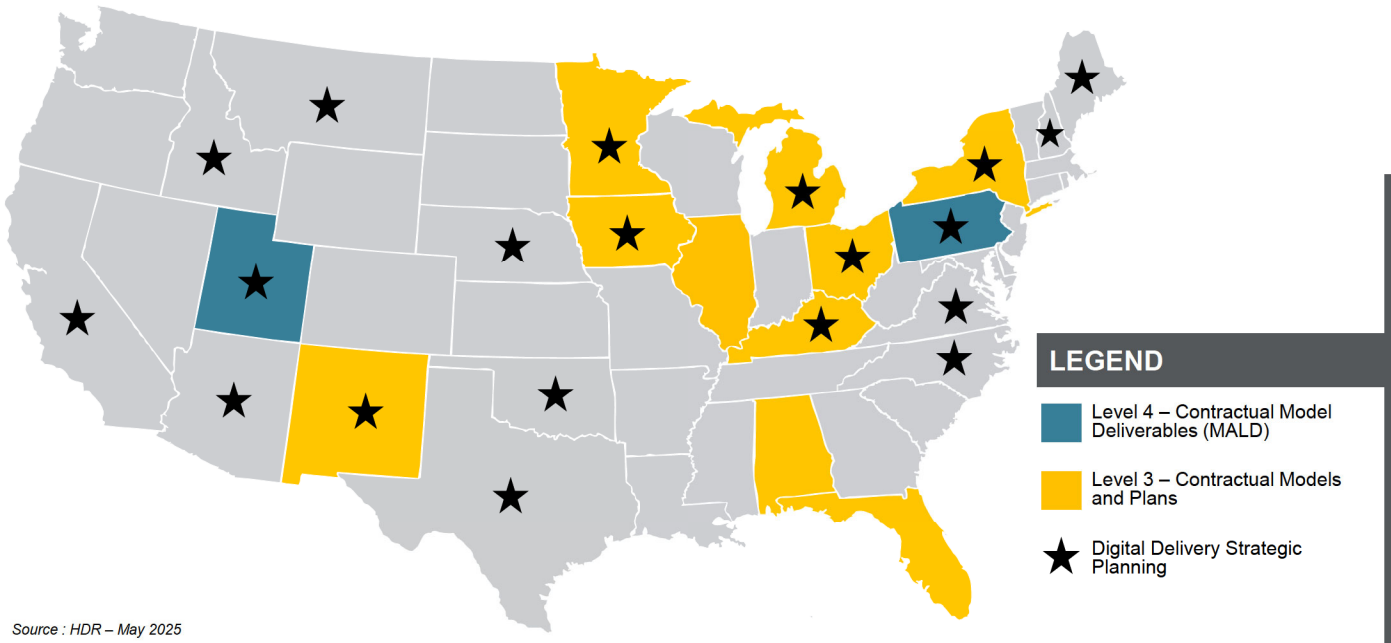
Source : HDR – May 2025

State Efforts: The Shift to Digital Delivery



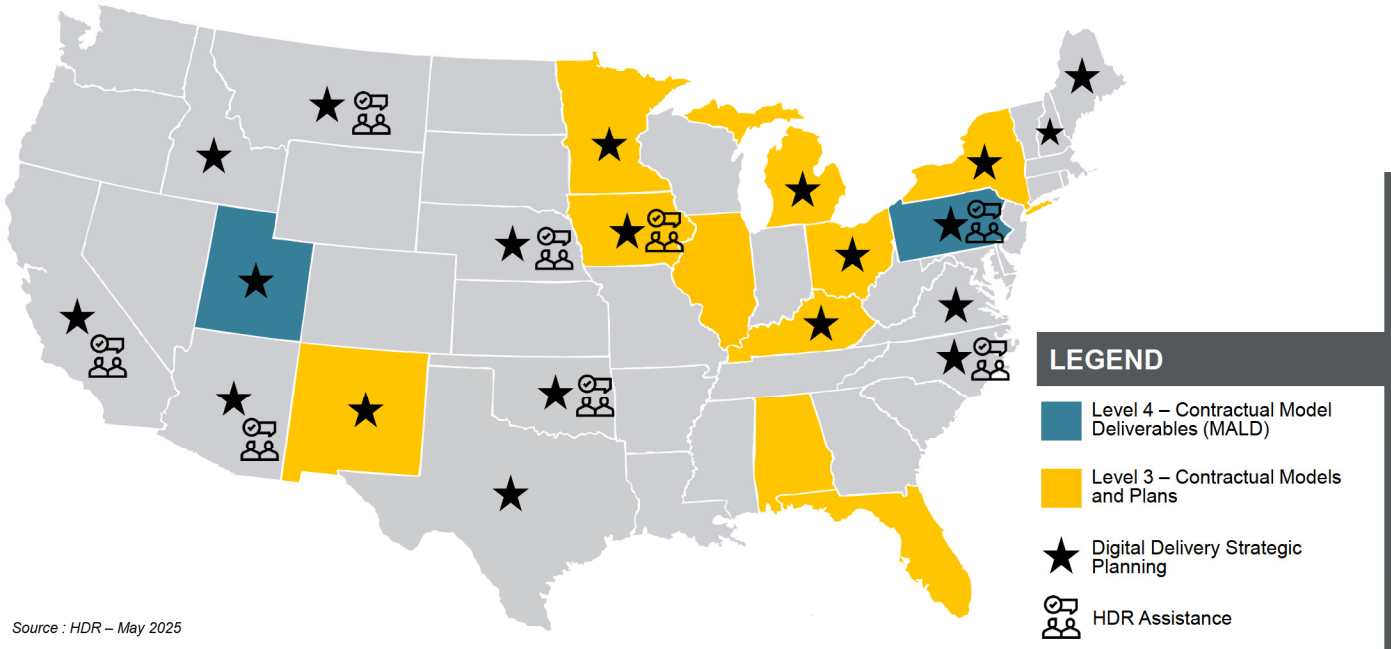
Source : HDR – May 2025

State Efforts: The Shift to Digital Delivery

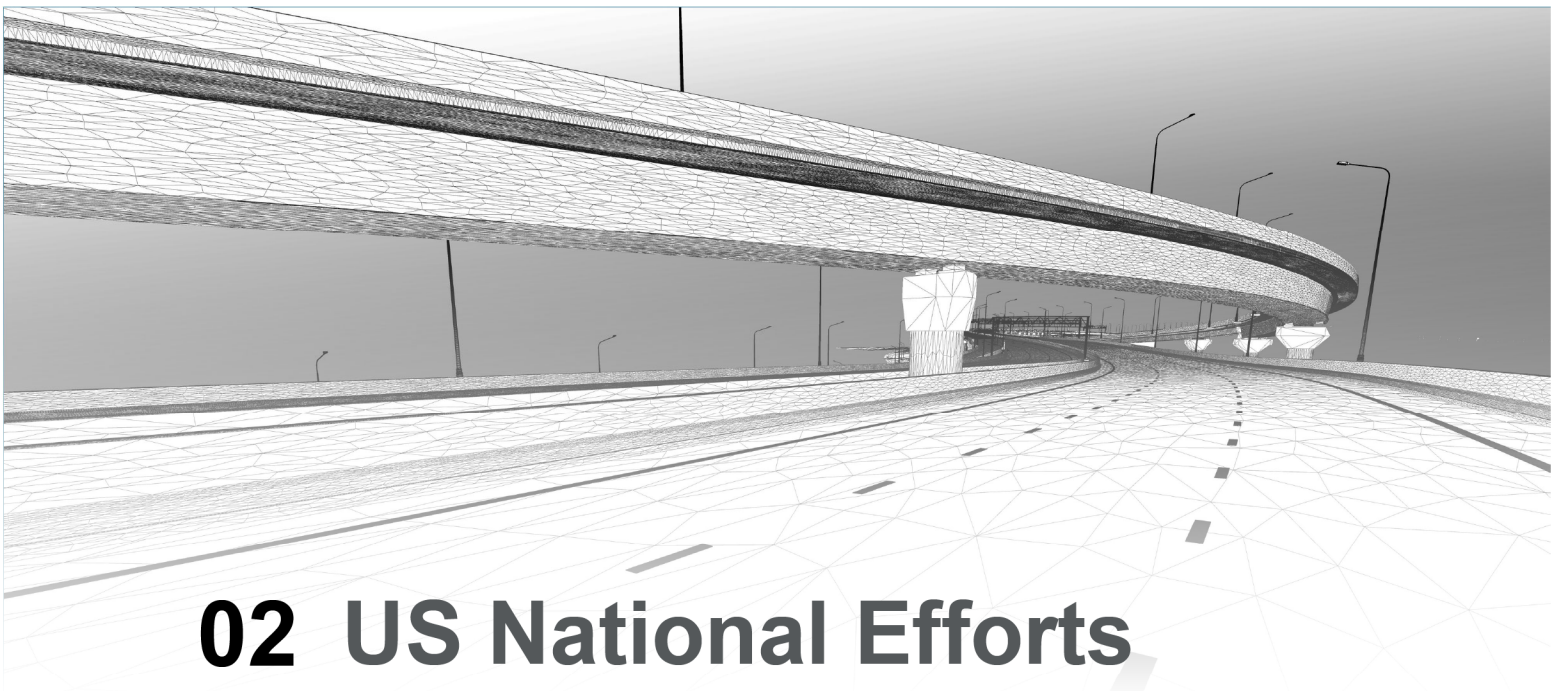


Source : HDR – May 2025

State Efforts: The Shift to Digital Delivery



Source : HDR – May 2025



02 US National Efforts

AASHTO Advancing BIM National OPEN Standards

Advancing Data Standards

2017 BIM for Bridges & Structures Pooled Fund created

2019
AASHTO AR-1-19 issued
- IFC national adopted standard for States
- J-Stan formed

2021
- BIM National Roadmap
- BIM for Infrastructure Pooled Fund created

2022
- AASHTO adopted national bridge open data standards
- **AASHTO joins bSI as a Principal Member**

2024
- BIM Bridges & Structures Pooled Fund - Starts Phase II

2025
- TRB Digital Delivery Leadership Meeting
- ADCMS Collaboration Meeting
