

 Hollywood, FL

 June 13-14, 2024

2024 TRANSPORTATION SYMPOSIUM

BRIDGING THE GAP: Increasing OBM Adoption

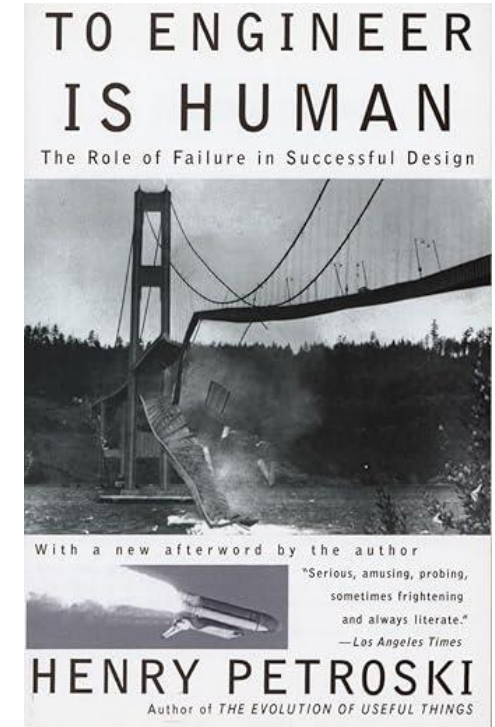


Vern Danforth

Anand Stephen, Laura Mueller &
Matt Greenholt



A Story of Trust in Technology



Objectives

Story
about
OBM
(Tech
Adoption)

Change
Management

Design Thinking

Empathy is a Critical Skill

V. Sympathy which is a feeling

Upskilling

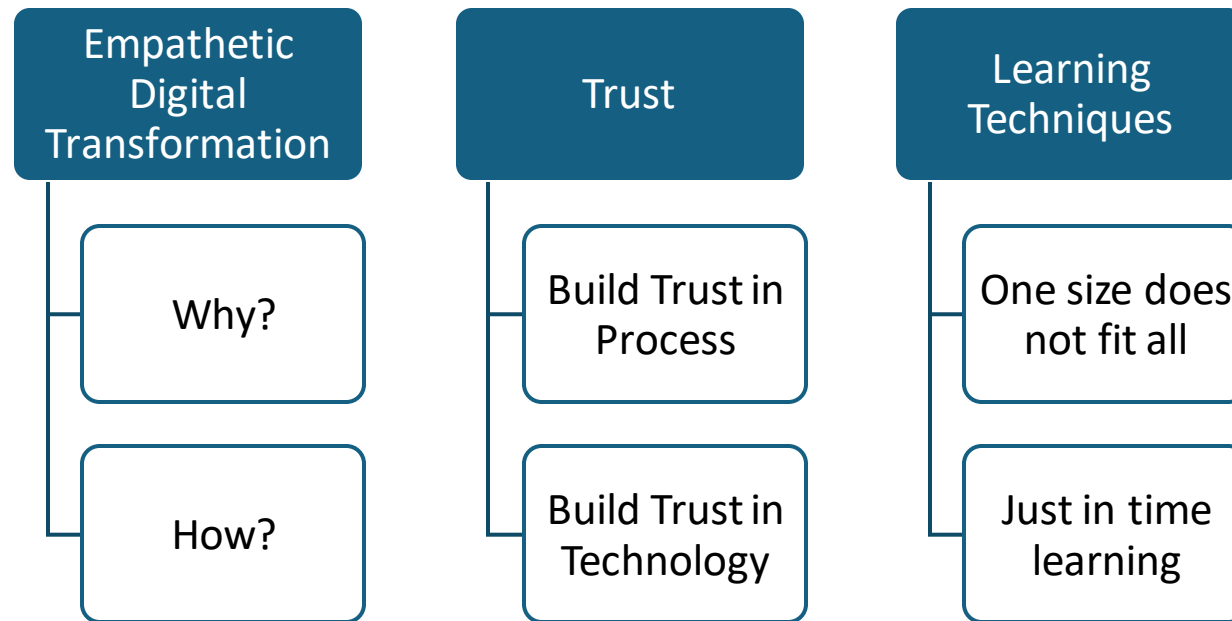
Varied Contexts and
Uses

Risk v. Reward

People-Centric

Building Trust in OBM Adoption

The story is about an adoption journey through various use cases and tangible project examples.



