Hollywood, FL

June 13-14, 2024

2024 TRANSPORTATION SYMPOSIUM

BRIDGING THE GAP:
Increasing OBM Adoption

Vern Danforth

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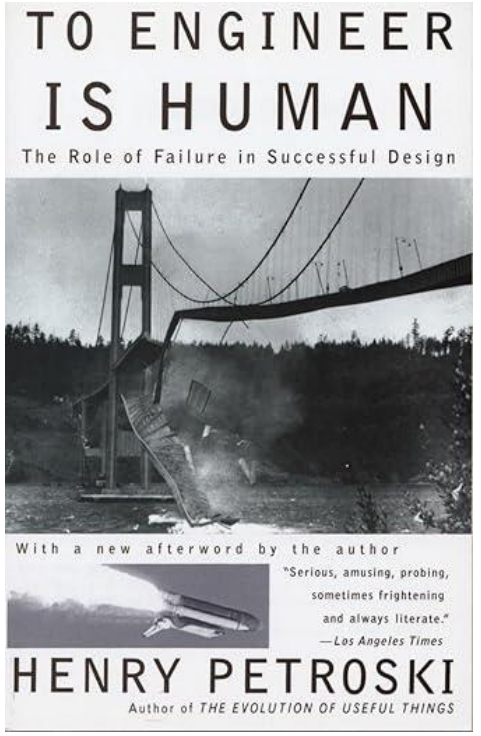
FDOT

GANNETT FLEMING

FDOT

A Story of Trust in Technology



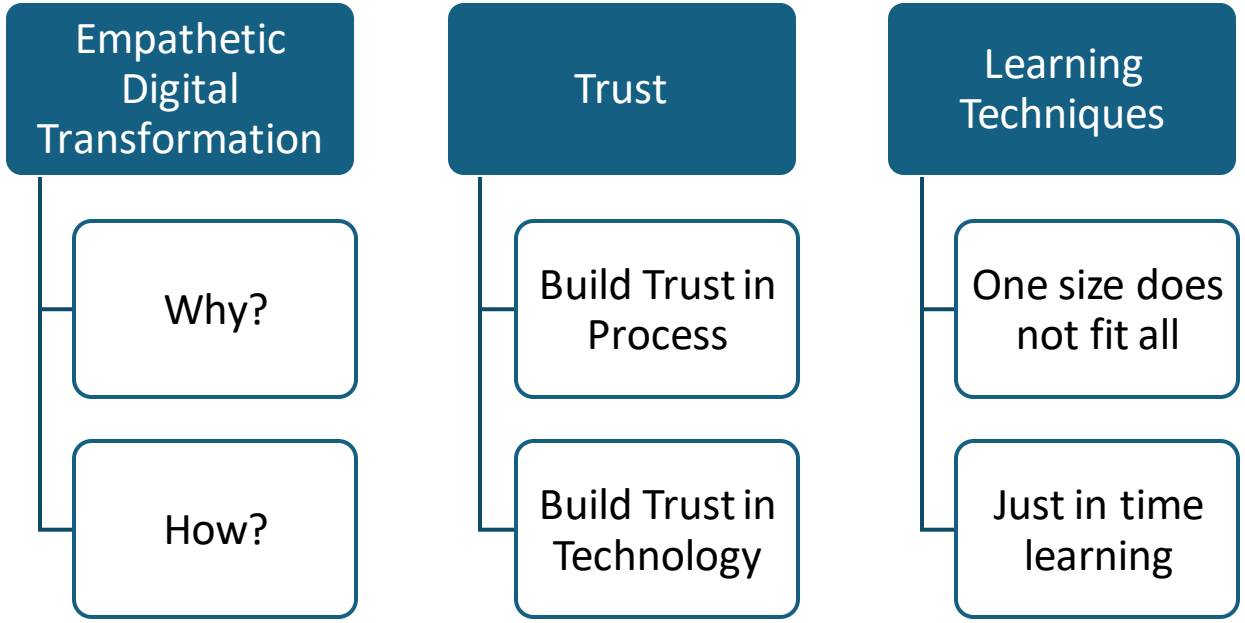
TRANSPORTATION SYMPOSIUM

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.