- **BIMWeek / openBIM Summit**

AASHTO Joint Sub-Committee on Data Standardization (J-STAN) Committees & Members

Bridges and Structures (COBS)
Cheryl Simmons, UDOT
Scott Westerfield, MSDOT

Construction (COC)
Shawn Smith, MEDOT
(Vacancy)

Data & Analytics
Will Holmes, KYTC
Mark Snyder, IDDOT

Design
Jennifer Lloyd, TNDOT
(Vacancy)

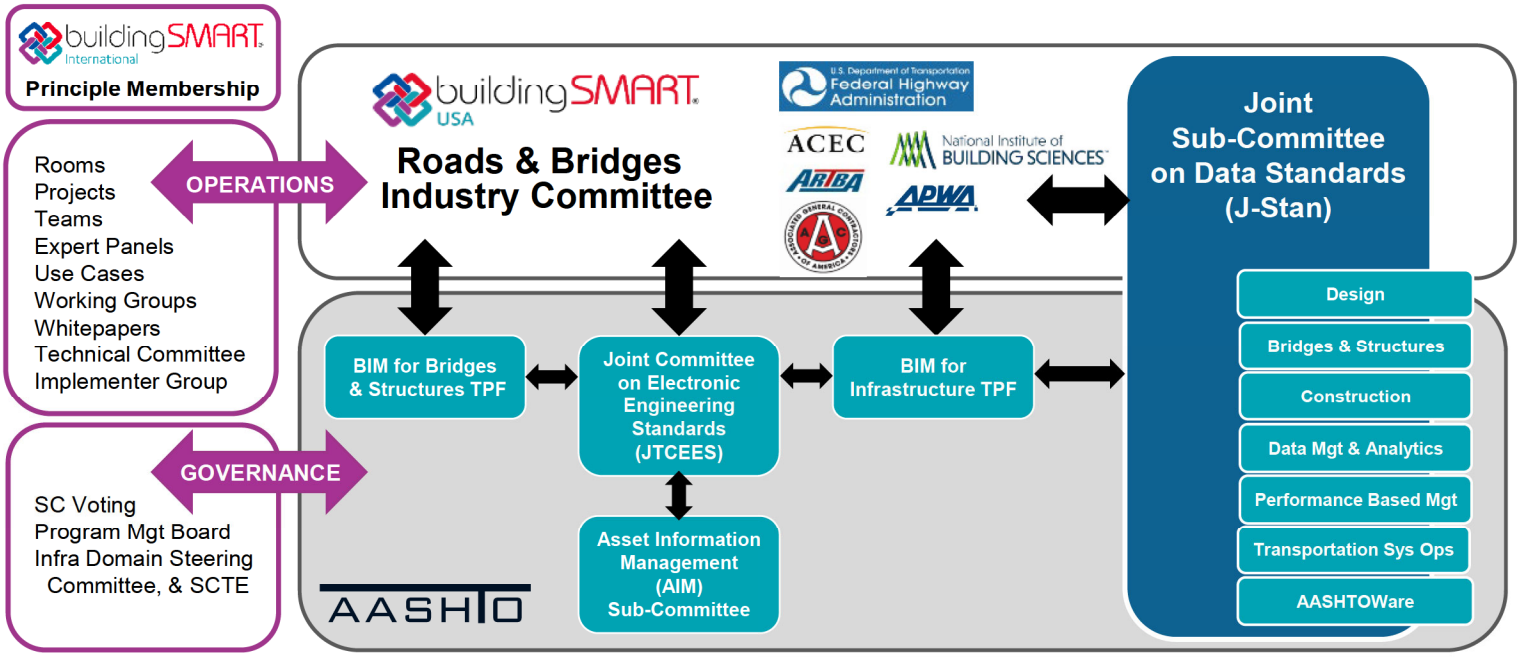
Performance Based Management
Trisha Stefanski, MNDOT
(Vacancy)

Transportation Systems Operations
Matt Miller, IA DOT
(Vacancy)

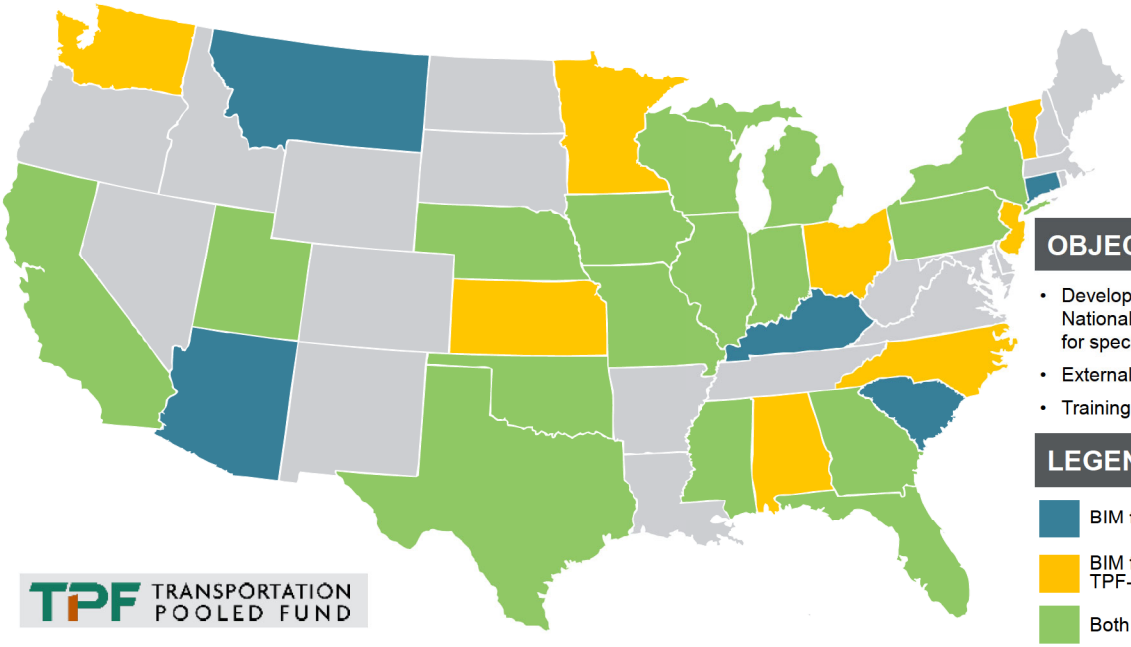
Special Committee on AASHTOWare
Lou Ann Daugherty, NEDOT
Todd Bergland, MNDOT

FHWA
Katherine Petros

buildingSMART, AASHTO, and State DOT's



US Pooled Funds – BIM / Open Data Standards



TPF TRANSPORTATION POOLED FUND

OBJECTIVES

- Develop AASHTO Endorsed National BIM Open Data Standards for specific use cases
- External Stakeholder Collaboration
- Training and pilot project efforts