Empathize

User-centric learning

Risk Tolerance

Define

Set the path

Ideate

Challenge Process

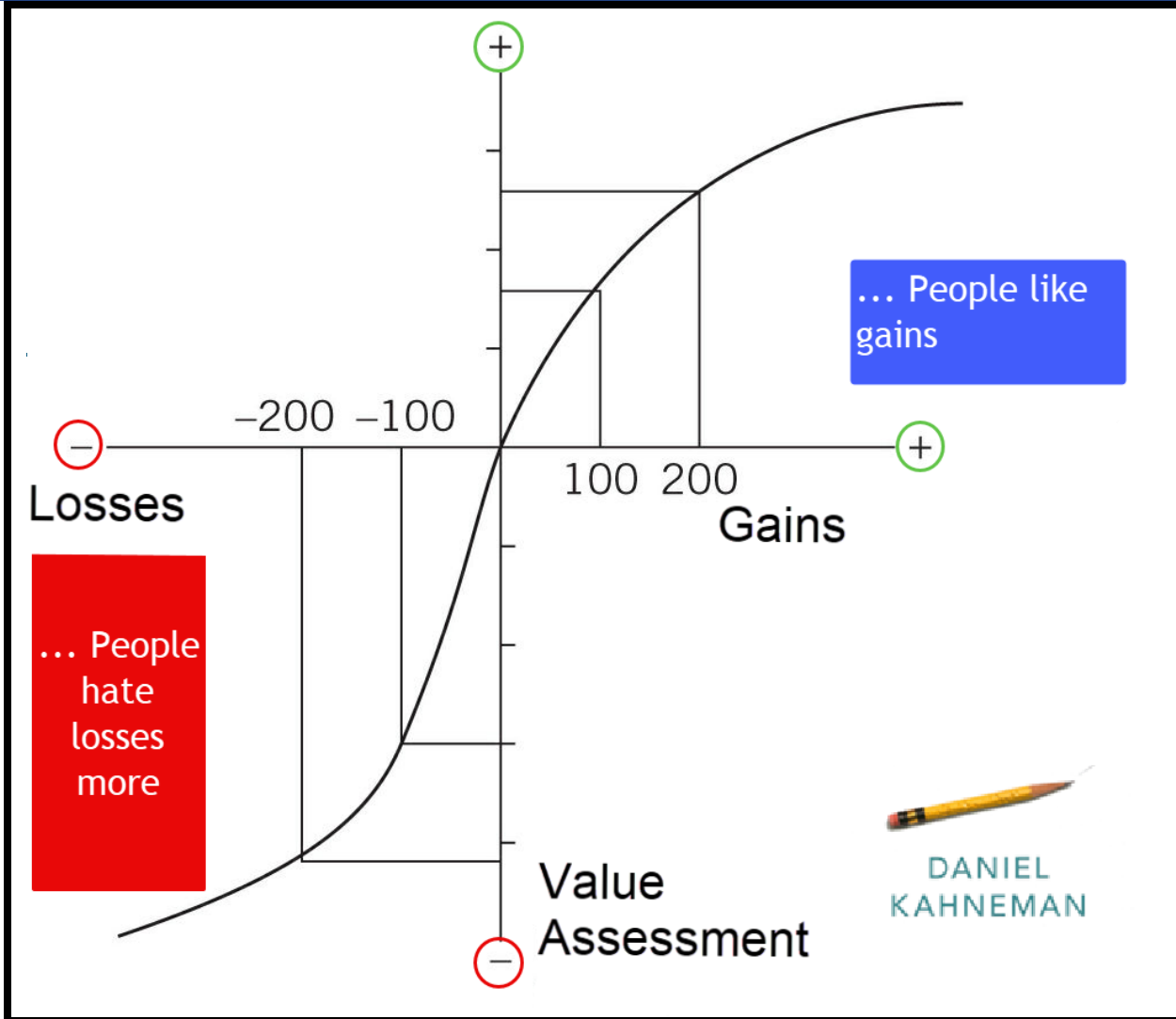
Prototype

Small Use-case

Test

v. Exist System

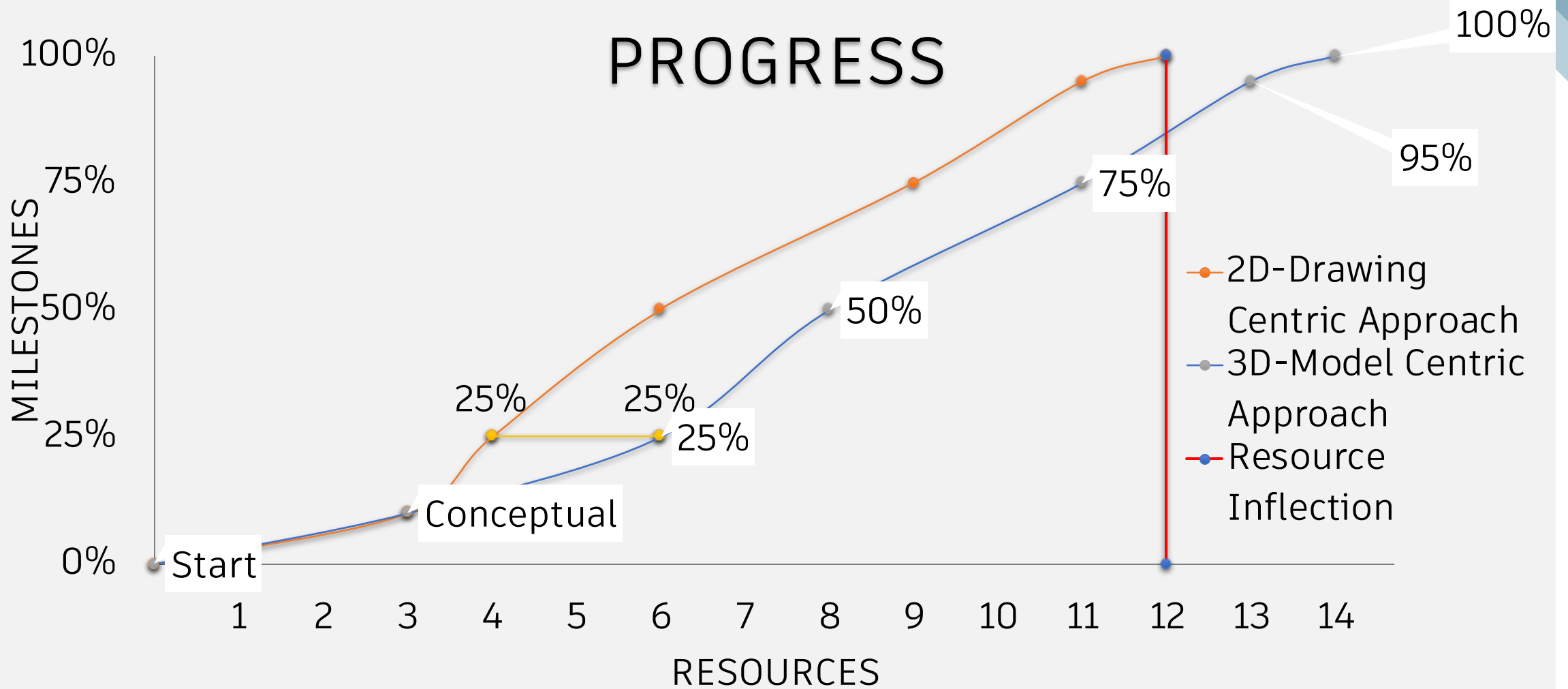
Building Trust in OBM Adoption



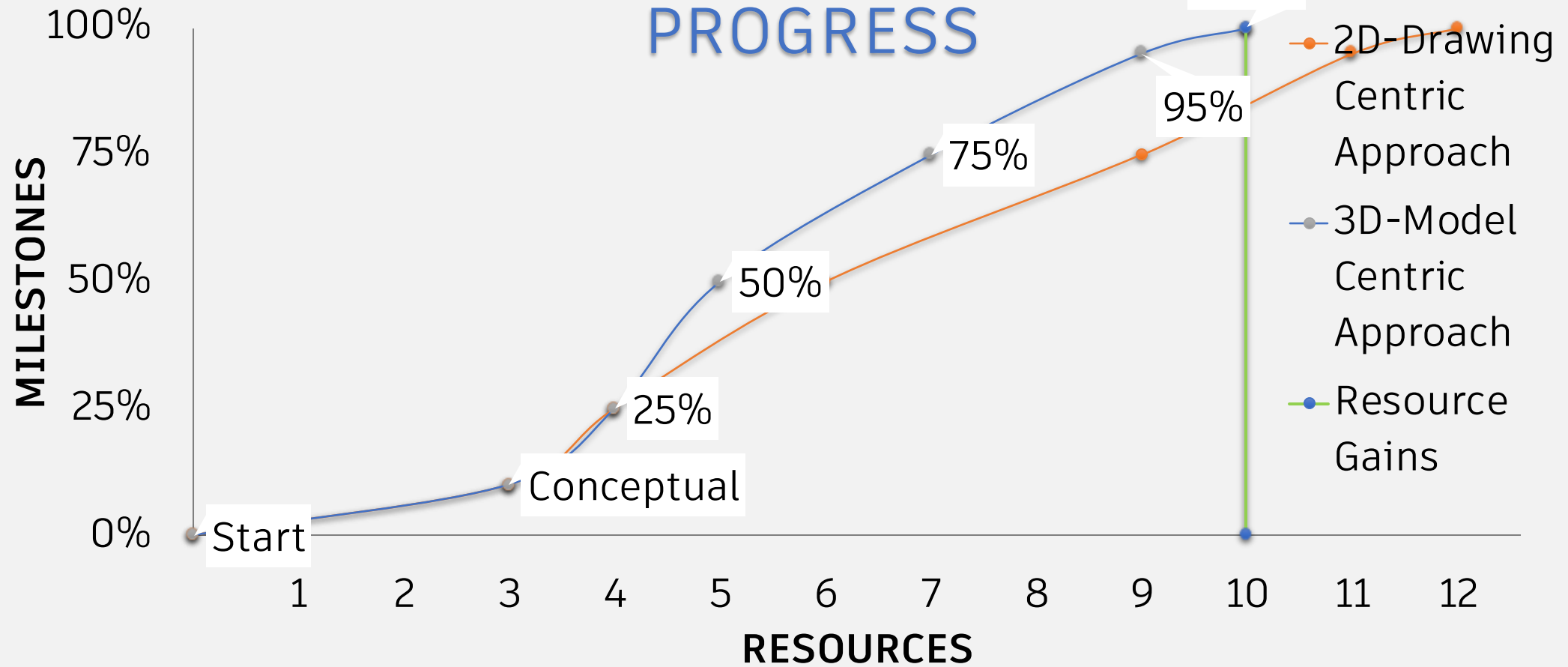
Prospect Theory

- People prefer small guaranteed outcomes over larger risky outcomes (Daniel Kahneman).
 - Low-risk tolerance, new tech

FIRST PROJECT: COMPARATIVE PROGRESS



SUBSEQUENT PROJECTS: COMPARATIVE PROGRESS



Celebrate Small Victories



"A picture is worth a thousand words, but a model is worth a million words."