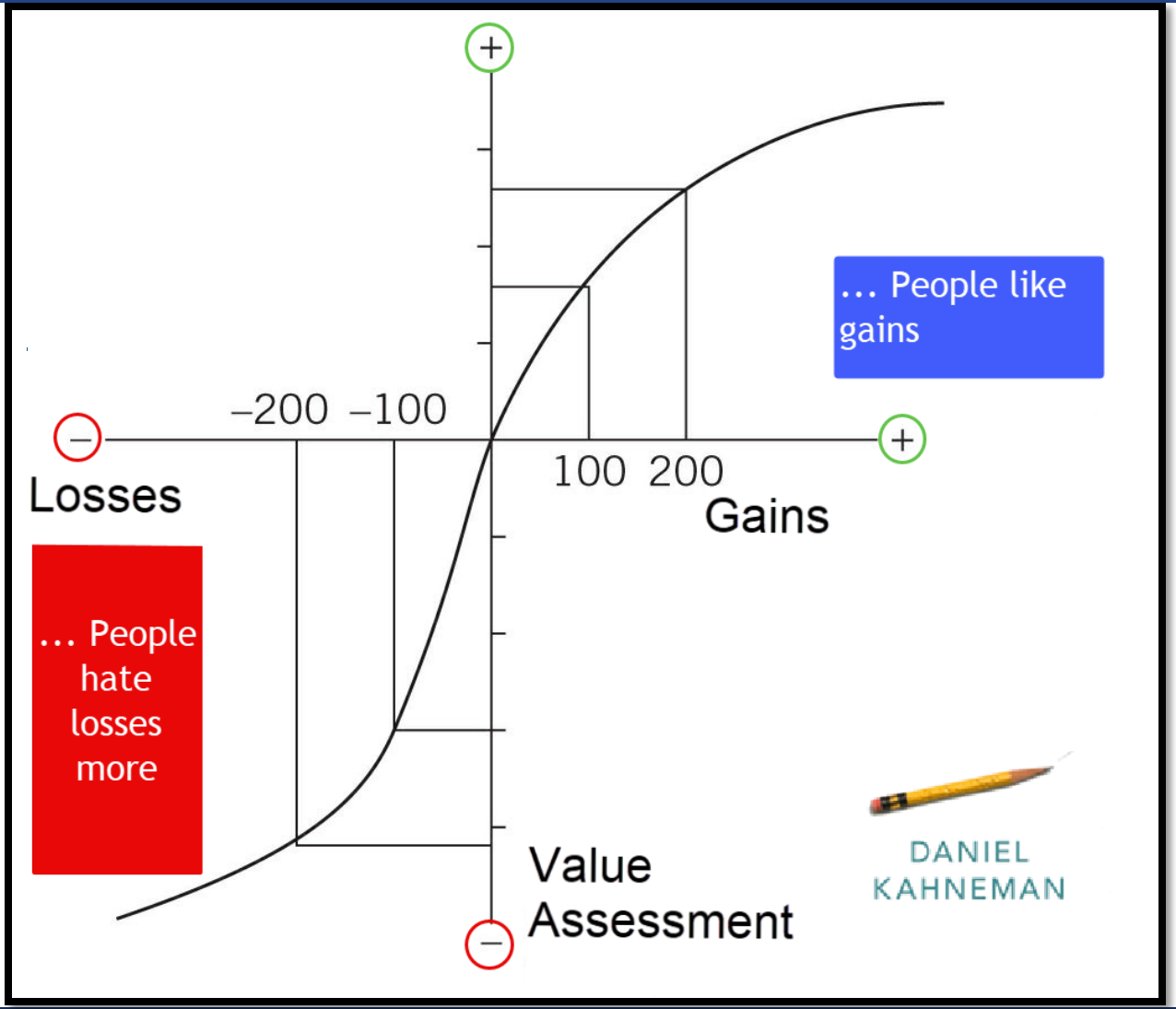


Design thinking

New Pathways

Empathize	User-centric learning
	Risk Tolerance
Define	Set the path
Ideate	Challenge Process
Prototype	Small Use-case
Test	v. Exist System