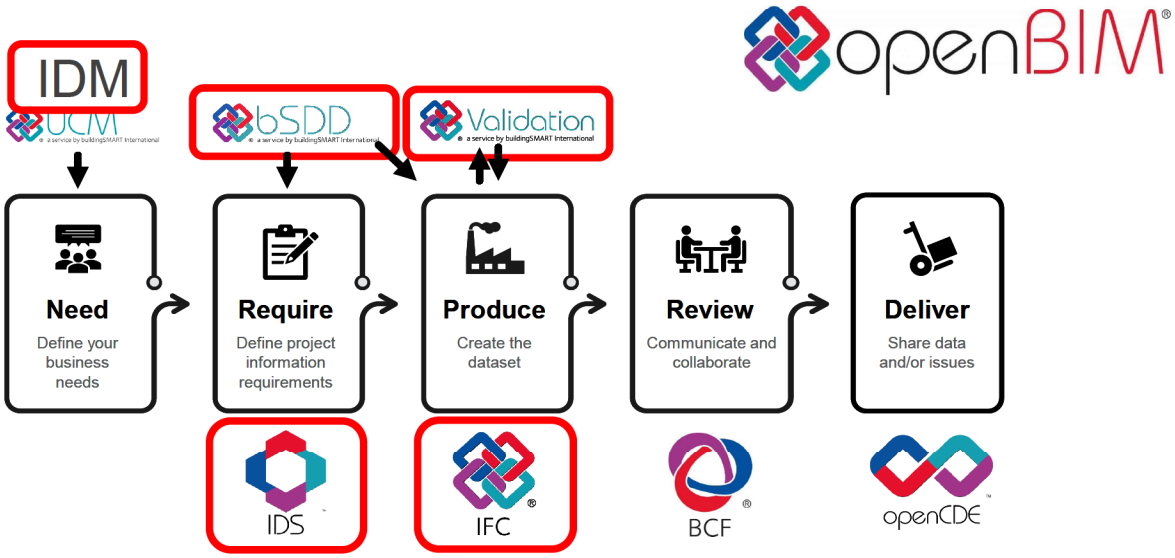
LEGEND

- BIM for Infrastructure TPF-5(480)
- BIM for Bridges and Structures TPF-5-(372), TPF-5(523)
- Both

BIM Pooled Fund Efforts

	TPF-5(372) – Phase 1 BIM for Bridges & Structures (2018-2024)	TPF-5(523) – Phase II BIM for Bridges & Structures (2024-2028)	TPF-5(480) BIM for Infrastructure (2023-2027)
Goal: Develop AASHTO-endorsed openBIM National Data Standards	"Design to Construction Exchange" for conventional bridge types	"Fabrication Detail Exchange" for conventional bridge types and up to 2 additional exchanges	Standards and workflows for 2 priority exchanges. Guidance and support for lifecycle information exchanges across the asset lifecycle.
Focus	Conventional, workhorse bridges, design-bid-build	Conventional, workhorse bridges, design-bid-build	Reconstruction, urban arterial highways, DBB; includes roadway, drainage, utilities, traffic, survey and geotechnical assets
Selected Data Exchanges	**1 exchange** Construction Contract Model	**3 exchanges planned (related to Digital As-Built Model)** (Advanced Detailing, Fabrication Detail, Construction Update)	**2 exchanges planned** Construction Contract Model (Design to Construction); Digital As-Built Model (Construction to O&M)
Create & Publish AASHTO-Endorsed IDM	✓	✓ **(planned)**	✓ **In Progress** D-C IDM scoped & documented
Develop IDS	✓	✓ **(planned)**	✓ **(planned)**
Develop Data Dictionary Content & Publish via bSDD Service	✓	✓ **(planned)**	✓ **(planned)**
Engagement with Industry Stakeholders	**Limited**	**More Robust (Active)**	**More Robust (Active)**

openBIM Focus – BIM for Bridges and Structures Pooled Fund



Digital Delivery and Open Data Standards Industry Support

ACEC

Digital Delivery Position Paper

*"ACEC endorses having client agencies require **open data standards** for **contractual digital deliverables** to provide reliable and repeatable data exchanges throughout the project lifecycle in a software agnostic format."*

AGC THE CONSTRUCTION ASSOCIATION

Digital Means and Methods Policy Statement

*"AGC fully supports initiatives that standardize how digital information is created, transmitted, and permitted for use, including **Model as Legal Document** and **open data standards**."*

ARTBA

Digital Construction Policy Statement and White Paper

*"ARTBA supports the adoption of **open data standards**, the **model as the legal document (MALD)**, and digital construction technologies and processes for infrastructure projects..."*

Bridge Pooled Fund Engaging with Technology Providers

AASHTOWare SOLUTIONS · esri · Eriksson software · propeller · BLUEBEAM A NEMETSCHEK COMPANY

AUTODESK · BridgeSight Software™ · ALLPLAN A NEMETSCHEK COMPANY · SOLIBRI A NEMETSCHEK COMPANY · ProMiles

Bentley · infotech

24 Participating software developers/vendors

OPENBrIM · THE HARD CODE

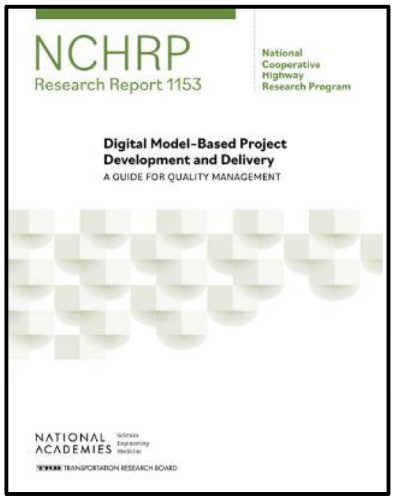
Jaud IT GmbH

Catenda · HIGH STEEL STRUCTURES LLC An Affiliate of High Industries Inc. · iENGINEERING

Kiewit · Trimble

DBM VIRCON · Michael Baker INTERNATIONAL · LUSAS · WSDOT

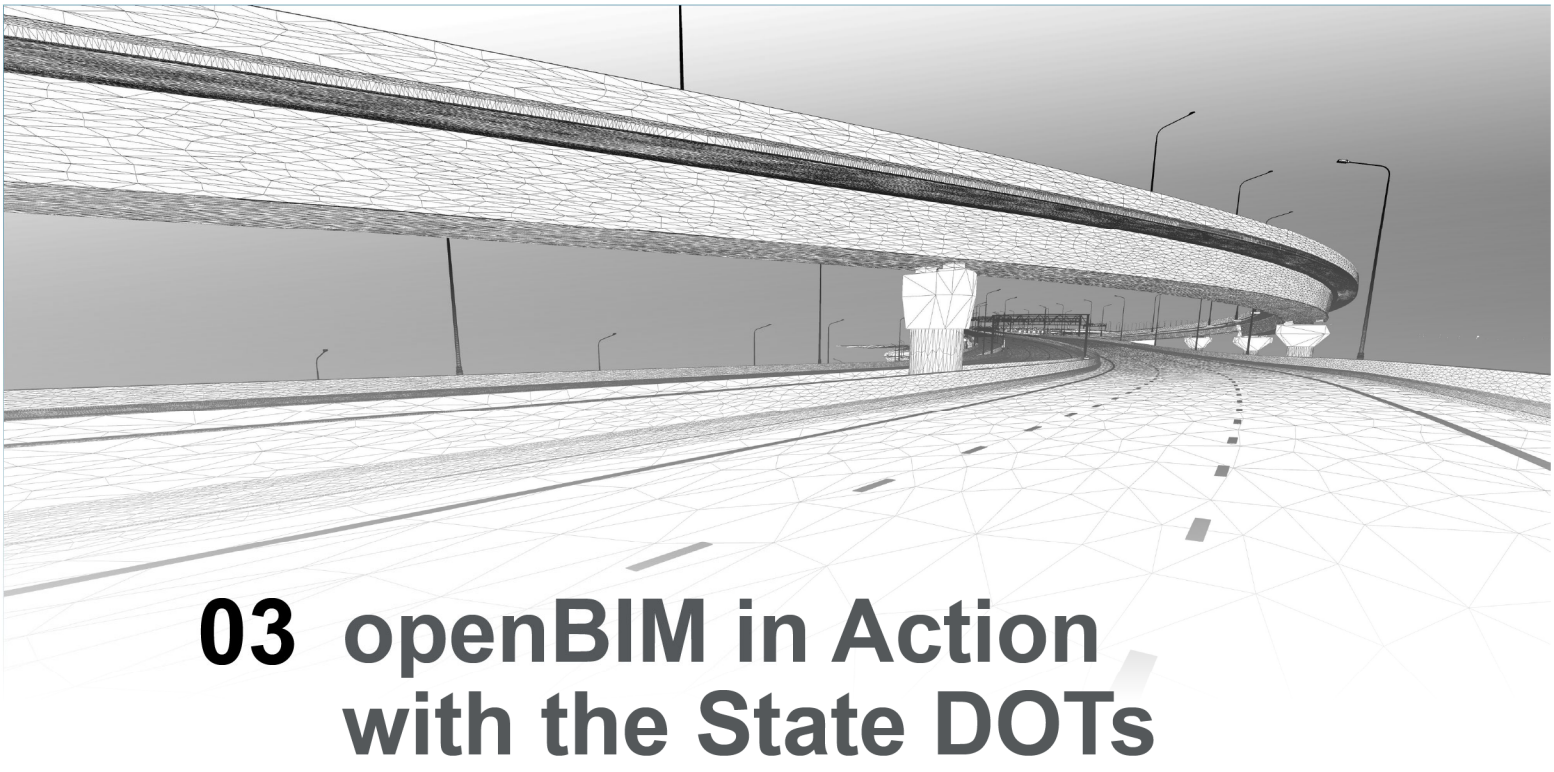
Quality Management for Model Based Delivery