Rewind

- Just a few years ago...
 - AEC technology moving full steam ahead
 - Bridge lagging behind
 - Keep pace without affecting project delivery and budget?



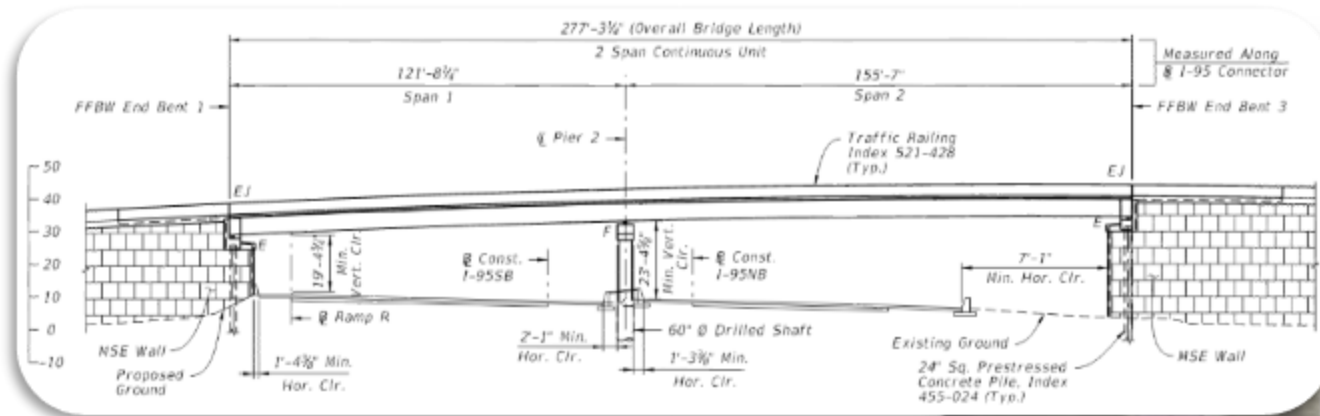
Small Bites

- When 3D deliverable is not required...
 - Upskill staff incrementally
 - Coordinate across disciplines
 - Leverage OBM tools to supplement tasks
 - Build trust in the software

Golden Glades Interchange – FDOT

Gannett Fleming sub to AECOM

- 2-Span Curved Steel Connector Ramp over I-95



- 3D modeling not required
- Learning & Development

Golden Glades Interchange – FDOT

Gannett Fleming sub to AECOM

- Consider Modeling Standards

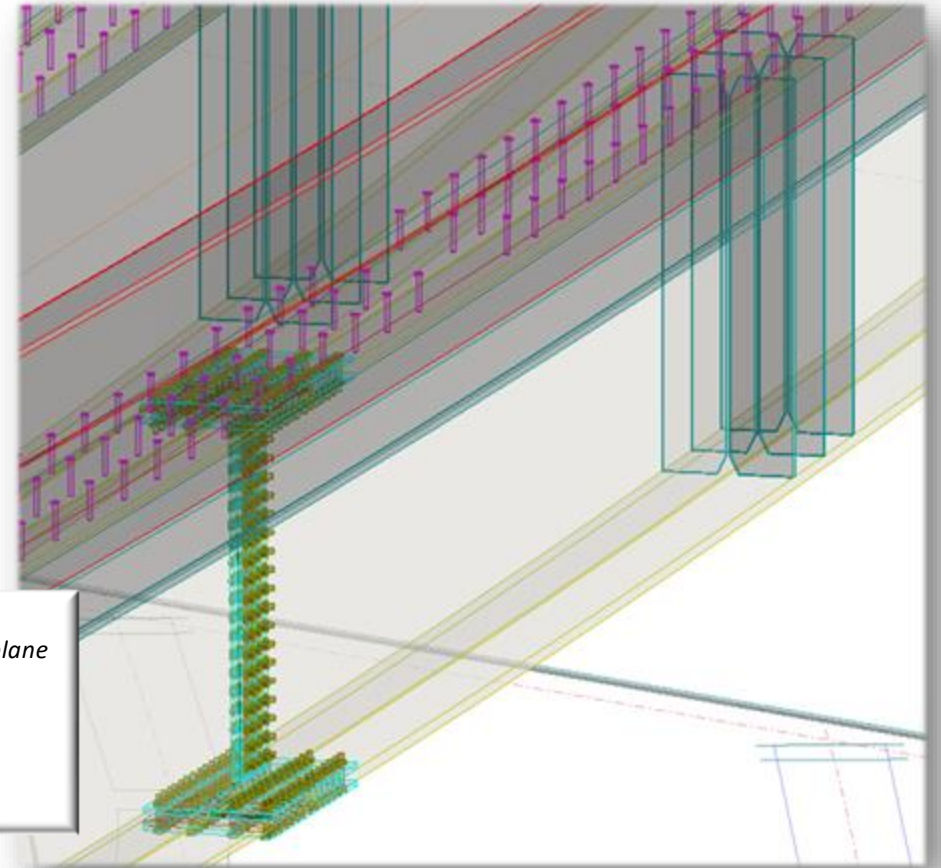
FDOT CADD Manual Section 5.16

- LOA – Existing Conditions Level of Accuracy
- LOD – Designed Level of Development
- Model Element Breakdown

Model Element Name	LOD Standard
Superstructure	
Steel Girder (studs)	400
Steel Cross Frames	400
Steel Stiffeners	400
Steel Connection Plates	400
Steel Shear Studs	400
Steel Field Splice	400



“The modeled element is graphically represented within the model as a specific system in the XYZ plane (3D). Size, shape, and orientation, interfaces with other objects, and fabrication instructions can be derived directly from the modeled element. Non-Graphical information has been attached to the modeled element.”

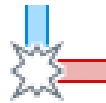


US 20 – IDOT

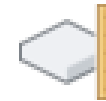
- 7.5-Mile Corridor including 5-Bridges
 - ORD required deliverable; OBM utilized for team coordination
 - Various reporting tools provide design assistance:



Input Report



Clash Detection



Deck Report



Change Management

- Revised Alignment & Cross-Discipline Coordination



Parameters

Selected Bridge: All
Selected Unit: All
Report Options: Bridge Type and Geometry

Reset Submit

Bridge Name: FoxEB
Bridge Unit: Unit1 :: Beam Slab Steel-Girders Bridge

Bridge Type and Geometry	
Bridge Type	Beam Slab (Steel Girders)
Structure Number	045-8310
Requires Road Alignment	Yes
Road Alignment	P_US20
Use Road Alignment For Stationing	Yes
Bridge Alignment	EB_PGL
Active Profile	PrPGL_US20_EB