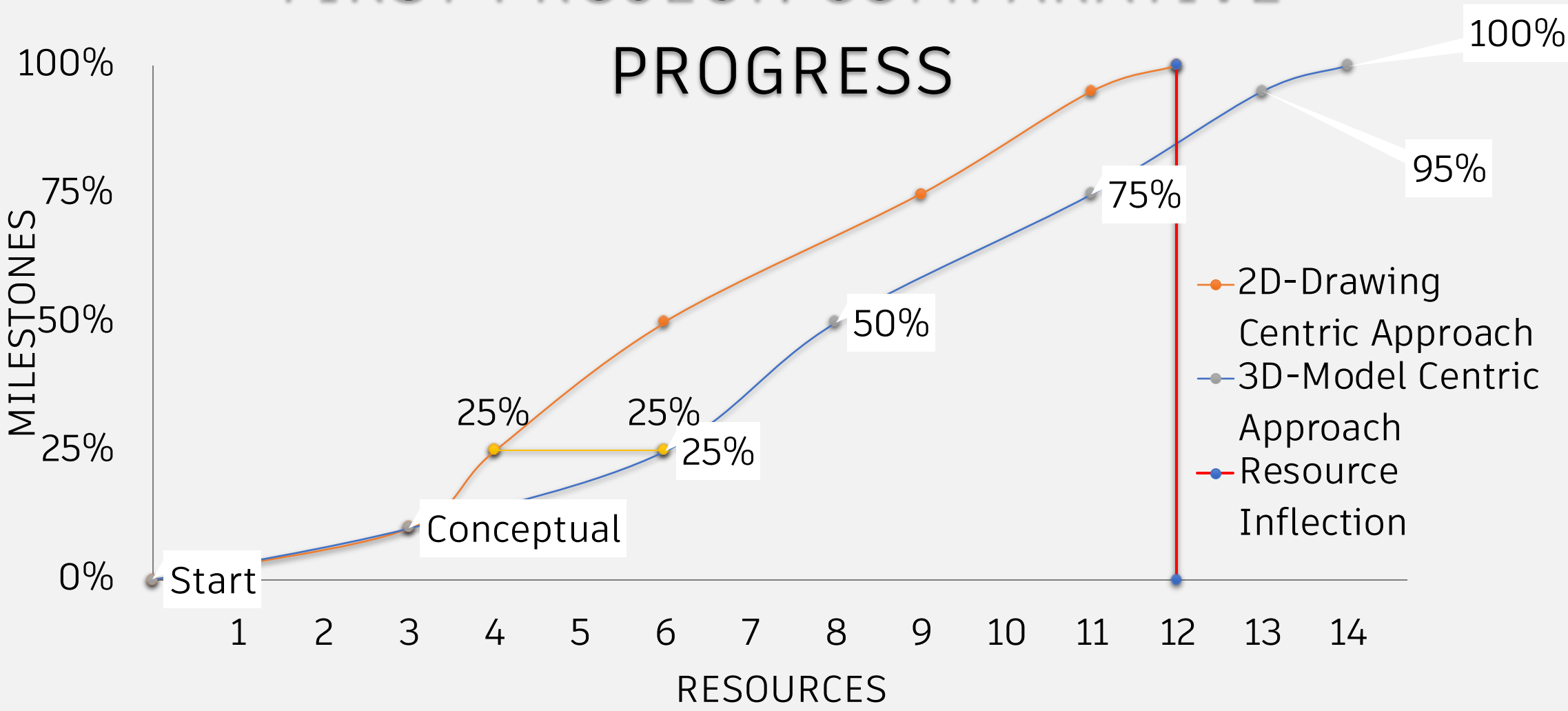
Building Trust in OBM Adoption



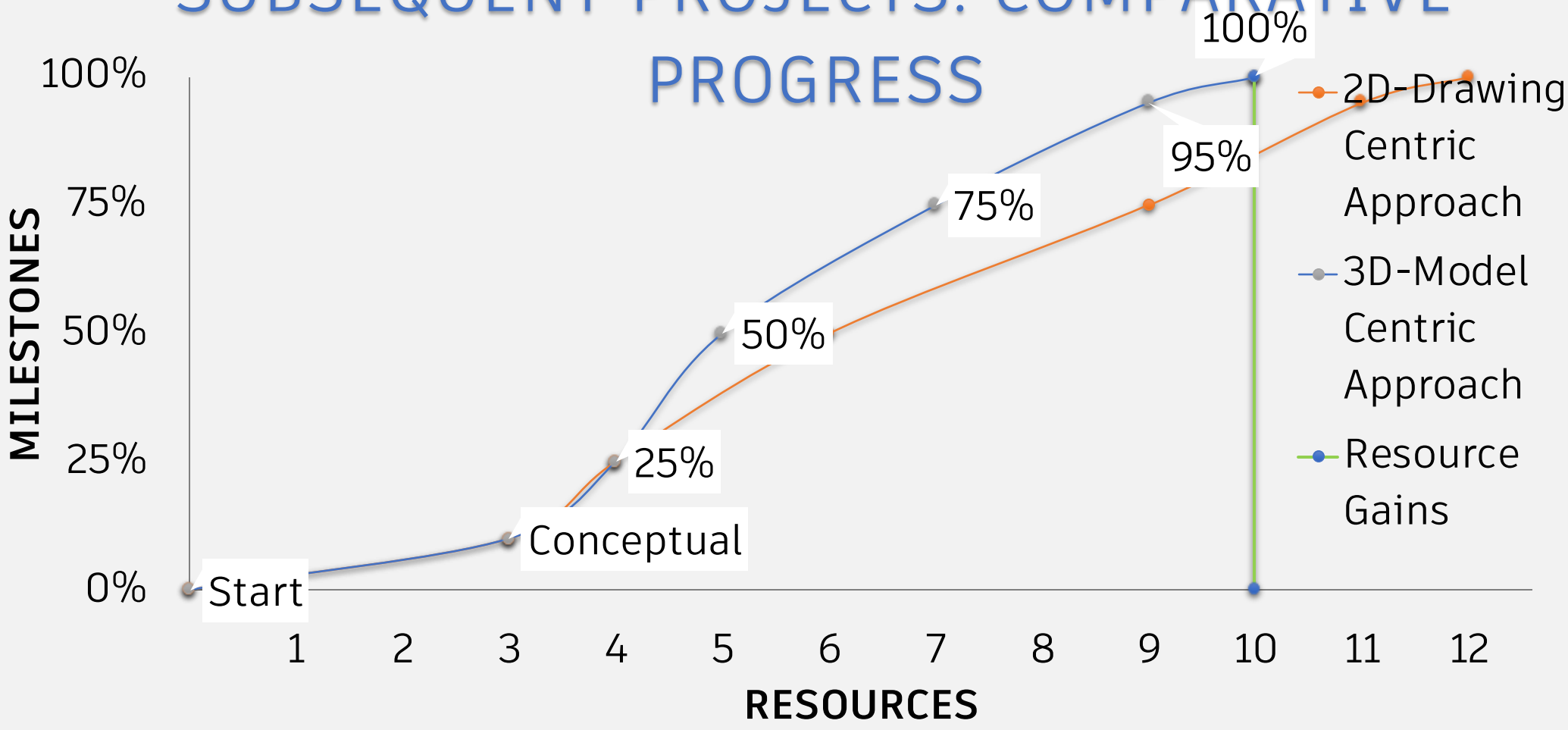
Prospect Theory

- 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."