CHAPTERS

- Introduction
- Quality Management
- Record Management
- Model Reviews
- Components of Review
- Implementing this Guide

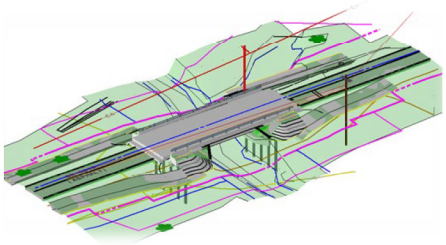
Research objective was to develop a guide that can serve as a national industry reference for quality assurance with 3D model-based project delivery



03 openBIM in Action with the State DOTs

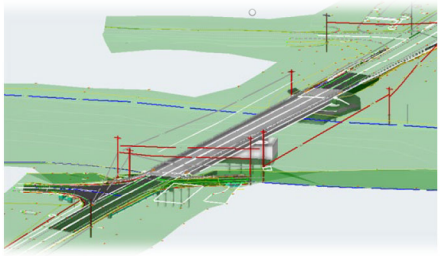
PILOT PROJECTS

openBIM using TPF-5(372) National Data Standards



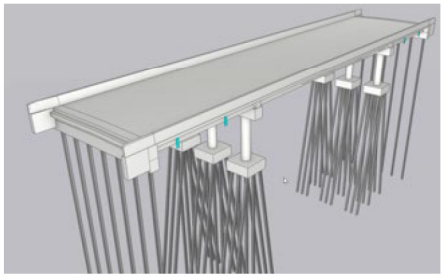
PennDOT
SR 3010 Rearick Road

- 1-Span PS Bulb Tee Beams
- Integral Abutments
- Lead Designer: JMT



PennDOT
SR 6 over French Creek

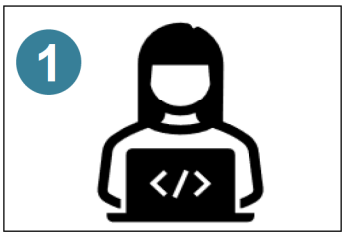
- 2-Span Steel Plate Girders
- Integral Abutments
- Lead Designer: Michael Baker



Iowa DOT
US59 over Iowa 92

- 3-Span PS Beams
- Integral Abutments
- Lead Designer: HDR

Open Data Standard Exchanges



ENGINEER
Creates Model using Software of Choice

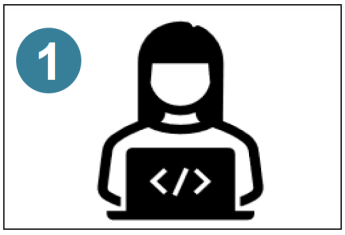
AUTODESK Revit

Tekla

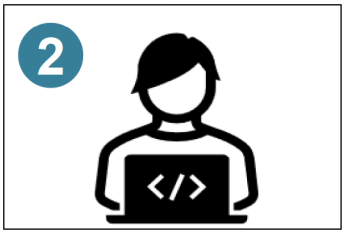
OPENBrIM

ALLPLAN

Open Data Standard Exchanges



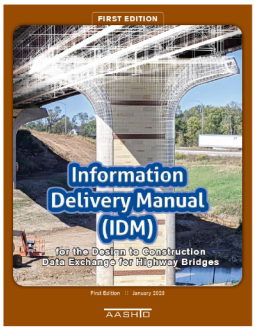
ENGINEER
Creates Model using Software of Choice

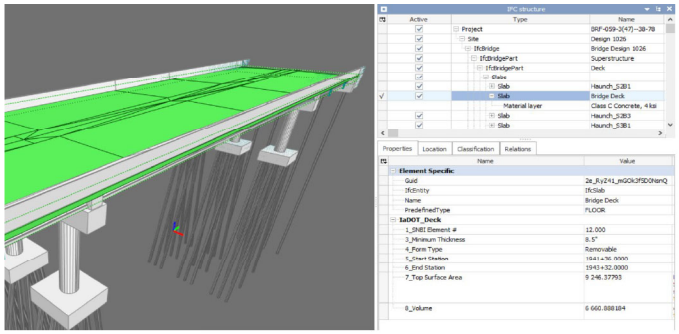


ENGINEER
Exports Model IFC Files for Owner

IFC

bSDD

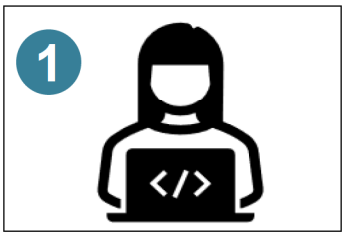




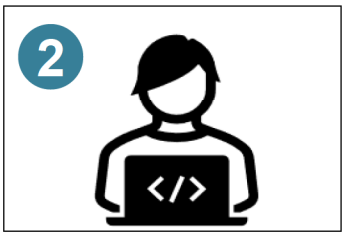
IDS

Validation

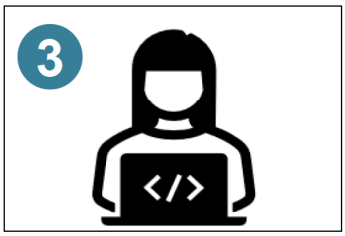
Open Data Standard Exchanges



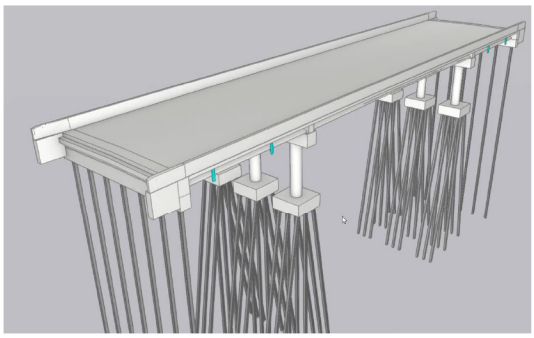
ENGINEER
Creates Model using Software of Choice