Support Lines Input Report

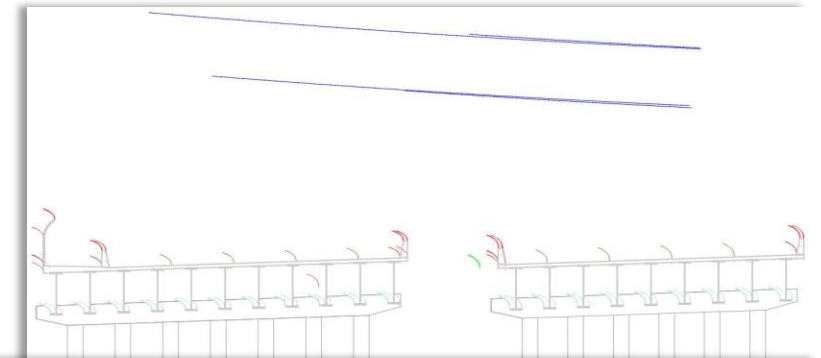
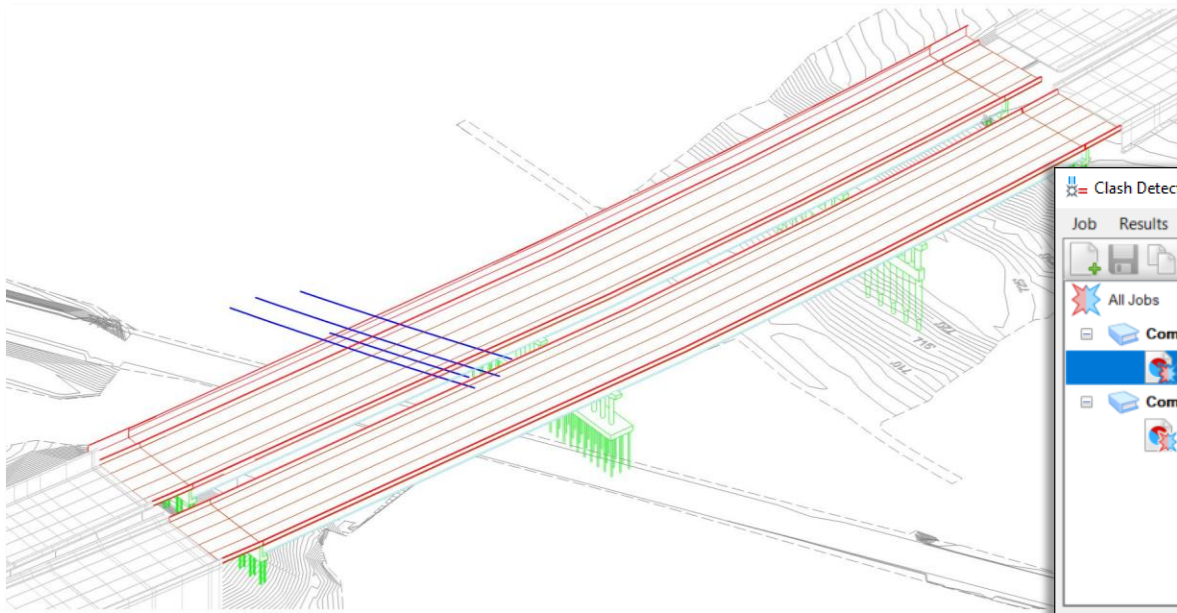
Support Lines	
WAppr (START)	
Station	R2 1396+49.74 (R)
Offset from SupportLine(')	-32.351
Length (')	100.000
Direction	N10°03'47.5"E
Skew	-00°20'34.8"
Horizontal Offset (')	25.000
WAbutBrig	
Station	R2 1396+82.00 (R)
Length (')	100.000
Direction	N10°00'01.3"E
Skew	00°00'00"
Horizontal Offset (')	25.000
Pier1	

Document Map

- Input Echo Report
 - Bridge Name: Liberty
 - Bridge Name: FoxEB
 - Bridge Name: FoxWB
 - Bridge Name: Poplar
 - Bridge Name: RayWB
 - Bridge Name: RayEB

Constraints & Clashes

- Conflicting EB & WB profiles constraints
 - Railroad clearance below WB
 - High voltage overhead lines EB



Clash Detection - ComEd-275deg (2 clashes)

Job Results

Criteria Rules Results

Name	Type	Clearance	Found By	Found On	Element ...	Element ...	Location (WGS84 Datum - Longitud
Clash1	Clearance	22.459	Imueller	2/22/2023 11:35 AM	SolidEntity	DTMEntity	-88°16'31.6", 42°1'12.3", 235.972
Clash2	Clearance	19.335	Imueller	2/22/2023 11:35 AM	SolidEntity	DTMEntity	-88°16'31.6", 42°1'12.0", 236.448

Element Info

Element Info A

General

Deck

Element Info B

General

Information

Process Close

Fulfilling QC Requirements

- Comparing software output vs manual methods

	Location	Station	Offset	Theoretical Grade Elevation	Theoretical Grade Adjusted DL Deflection
Girder 1	Bk. W. Abut.	440+14.83	-34.50	724.38	724.38
	CL Brg. W. Abut.	440+17.41	-34.50	724.34	724.34
	A	440+27.41	-34.50	724.18	724.20
	B	440+37.41	-34.50	724.04	724.06
	C	440+47.41	-34.50	723.91	723.92
	CL Pier 1	440+53.50	-34.50	723.84	723.84
	D	440+63.50	-34.50	723.72	723.73
	E	440+73.50	-34.50	723.61	723.63
	F	440+83.50	-34.50	723.52	723.53
	CL Pier 2	440+95.83	-34.50	723.42	723.42
	G	441+05.83	-34.50	723.34	723.35
	H	441+15.83	-34.50	723.28	723.30
	I	441+25.83	-34.50	723.23	723.24
	CL Brg. E. Abut.	441+31.91	-34.50	723.20	723.20
Bk. E. Abut.	441+34.50	-34.50	723.19	723.19	

OpenBridge Model

Search

- Bridge(Poplar) **
 - Complex Element: E_US20_02
 - Units
 - Main :: Beam Slab Steel-Girder
 - Decks
 - Beam Layouts
 - Beam Groups
 - Tub Girder Groups
 - Field Splice Groups
 - Transverse Stiffener Group
 - Cross-Frame Groups
 - Shear Studs Groups
 - SupportLines
 - Supports
 - Abutment Wingwalls
 - Barriers
 - Accessories
 - Bearings
 - Tendons
 - Reports
 - Poplar_Screens [DeckElevati...

OpenBridge Standards

Items

Resources

Sheet Index

Bridge Name: Poplar

Bridge Unit: Main :: Beam Slab Steel-Girders Bridge

Deck Elevation Report

Parallel to start support

BeamPath with offset = 0.000 (Deck)

Beam-L

Span 1

Point Of Interest	Station - Bridge Alg[']	Offset - Bridge Alg[']	Elevation[']
0/4 L	440+17.41	-34.500	724.218
1/4 L	440+27.41	-34.500	724.058
2/4 L	440+37.41	-34.500	723.899
3/4 L	440+47.41	-34.500	723.775
4/4 L	440+53.50	-34.500	723.699

Span 2

Point Of Interest	Station - Bridge Alg[']	Offset - Bridge Alg[']	Elevation[']
0/5 L	440+53.50	-34.500	723.699
1/5 L	440+63.50	-34.500	723.579
2/5 L	440+73.50	-34.500	723.488
3/5 L	440+83.50	-34.500	723.398
4/5 L	440+93.50	-34.500	723.336
5/5 L	440+95.83	-34.500	723.326

