



2019 ACEC\FHWA\IDOT Conference

Iowa DOT BIM Update

September 11, 2019 Michael J. Kennerly P.E

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Presentation Overview



- Current Status of our 3D Design Effort
- The Status of BIM Implementation at the Iowa DOT
- AASHTO Perspective: Joint Technical Committee on Electronic Standards
- National BIM Efforts

3D Design Update:

Although we have been providing electronic files to contractors since 2006, it was in 2009 that we moved to our first true 3D design software when we moved to Bentley's Corridor Modeler application.

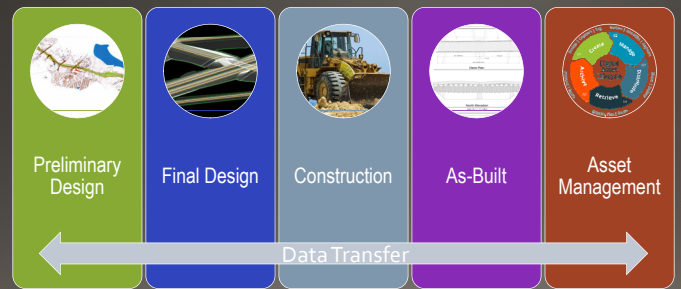
We migrated to Bentley's SS4 platform in 2015.

We are currently in the process of migrating to Connect through Bentley's Accelerated Migration Program (AMP)

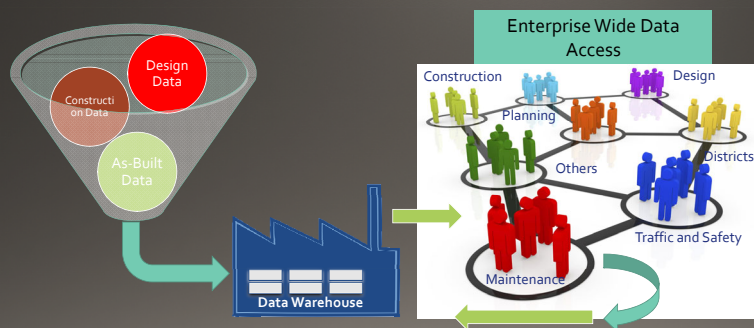
That work officially began in July of this year and is scheduled to be completed in June 2019.

We have a team that is lead by Tom Hamski, and Chad Hightshoe fro IT guiding implementation.

Building Information Models (BIM) Update:

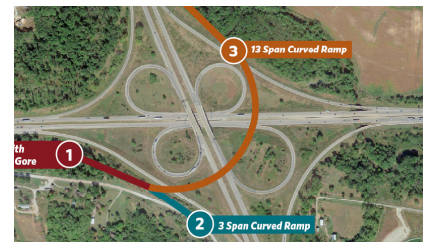


BIM Data Cycle



Iowa DOT BIM Update I80/380 Bridge BIM Project

- Letting Date: July 31, 2018
- Cost: \$38.2 Million
- 1. 2D Plans; BIM for Information Only
- 2. BIM Deliverable
- 3. 2D Plans; BIM for Information Only



Iowa BIM Update:

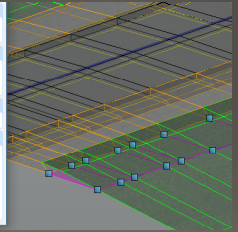
Plan to let first BIM project for a highway improvement project in FY 2020

Issues:

- Bidding documents
- Plan Review
- Contract Management
- Field Platform (Tablet and Software)
- As-Built
 - What data to collect
 - How will it be transferred
 - Where will it be stored
 - Complete Review of the plans

Pilot BIM Model

Feature	
Feature Definition	den36364EarthFill
Feature Name	Right Shoulder Edge Treatment
Component Layer	
Description	
Start Station	1189.000000
End Station	2414.000000
Geometry	
Surface Area	11462.474 Sq.ft
SHLD Finish, Earth	
Bit Item	2123 7450020
Specification	Section 2123
STA	1229
Begin Station	327+75.0
End Station	340+00.0
Review	IMC
Date	5/20/2019 3:41:34 PM