ENGINEER
Exports Model IFC Files for Owner

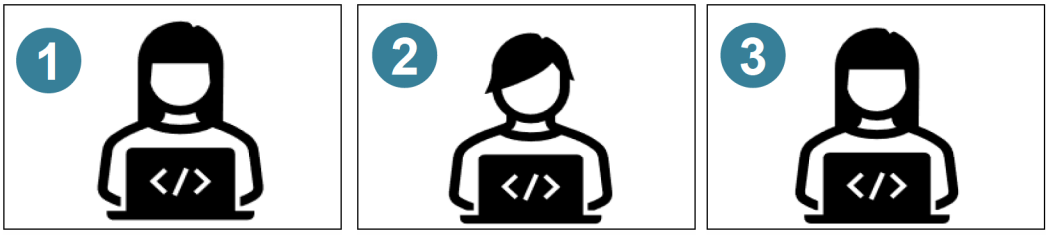


OWNER
Advertises Project Model openBIM



Geometry
Relationship/Hierarchy
Semantics/Identity
Properties

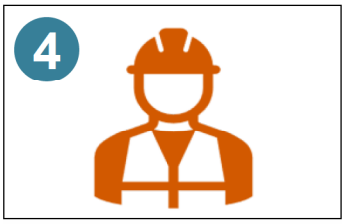
Open Data Standard Exchanges



ENGINEER
Creates Model using Software of Choice

ENGINEER
Exports Model IFC Files for Owner

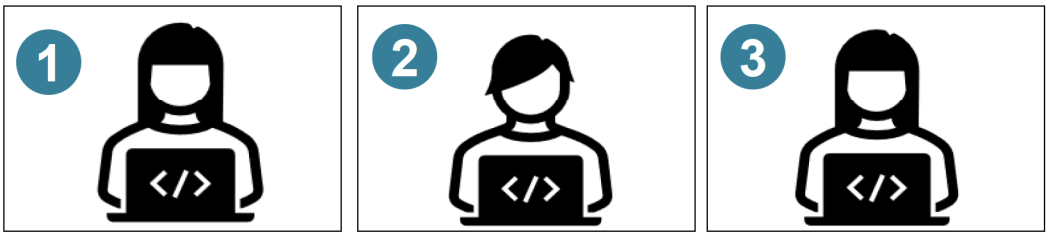
OWNER
Advertises Project Model openBIM



CONTRACTOR
Imports Model openBIM Files

Trimble Connect
DALUX
propeller
BIMvision
Catenda
usBIM

Open Data Standard Exchanges



ENGINEER
Creates Model using Software of Choice

ENGINEER
Exports Model IFC Files for Owner

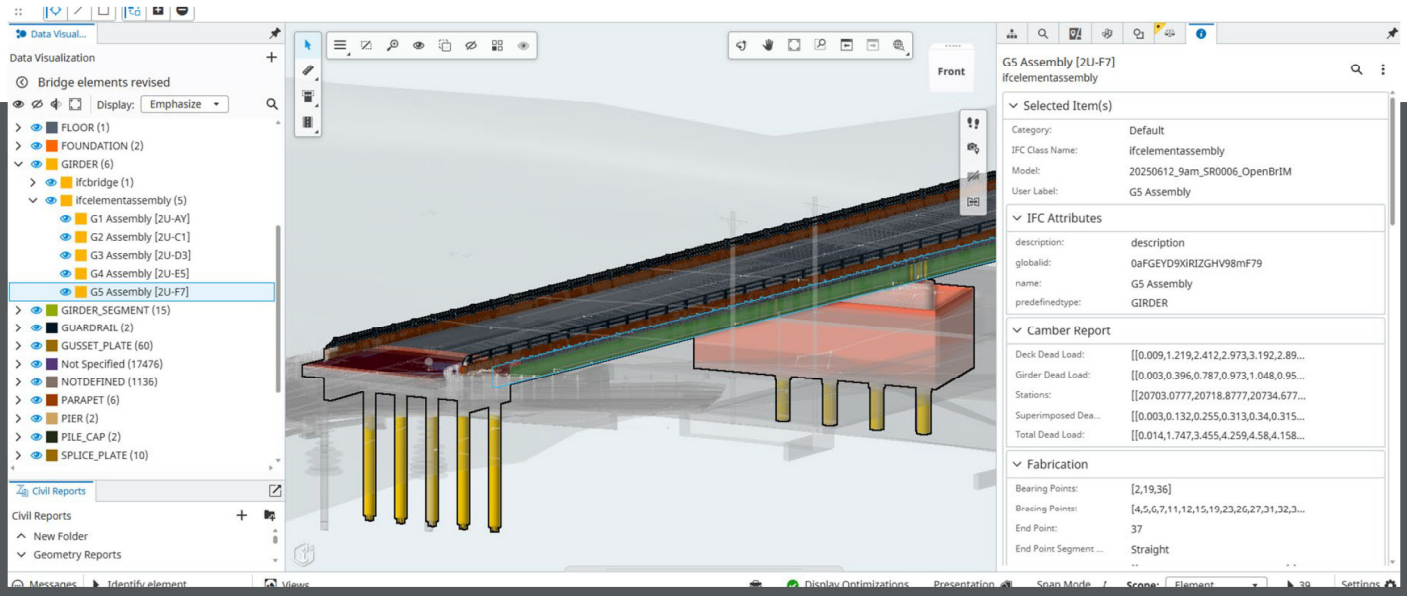
OWNER
Advertises Project Model openBIM

CONTRACTOR
Imports Model openBIM Files

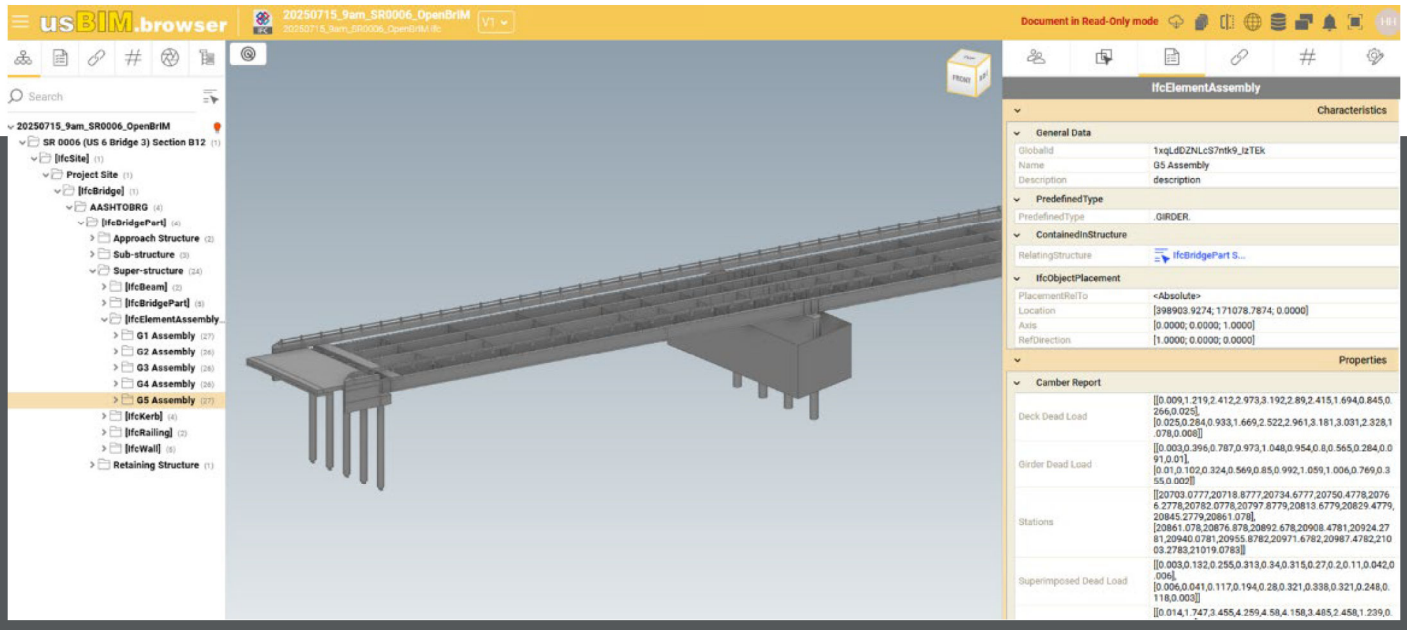
CONTRACTOR
Exports Model openBIM Files

OWNER
Imports openBIM for Asset Management

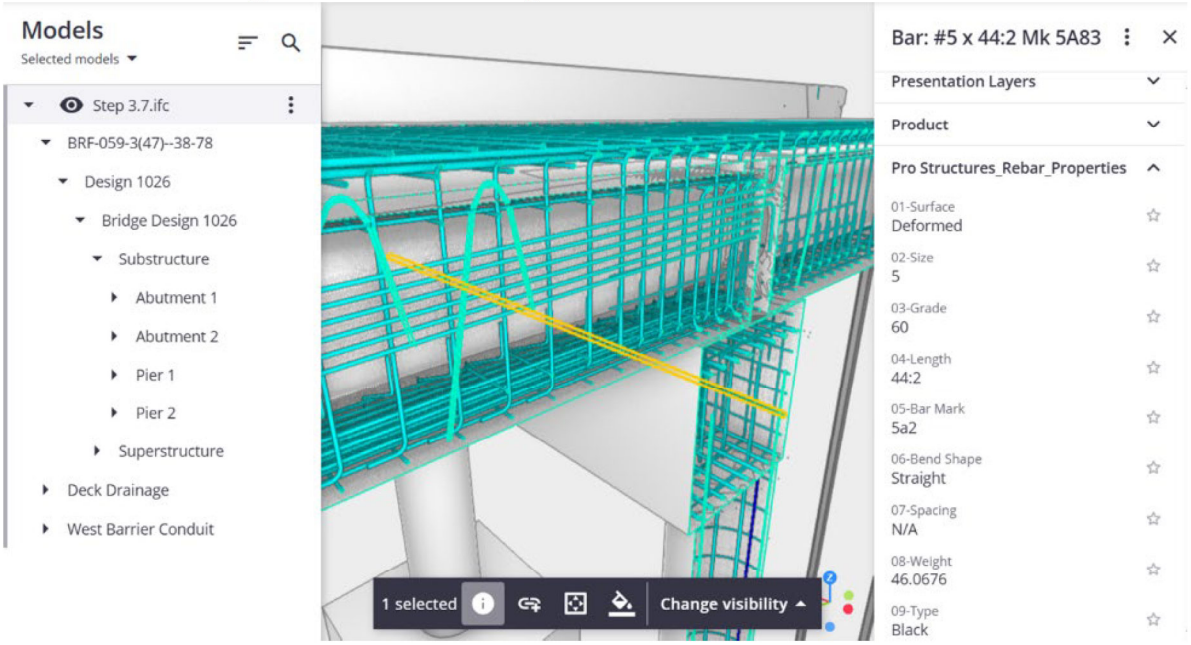