TRANSPORTATION SYMPOSIUM

Rewind

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

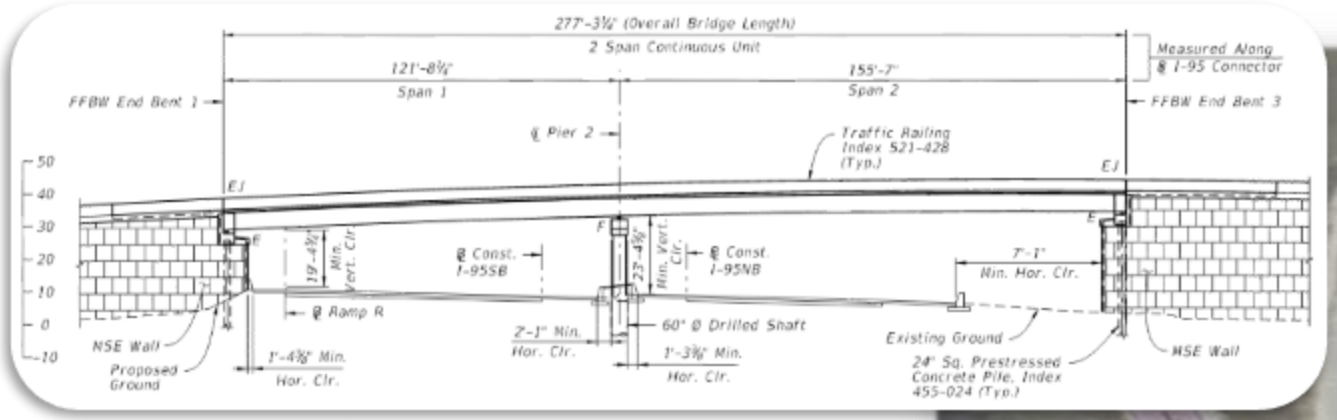
Small Bites

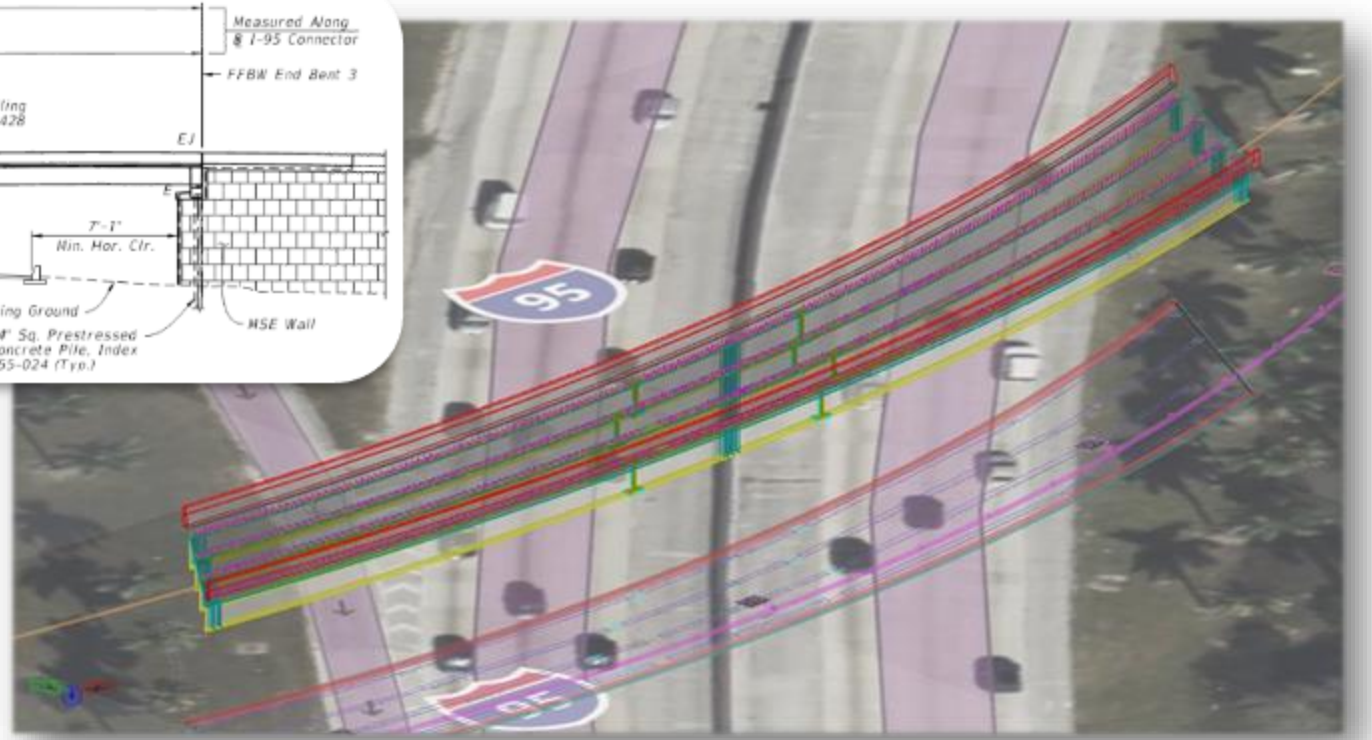
- When 3D deliverable is not required…
  - Upskill staff incrementally
  - Coordinate across disciplines
  - Leverage OBM tools to supplement tasks
  - Build trust in the software

Golden Glades Interchange – FDOT

Gannett Fleming sub to AECOM

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





- 3D modeling not required
- Learning & Development

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Golden Glades Interchange – FDOT

Gannett Fleming sub to AECOM

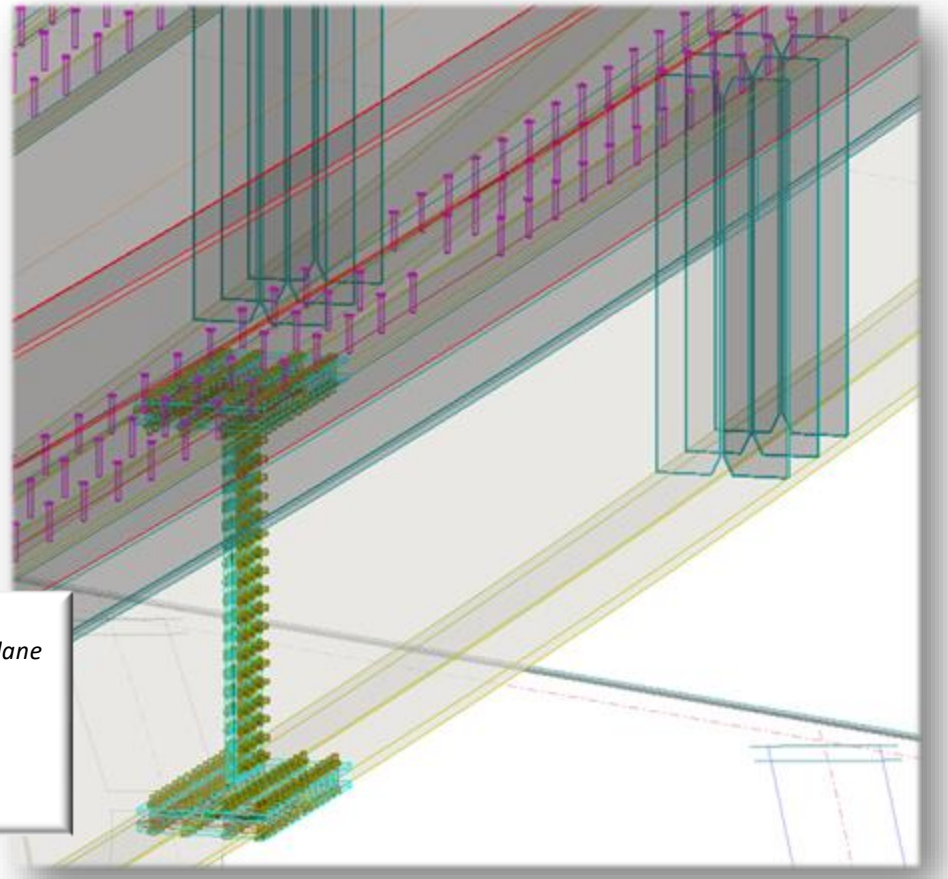
- Consider Modeling Standards

  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."