Span 3

Point Of Interest	Station - Bridge Alg[']	Offset - Bridge Alg[']	Elevation[']
0/4 L	440+95.83	-34.500	723.326
1/4 L	441+05.83	-34.500	723.284
2/4 L	441+15.83	-34.500	723.244
3/4 L	441+25.83	-34.500	723.206
4/4 L	441+31.91	-34.500	723.183

BeamPath with offset = 0.000 (Deck)

Beam-2

Span 1

Point Of Interest	Station - Bridge Alg[']	Offset - Bridge Alg[']	Elevation[']
0/4 L	440+14.23	-28.750	724.383
1/4 L	440+24.23	-28.750	724.224
2/4 L	440+34.23	-28.750	724.065
3/4 L	440+44.23	-28.750	723.929
4/4 L	440+50.31	-28.750	723.854

OpenBridge Modeler version 10.10.20.92

1/11

Fast Forward... 2024

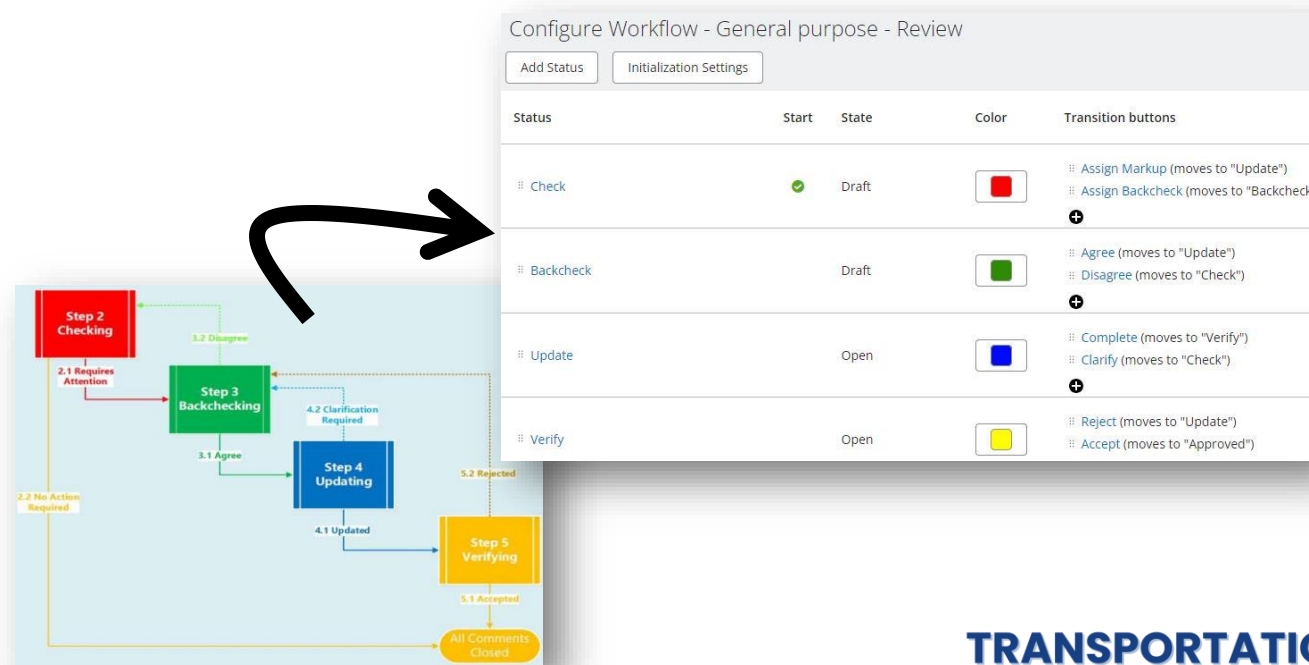
- Value in FL & IL Efforts

- Notable team coordination and reporting efficiencies gained during production
- Designers possess expertise for work-sharing & upskilling new locales requiring OBM to keep projects on pace

- Infrastructure Cloud

(FDOT platform for Design Review)

- Developing QC Workflows



iTwin Review – File Source Control

The screenshot displays the iTwin Review interface. At the top, the 'ProjectWise | Validate' status is shown. The current project is 'GF-DT_Prototype' in the 'DESIGN' phase. The left sidebar contains navigation options: Home, Work, Documents, Deliverables, iModels, and Dashboard. The 'Documents' view shows a tree structure of the project files, with the 'ESS2' folder under 'RDWG' selected. The main pane shows the contents of the 'ESS2' folder, including a table of files and a details panel for the selected folder.

GF-DT_Prototype
GF-DT_Prototype DESIGN ☆

+ Create Documents Components

Home Work Documents Deliverables iModels Dashboard

GF-DT_Prototype iTWIN

- Out to me [0]
- _Project_Information
- _PWSetup
- _RESOURCES
- _SHARED
- DESIGN
 - CSMG
 - ES
 - FAC
 - GIS
 - RAIL
 - RDWG
 - BRDG
 - Erford Road Inspecti...
 - ESS2**
 - Int14
 - Revit test

GF-DT_Prototype iTWIN > DESIGN > RDWG > BRDG > ESS2

+ New [Download] [Link] [Print] [Share] [More]

<input type="checkbox"/>	Name	Description	File Name	Out to
<input type="checkbox"/>	Beam seat report.pdf	Beam seat report	Beam seat report.pdf	
<input type="checkbox"/>	bridge_10-2.dgn	bridge_10-2	bridge_10-2.dgn	
<input type="checkbox"/>	bridge_10-2.dgn.i.dgn	bridge_10-2.dgn.i.dgn	bridge_10-2.dgn.i.dgn	
<input type="checkbox"/>	ESS2.obdx	ESS2.obdx	ESS2.obdx	
<input type="checkbox"/>	span 1-4.pdf	span 1-4	span 1-4.pdf	

Search in ESS2 and all sut [Refresh] [Info] [Full Screen] [More]

View: Global

ESS2 [Settings] [Close]

Details Attributes Audit trail Document code

General properties

Name: ESS2

Description: [Empty]