openBIM Bridge Pilot Projects Details



openBIM Bridge Pilot Projects Details



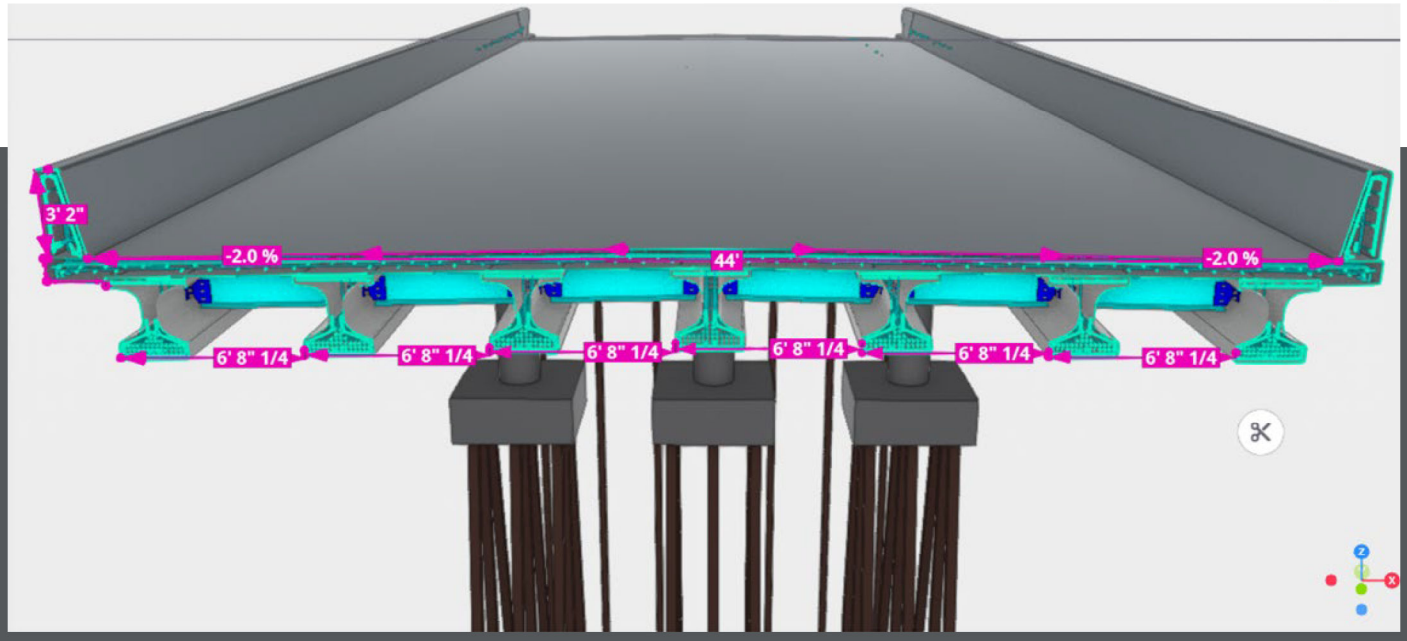
openBIM Bridge Pilot Projects Details



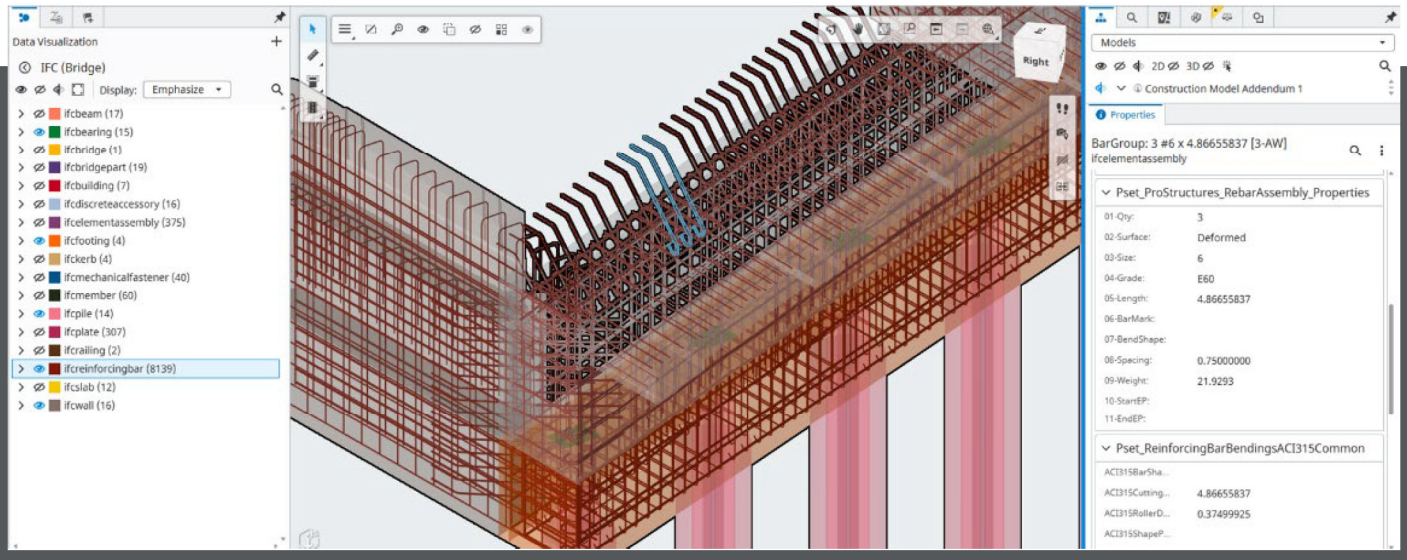
openBIM Bridge Pilot Projects Details

05-BarMark	Identificati...	Count	Name	Material	01-Surfa...	02-S...	03-G...	04-Length	06-BendShape	07-Spac...	08-Weight	09-T...	Bar Shape Code
#5 (3)	2404-7775000	3	Reinforcing Steel	ASTM A615, A706, A996	Deformed	5	60	193:6	X	N/A	201.667	Black	X
10a1 (8)	2404-7775000	8	Reinforcing Steel	ASTM A615, A706, A996	Deformed	10	60	50:8	17	N/A	218.375	Black	17
10b1 (8)	2404-7775000	8	Reinforcing Steel	ASTM A615, A706, A996	Deformed	10	60	44:2	Straight	N/A	190.047	Black	--
5a2 (10)	2404-7775000	10	Reinforcing Steel	ASTM A615, A706, A996	Deformed	5	60	44:2	Straight	N/A	46.0676	Black	--
5c1 (120)	2404-7775000	120	Reinforcing Steel	ASTM A615, A706, A996	Deformed	5	60	13:10	T10	N/A	14.4287	Black	T10