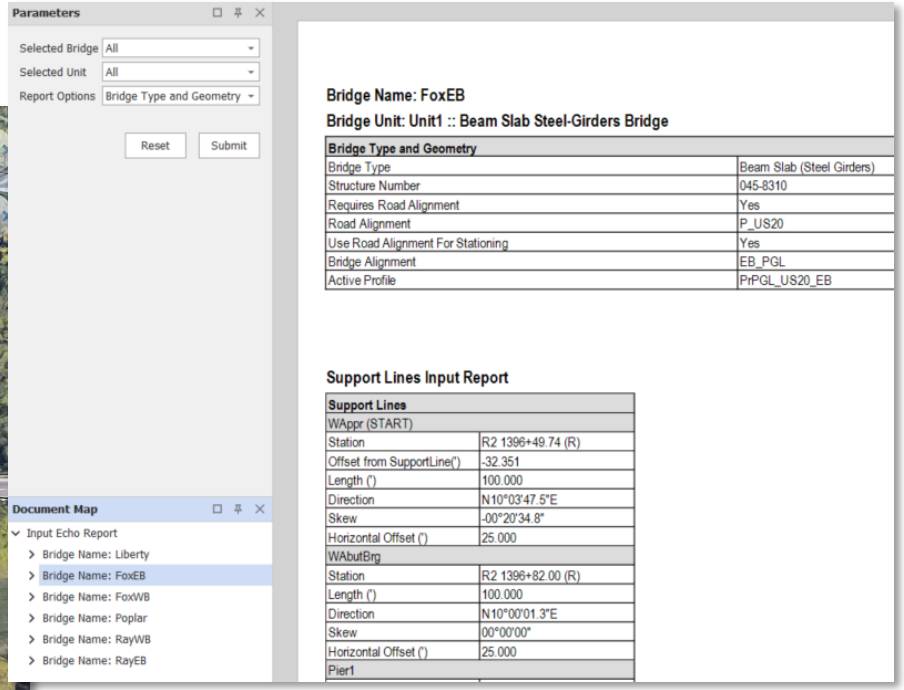
US 20 – IDOT

- 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



Bridge Name: FoxEB

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

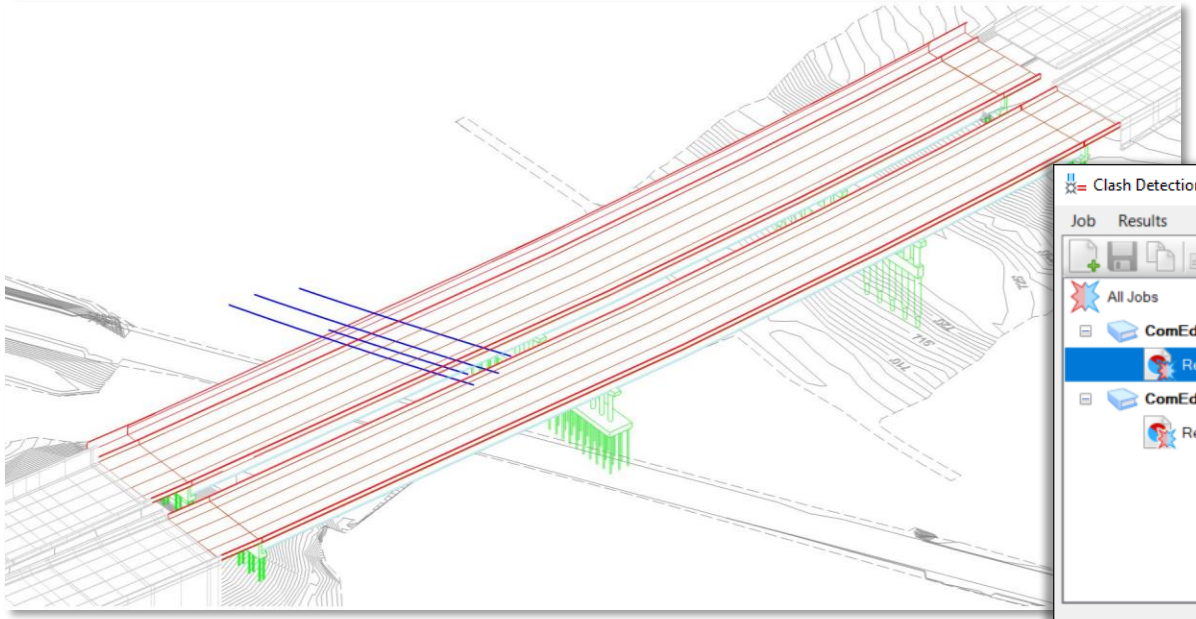
Bridge Type and Geometry	
Bridge Type	Beam Slab (Steel Girders)
Structure Number	045-8310
Requires Road Alignment	Yes
Road Alignment	P_US20
Use Road Alignment For Stationing	Yes
Bridge Alignment	EB_PGL
Active Profile	PrPGL_US20_EB