AASHTO BIM Effort: Joint Technical Committee on Electronic Engineering Standards

Chair: Michael Kennerly;
Iowa DOT

Vice Chair: Jennifer Lloyd;
TDOT

17 State Transportation Agencies

2 Consulting firms (HDR, CDM Smith)

Bentley

Autodesk

Trimble

AGC

Goals of the Committee

1. Identify the data that needs to be transferred at various stages of project delivery, construction, maintenance and asset management. The goal is to ensure data can be transferred seamlessly, thereby minimizing rework, and ensuring that agencies and our industry partners have the information they need to effectively and efficiently manage these transportation assets throughout their lifecycle.
2. The industry has long recognized the need for a non-proprietary or open file format that ensures interoperability and is accepted as the industry standard. Although several non-proprietary and open formats have been developed no single standard or group of standards have been adopted. The goal of the committee would be to develop and recommend a plan to adopt an industry standard.
3. Conduct a synthesis of best practices on implementing 3D infrastructure information models. The synthesis should focus on the issues associated with creating 3D models and progressing from models that are for information only to models that are the controlling document and serve as a source of data for asset management.

JTCEES Work Plan

Conduct	Conduct a survey to determine where we need to focus our efforts and where the industry is headed.
Develop	Develop guidance on level of detail, level of development, and level of accuracy in a model centric environment.
Recommend	Recommend direction for enhancing interoperability
Develop	Develop guidance on an electronic/Intelligent plan of Building Information Model (BIM)

Conduct a Survey of Needs

- Of Contractors
 - Of DOT's
 - Of Equipment manufacturers of the industry
- **Activity:** Survey the AGC on information needs and issues associated with using the model for construction. Survey State Transportation Agency's on the current state of the practice regarding the information they provide. Survey, or get feedback from equipment manufacturers on file type, size, format, and interoperability.
- **Use:** This information would serve as the foundation for recommendations to STA's on how to structure their deliverables to minimize rework/adjustments required by the end user. This information could also be used by the group working on interoperability.

Plan Detail

- Level of Development
- Level of Detail
- Level of Accuracy

• **Activity:** Develop outlines for a Level of Development specification or template, that STA's can modify to fit their individual workflows and business model. I do not believe this effort has to nail down every detail because each agency will be different, but it should provide a framework that can be built upon that gives agency's a jump start. The same would be true for outlining the role and connection with Level of Accuracy and Level of Detail.

• **Use:** LOD specifications are extremely important in the vertical industry because the teams or contractors and designers working on projects may not work together that often. Therefore, a common language and understanding of what is required and what needs to be provided at various stages of development among all those involved is critical to success.

Plan Detail

- If we take the approach I outlined previously in terms of the basic structure for LOD in our industry LOD is already somewhat defined by our current workflows, although they would need to be expanded upon to include detail and accuracy, and the model.
 - LOD 100-Concept
 - LOD 200-Preliminary Plans
 - LOD 300-Final Plans
 - LOD 350-Specifications, Estimates, Final Quantities, Tabulations Plan Notes, etc. (essentially PS&E)
 - LOD 400-As Let Plans, which would include all addendums and changes after the plan was turned in for advertising
 - LOD 500-As Built Plans
- This is also very important for STA's when working with consultants in determining level of effort and defining deliverables at various stages of development.

Interoperability

- Use of TransXML
- Use of IFC Road
- Industry Solution

• **Activity:** Review the existing efforts by IFC, the work previously done for TransXML and what the vendors are doing to address interoperability. The key is whether it is IFC, TransXML, or a vendor led effort the objective is interoperability. The question is whether we want to make a recommendation as to which direction we should go as STA's?

• IFC already has a lot of momentum internationally, the US is involved, and we share many of the same software vendors. We could simply allow that process to work its way through and adopt it once it is complete. However, if we do not believe that will meet our needs in terms of content or time frame, we could look at what it would take to expand TransXML to serve as an industry standard in the US. The other option would be to evaluate progress by the industry on interoperability and assume market forces were accomplish what we need.

• **Use:** We need to establish a direction for STA's that we believe will address our interoperability needs and move forward.

Electronic/Intelligent Plan/BIM

- Specifications
- Model of Record
- Platform
- Asset Management

• **Activity:** Outline the issues associated with providing an electronic model that can supplant the need for traditional paper plans, serve as the model of record and provide a seamless transition of data from design to construction to asset management.

• **Use:** The ultimate goal is a model that does not simply replace paper plans but serves as a transfer vehicle for data through the development process. It should have the ability to assign intelligence or attributes directly to the features that can be summarized in tabular form for bidding and can be updated through construction and ultimately harvested for asset management. One of the keys to success in any effort is to begin with the end in mind. As we look at all the other issues it is important to keep in mind or address how they would be influenced or impact the ultimate goal. Conversely, knowing the ultimate goal should influence how we address the other issues as well.

Questions

- <https://www.youtube.com/watch?v=kTcRRaXV-fg>

BIM: The National Picture