Owner: mdgreenholt

> History

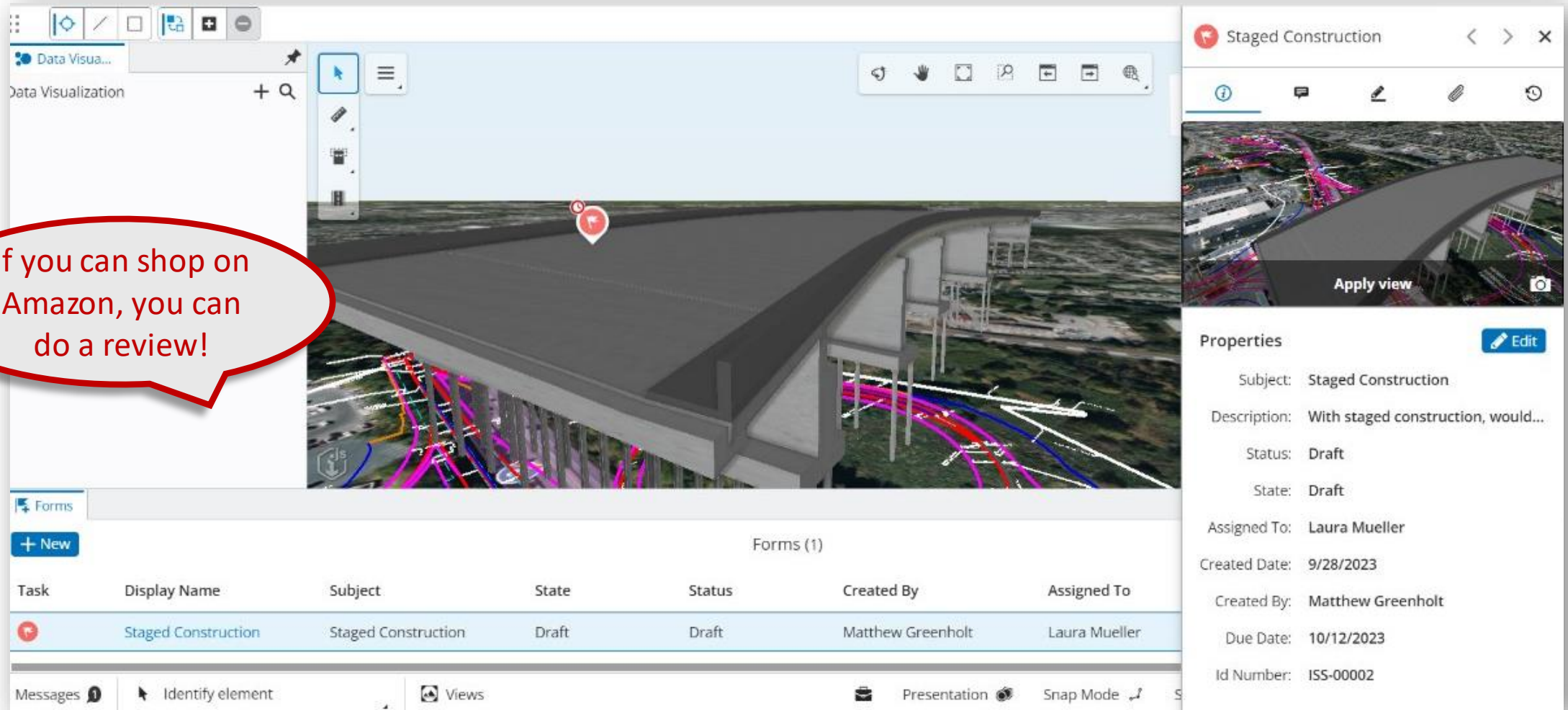
> Environment

> Parent folder

> Contents

iTwin Review – Design Tasks

If you can shop on Amazon, you can do a review!

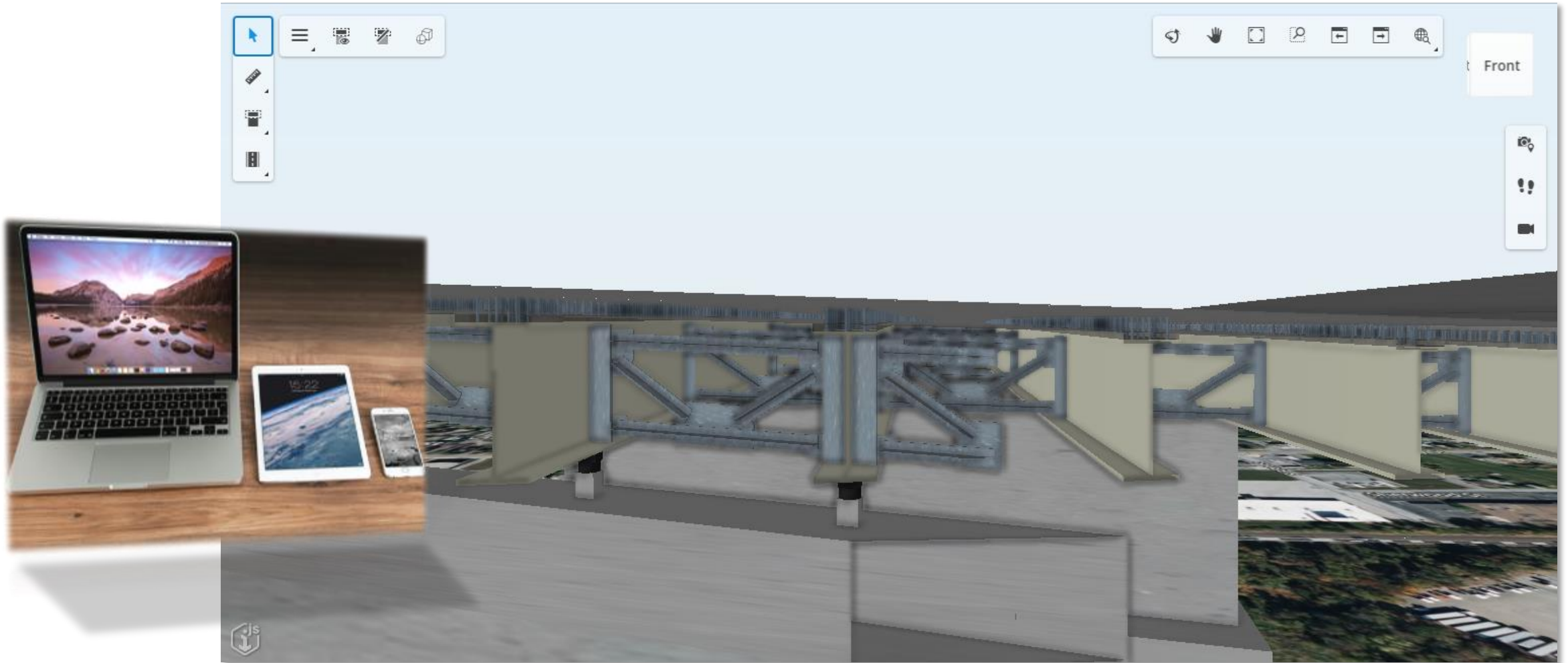


The screenshot displays the iTwin Review interface. The main view shows a 3D architectural model of a building with a red location pin on its roof. A toolbar at the top provides navigation and editing tools. On the right, a 'Staged Construction' task card is visible, featuring a thumbnail of the model and an 'Apply view' button. Below the model, a 'Forms' panel contains a table with the following data:

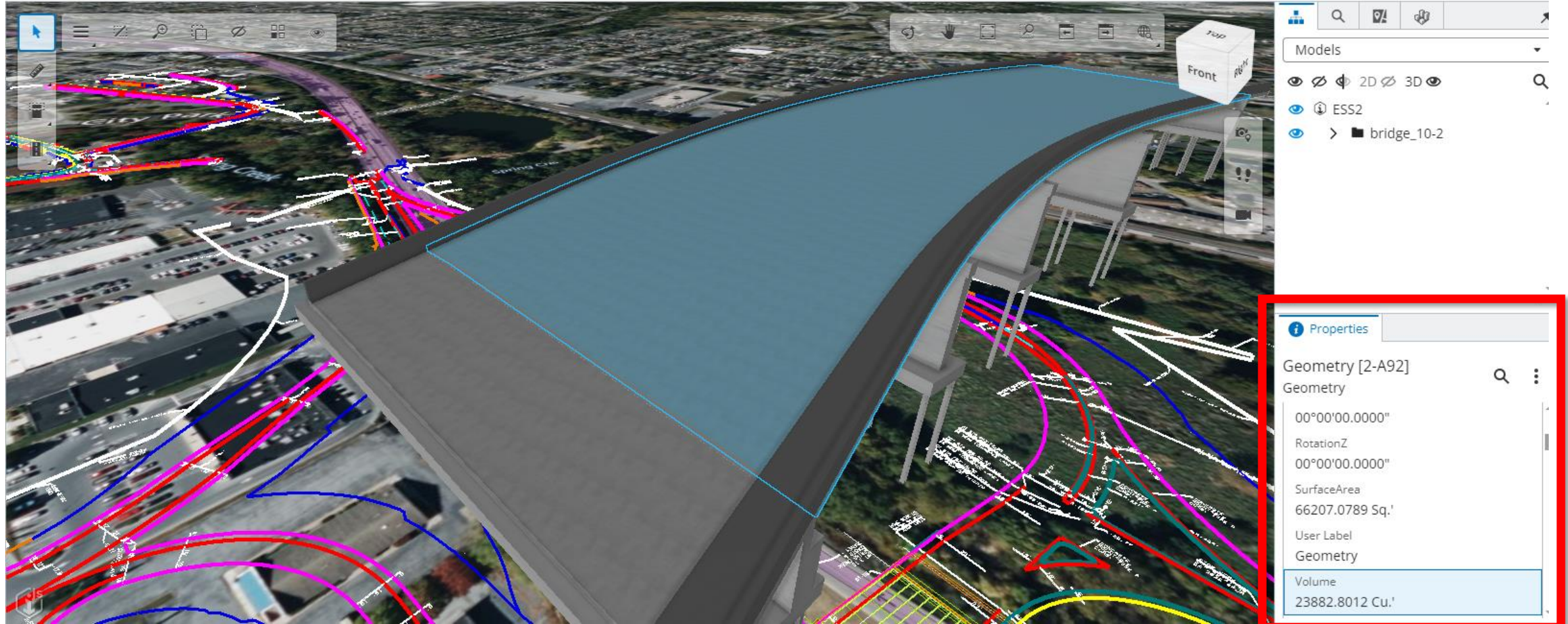
Task	Display Name	Subject	State	Status	Created By	Assigned To
	Staged Construction	Staged Construction	Draft	Draft	Matthew Greenholt	Laura Mueller

At the bottom of the interface, there are buttons for 'Messages', 'Identify element', 'Views', 'Presentation', and 'Snap Mode'.

iTwin Review – Section Cuts



iTwin Review – Quantities & Properties



iTwin Review – Document Review

Back Pdf Beam seat report.pdf GF-DT_Prototype DESIGN ☆

133% View Annotate Shapes Insert Measure Fill and Sign

Bridge Name: Bridge_10

Bridge Unit: Bridge_10 :: Beam Slab Steel-Girders Bridge

Bearing Seats and Grout Pads or Bevel Plates Report

Grout Pads/Bevel Plates

Elevation

Support Line Name	Bearing Line	Girder1(')	Girder2(')	Girder3(')	Girder4(')	Girder5(')	Girder6(')	Girder7(')	Girder8(')	Girder9(')	Girder10(')	Girder11(')
Abutment_1	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		399.0199	399.0507	398.7352	398.4197	398.1041	397.7886	397.4731	397.1576	396.8420	396.4833	396.1444
Pier_1	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		401.5048	401.5627	401.2727	400.9813	400.6882	400.3933	400.0965	399.7978	399.4970	399.1507	398.8011
Pier_2	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		402.2213	402.3069	402.0460	401.7849	401.5234	401.2616	400.9995	400.7371	400.4743	400.1678	399.8601
Pier_3	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		401.6434	401.7281	401.4663	401.2045	400.9426	400.6804	400.4181	400.1558	399.8932	399.5872	399.2802
Abutment_2	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		399.1544	399.2251	398.9494	398.6737	398.3979	398.1220	397.8461	397.5702	397.2941	396.9748	396.6546

top of sole plate (confirmed in cross section view)

Thickness at Center

Support Line Name	Bearing Line	Girder1(')	Girder2(')	Girder3(')	Girder4(')	Girder5(')	Girder6(')	Girder7(')	Girder8(')	Girder9(')	Girder10(')	Girder11(')
Abutment_1	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921
Pier_1	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921
Pier_2	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921
Pier_3	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921
Abutment_2	None	Beam-L	Beam-2	Beam-3	Beam-4	Beam-5	Beam-6	Beam-7	Beam-8	Beam-9	Beam-10	Beam-R
		0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921	0.4921

OpenBridge Modeler version 10.11.00.310

FEA to IFC for QA/QC



iTwin Review – Data Connectors

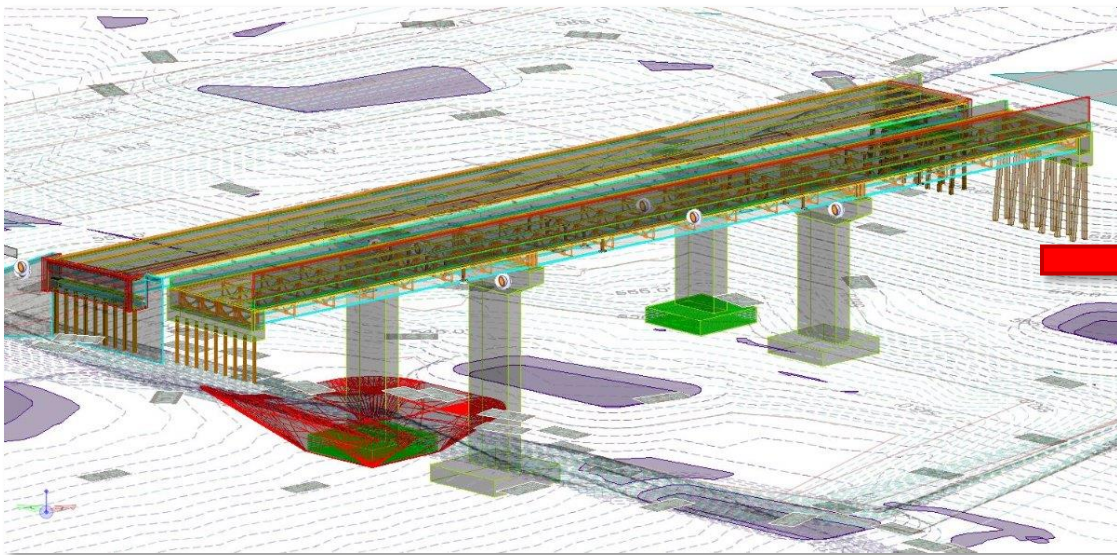
Third Party applications

Application	Connector
3D Studio	MicroStation
AutoCAD	AutoCAD Dwg
Civil 3D	Civil3D
Intergraph Smart 3D Review	VUE
Intergraph Smart P&ID	SmartPlant P&ID
Navisworks	Navisworks
Revit	Revit
Rhino	MicroStation
Sketchup	MicroStation