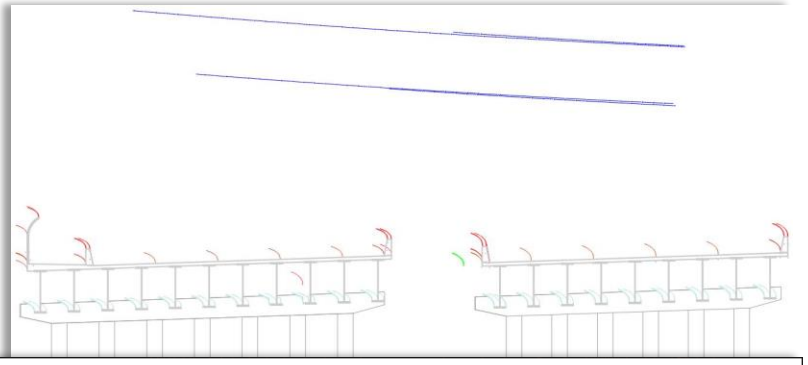
Support Lines Input Report

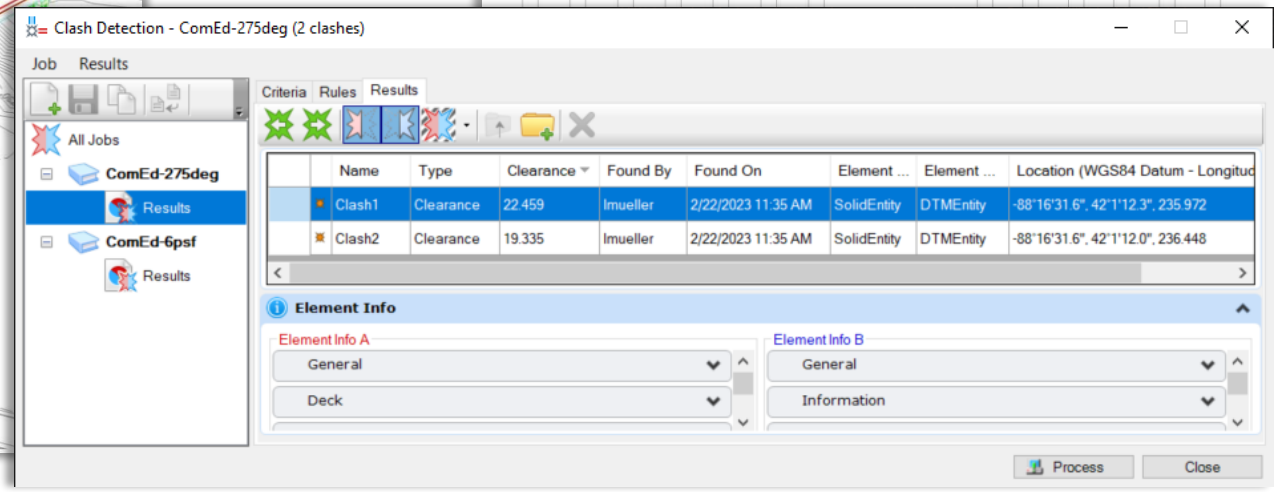
Support Lines	
WAppr (START)	
Station	R2 1396+49.74 (R)
Offset from SupportLine(')	-32.351
Length (')	100.000
Direction	N10°03'47.5"E
Skew	-00°20'34.8"
Horizontal Offset (')	25.000
WAbutBrg	
Station	R2 1396+82.00 (R)
Length (')	100.000
Direction	N10°00'01.3"E
Skew	00°00'00"
Horizontal Offset (')	25.000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