openBIM Bridge Pilot Projects Details

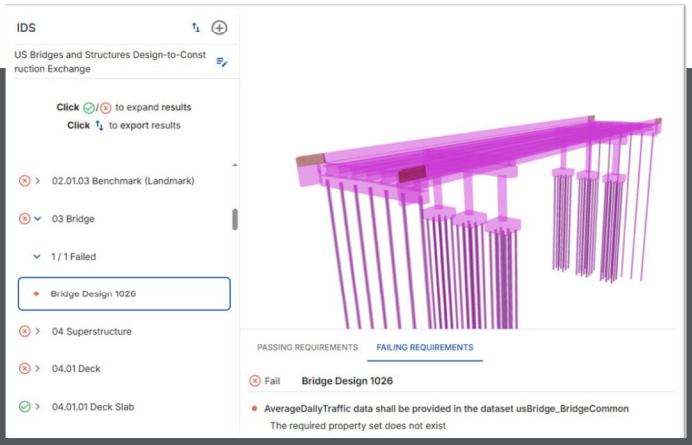


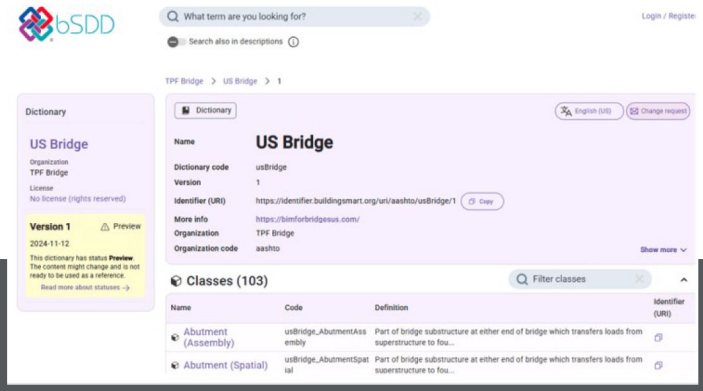
openBIM Bridge Pilot Projects Details

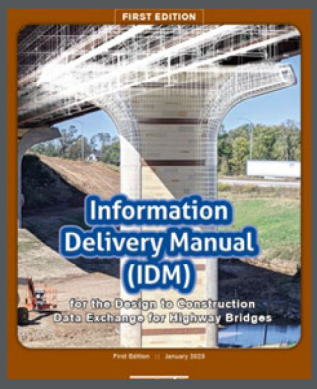


Pilot Project Key Takeaways

- BIM for Bridges and Structures National Standards Leveraged







Pilot Project Key Takeaways

- BIM for Bridges and Structures National Standards Leveraged
- **3 Bridges – 3 Design Firms – Several Design Authoring Tools Used**

pennsylvania DEPARTMENT OF TRANSPORTATION

IOWA DOT

Asset Owners

HDR

Michael Baker INTERNATIONAL

JMT

Designers

Technology

OPENBrIM

blender

Bonsai

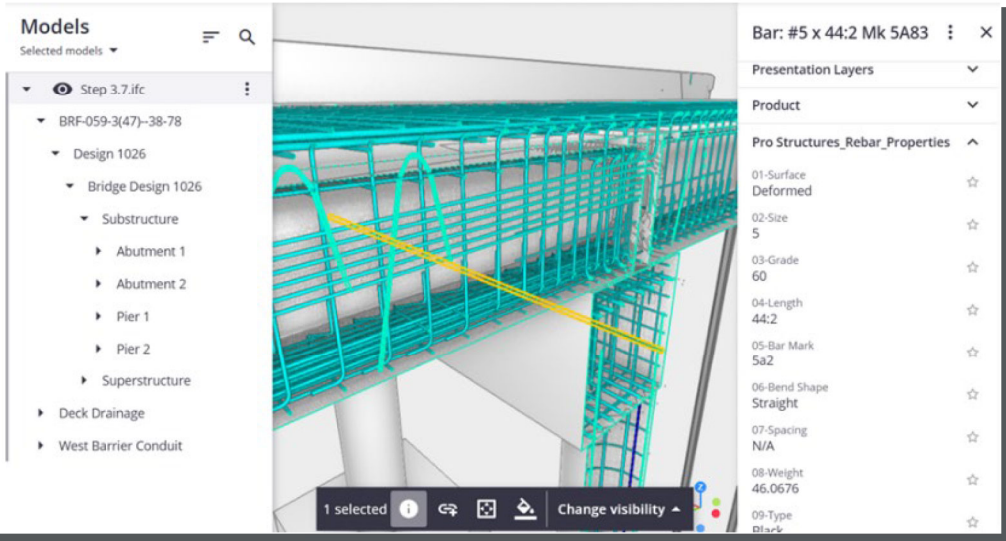
Pilot Project Key Takeaways

- BIM for Bridges and Structures National Standards Leveraged
- 3 Bridges – 3 Design Firms – Several Design Authoring Tools Used
- **Consistent IFC Deliverables**

US Bridges and Structures Concepts (Hierarchies, Aggregations, and Elements)	IFC4.3.2.0 Mapping	usBridge Data Dictionary
Project	IfcProject	
Site	IfcSite	*BridgeSite*
Bridge	IfcBridge.GIRDER IfcBridge.USERDEFINED.SLAB_BRIDGE	*Bridge*
Superstructure	IfcBridgePart.SUPERSTRUCTURE	*BridgeSuperstructure*
Deck	IfcBridgePart.DECK IfcBridgePart.DECK_SEGMENT	*Deck OR DeckSegment*
Slab(s)	IfcSlab.FLOOR	*DeckSlab*
Reinforcing (see below)		
Haunch	IfcSlab.USERDEFINED:HAUNCH	*Haunch*
Wearing Surface (optional)	IfcSlab.WEARING	*WearingSurface*
Closure Pour	IfcSlab.USERDEFINED:CLOSURE_POUR	*ClosurePour*
Reinforcing (see below)		
Median	IfcKerb.USERDEFINED:MEDIAN	*Median*
Reinforcing (see below)		
Expansion Joint	IfcDiscreteAccessory.EXPANSION_JOINT_DEVICE	*ExpansionJoint*
Curb / Sidewalk	IfcKerb.USERDEFINED:CURB *or* SIDEWALK	*Curb or Sidewalk*
Reinforcing (see below)		

Pilot Project Key Takeaways

- BIM for Bridges and Structures National Standards Leveraged
- 3 Bridges – 3 Design Firms – Several Design Authoring Tools Used
- Consistent IFC Deliverables
- **Flexibility in Construction Technology Used**