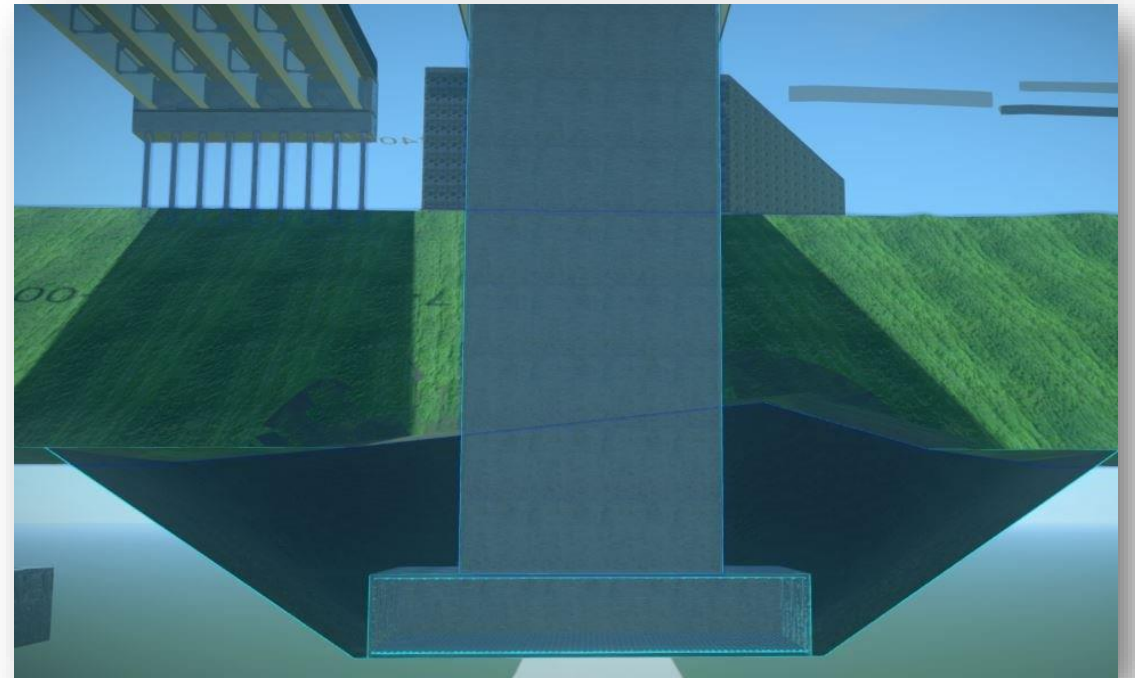
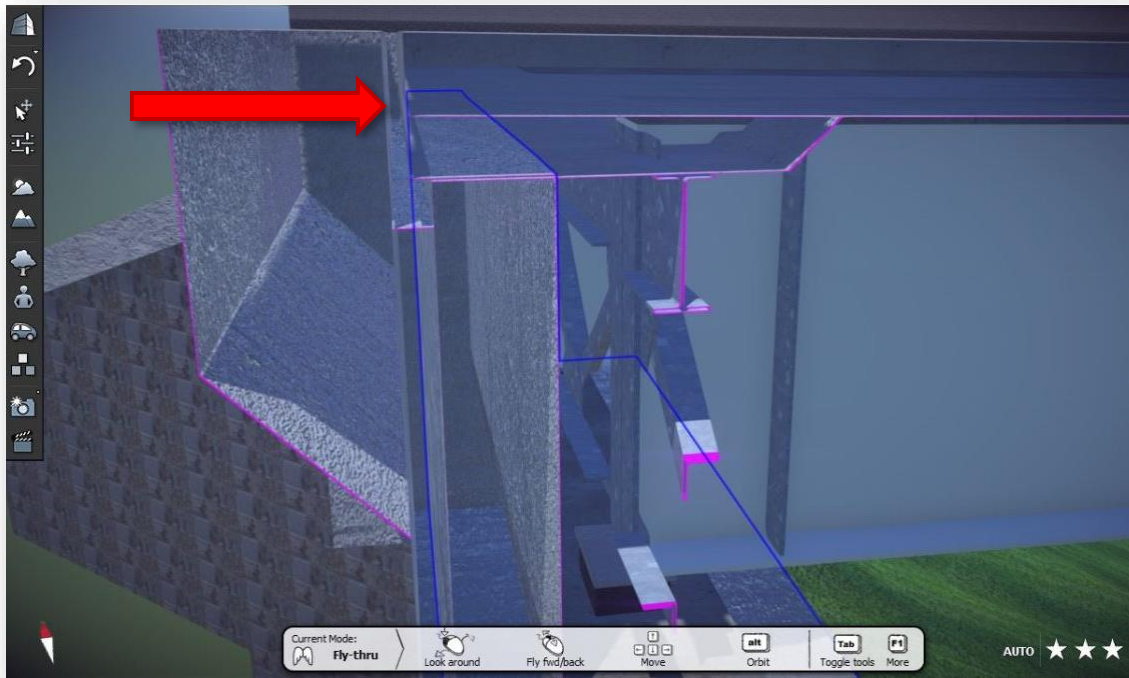
Interchange formats

Interchange Formats	Connector
ACIS	MicroStation (via dgn)
ArcGIS Feature Service	Geo
Autodesk 3DS Max	MicroStation
CGM	MicroStation (via dgn)
Collada	MicroStation (via dgn)
Hidden edges	MicroStation
DXF	AutoCAD
FBX	MicroStation
Geojson	Geo
IFC	IFC
IGES	MicroStation (via dgn)

OBM to LumenRT

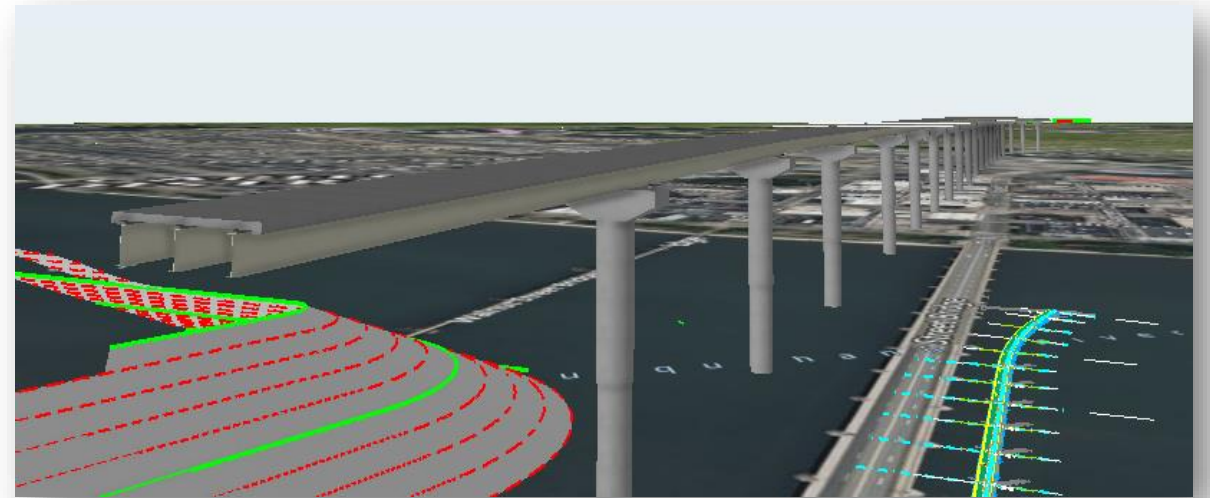
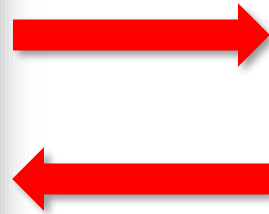


LumenRT



Lessons Learned

- Gradual process, start small
- Trust is the glue
- Training tool for young engineers



Safety Message

DRIVE SAFE.
FLORIDA'S FUTURE DEPENDS ON IT.



**TRANSPORTATION
SYMPOSIUM**

Contact Us



Thank you for joining our training session!

Need HELP? Contact us...

E-mail: vern.danforth@dot.state.fl.us

<http://www.fdot.gov/cadd/>



Contact Us



MATT GREENHOLT, PE, CBSI
Structural Engineer

mdgreenholt@gfnet.com

717-886-5352



LAURA MUELLER
Digital Delivery Leader,
Bridge

lmuller@gfnet.com

312-894-7091



ANAND STEPHEN, PE, CME
Digital Delivery Leader,
Roadway

astephen@gfnet.com

908-977-0571