Constraints & Clashes

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





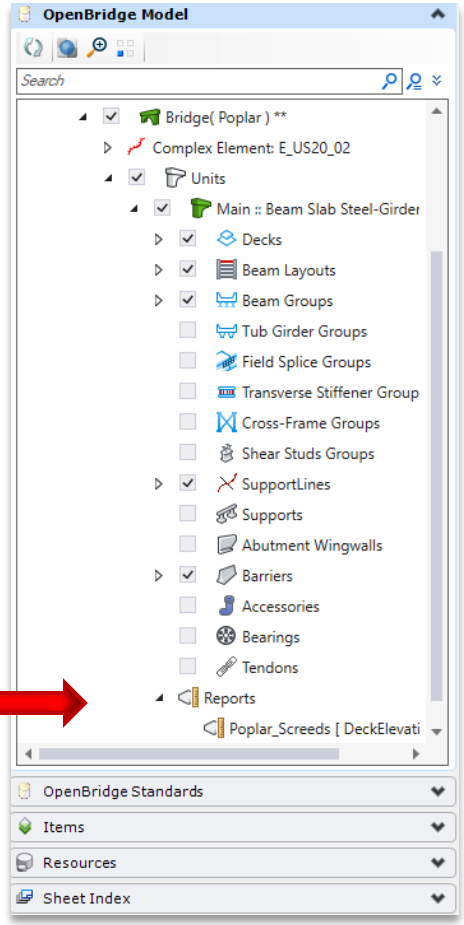


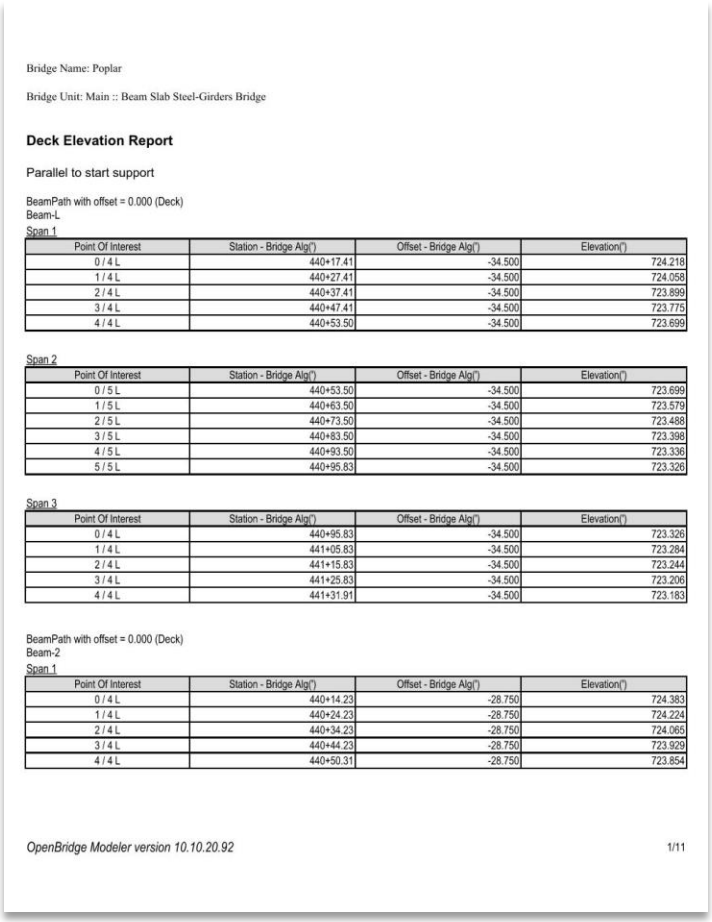
TRANSPORTATION SYMPOSIUM

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





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

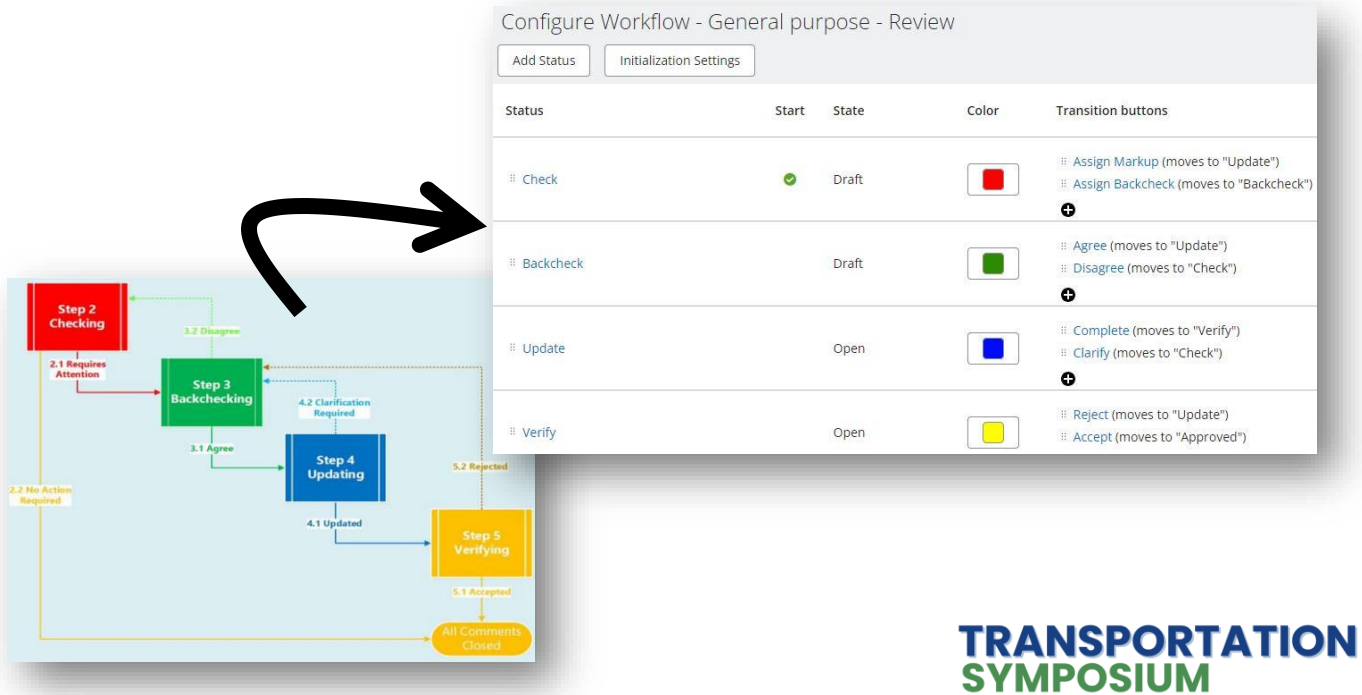
Point Of Interest	Station - Bridge Alg(')	Offset - Bridge Alg(')	Elevation(')
0 / 4 L	440+14.23	-28.750	724.383
1 / 4 L	440+24.23	-28.750	724.224
2 / 4 L	440+34.23	-28.750	724.065
3 / 4 L	440+44.23	-28.750	723.929
4 / 4 L	440+50.31	-28.750	723.854

OpenBridge Modeler version 10.10.20.92 1/11

Fast Forward… 2024

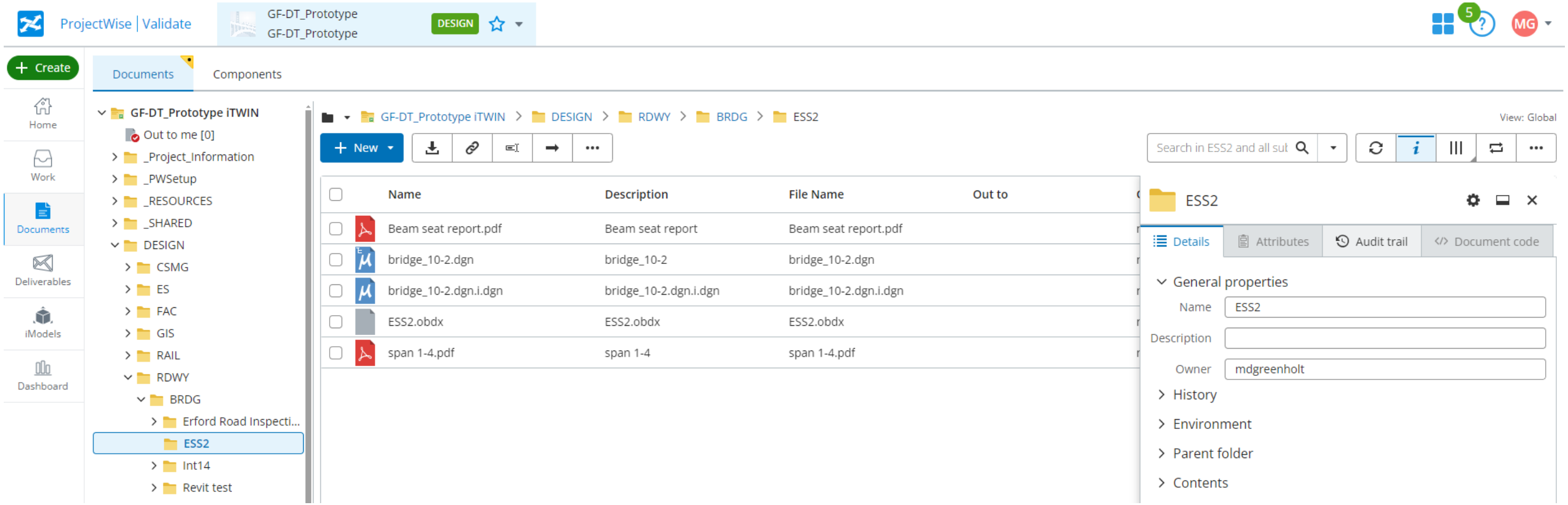
- Value in FL & IL Efforts
  - Notable team coordination and reporting efficiencies gained during production
  - Designers possess expertise for work-sharing & upskilling new locales requiring OBM to keep projects on pace

- Infrastructure Cloud
  (FDOT platform for Design Review)
  - Developing QC Workflows