Pilot Project Key Takeaways

- BIM for Bridges and Structures National Standards Leveraged
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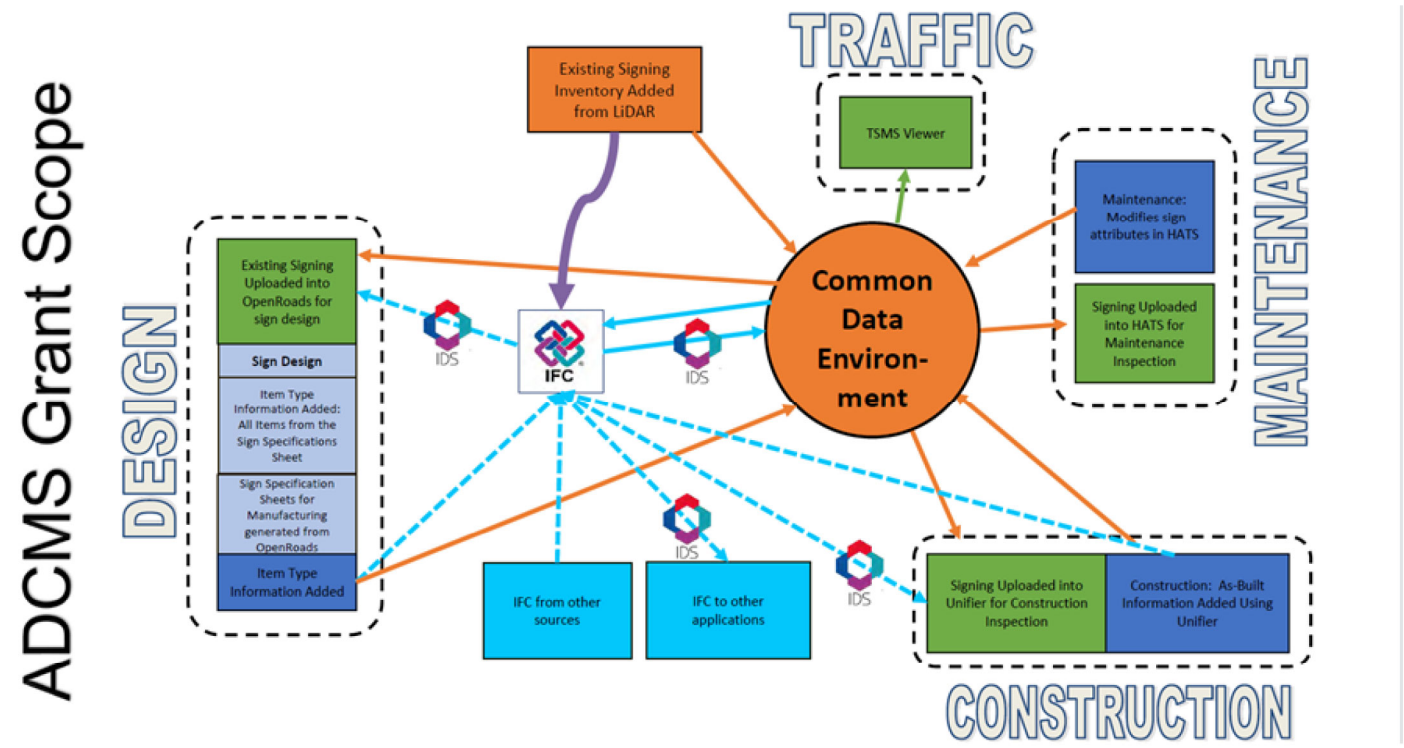
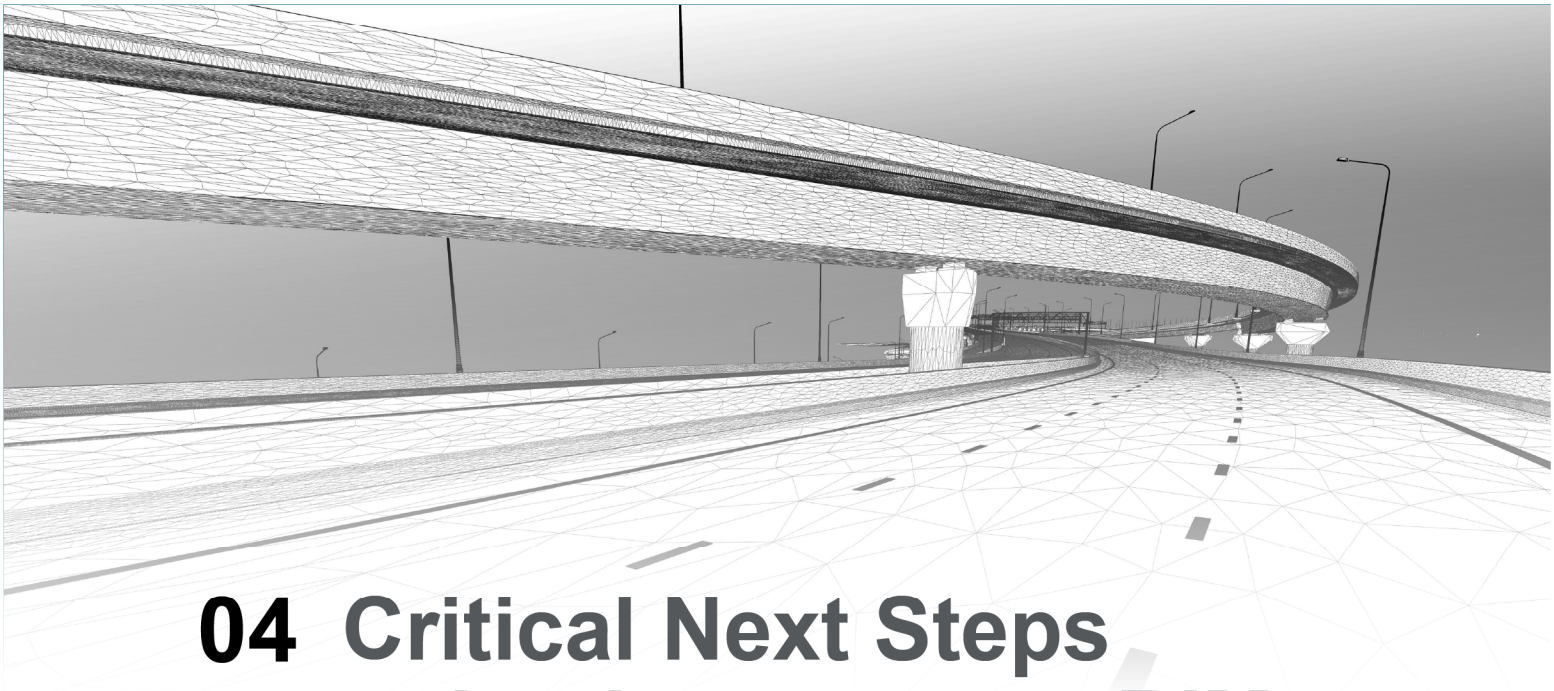
- Consistent IFC Deliverables
- Flexibility in Construction Technology Used
- **Pilots informing AASHTO openBIM Standards Revisions**



Washington DOT: Digital Sign Lifecycle



04 Critical Next Steps to Implement openBIM

openBIM Next Steps

- Expand Standards for Additional Use Cases
- Support Implementation
  - Pilot Projects
  - Provide go-by IFC data sets
  - External Stakeholder Support
  - Technology Provider Support
  - Continued buildingSMART International Partnership
  - Role Based Training
- Establish AASHTO openBIM Standards Governance
- Expedite Approval / Publishing of open data exchange standards

bSI Project: Asset Operations Handover (AOH)

- Focuses on
  - Enhancing the Built Asset Handover from Capital project to Operations.
  - Improving data interoperability,
  - Leveraging open standards (IFC and IDS)
  - Promoting the use of openBIM.
- Two use cases will be developed:
  - One for buildings
  - One for civil infrastructure.
- Deliverables include IDS files and possible entries in the bSDD.
- Partners:
  - Statsbygg (Norway)
  - Quebec ministries, Société Québécoise des infrastructures (SQI) (Canada)
  - Kentucky Transportation Cabinet (USA)

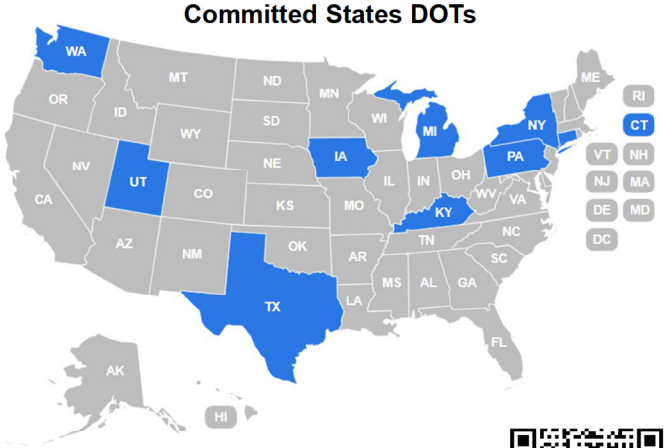
IFC Validation and Software Certification Pooled Fund

Business Objectives for State DOT's:

- Specify IFC certified software for road/bridge projects
- Validate deliverables to enhance project delivery and management quality.

Schedule – 2026 to 2028

Committed States DOTs



IFC®

Certification

Validation

TPF TRANSPORTATION POOLED FUND

openBIM
Transportation Summit

two-day event hosted by buildingSMART USA | in collaboration with AASHTO J-Stan Joint Subcommittee on Data Standardization | BIM FOR BRIDGES AND STRUCTURES TPF-5(523) | BIM FOR INFRASTRUCTURE POOLED FUND TPF-5(480) | HIGHWAY ENGINEERING EXCHANGE PROGRAM

2025 openBIM Roads and Bridges Transportation Summit

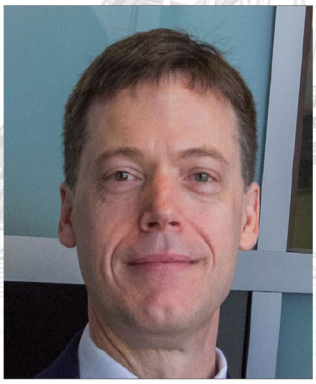
November 5-6, 2025 | San Diego, California

AGENDA

- openBIM Workflows
- International Updates
- National Updates
- openBIM Industry Updates
- openBIM in Action
- External Stakeholders Input

https://www.buildingsmart.us/november-2025

Thank you!



Will Holmes
IT GIS / BIG DATA BRANCH MANAGER

TEAM KENTUCKY TRANSPORTATION CABINET

AASHTO

Will Sharp
SENIOR VICE PRESIDENT

HDR

buildingSMART USA

Presentation Slides and Internet Links

"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has."

Margaret Mead
American cultural anthropologist