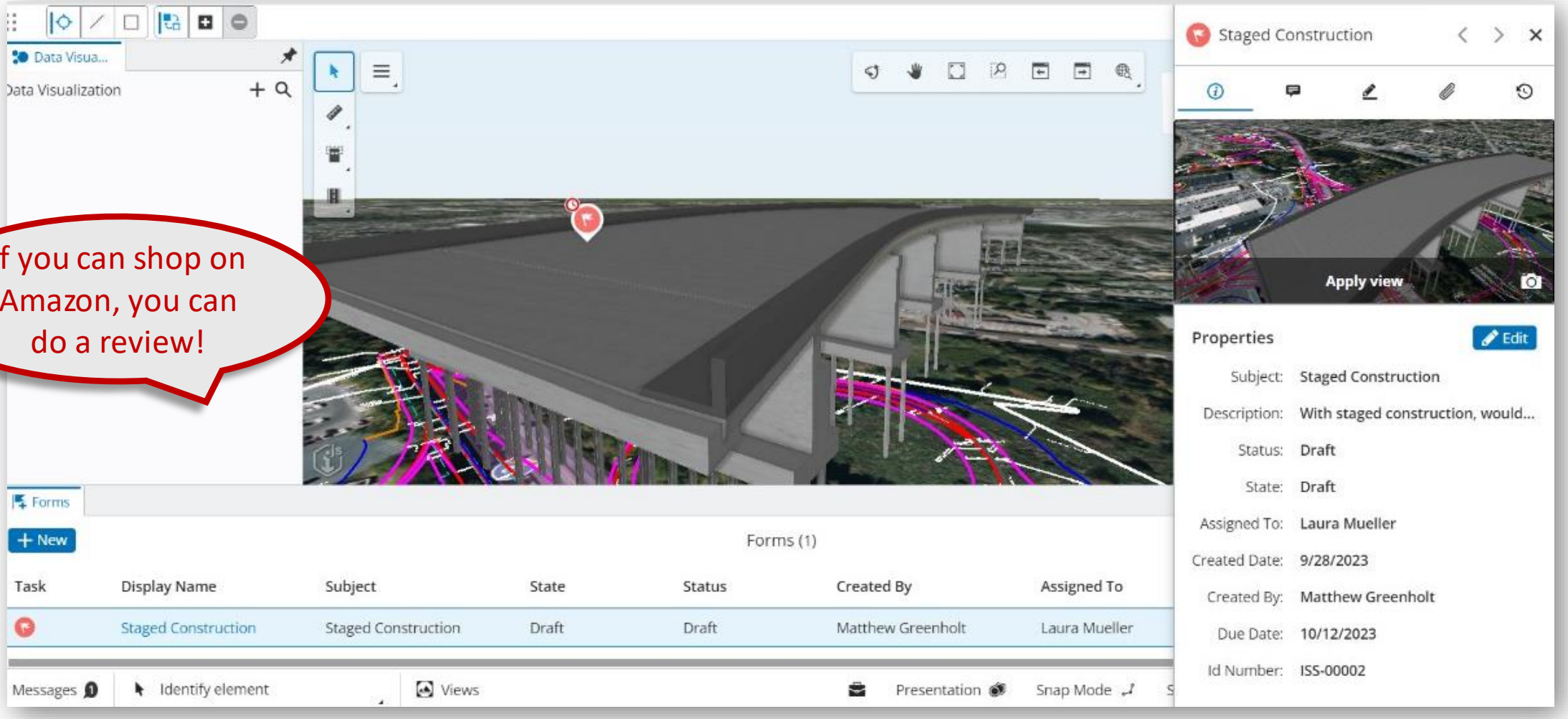
TRANSPORTATION SYMPOSIUM

iTwin Review – File Source Control



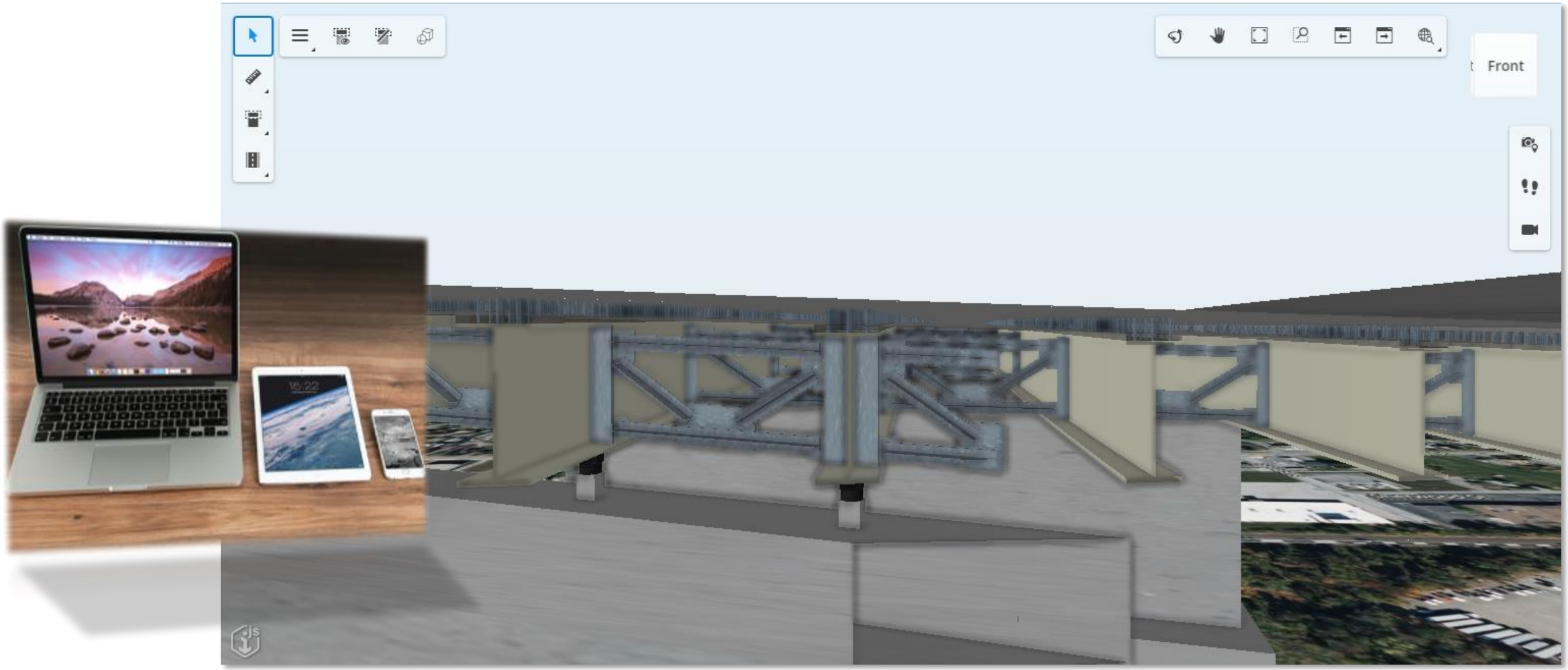
TRANSPORTATION SYMPOSIUM

iTwin Review – Design Tasks



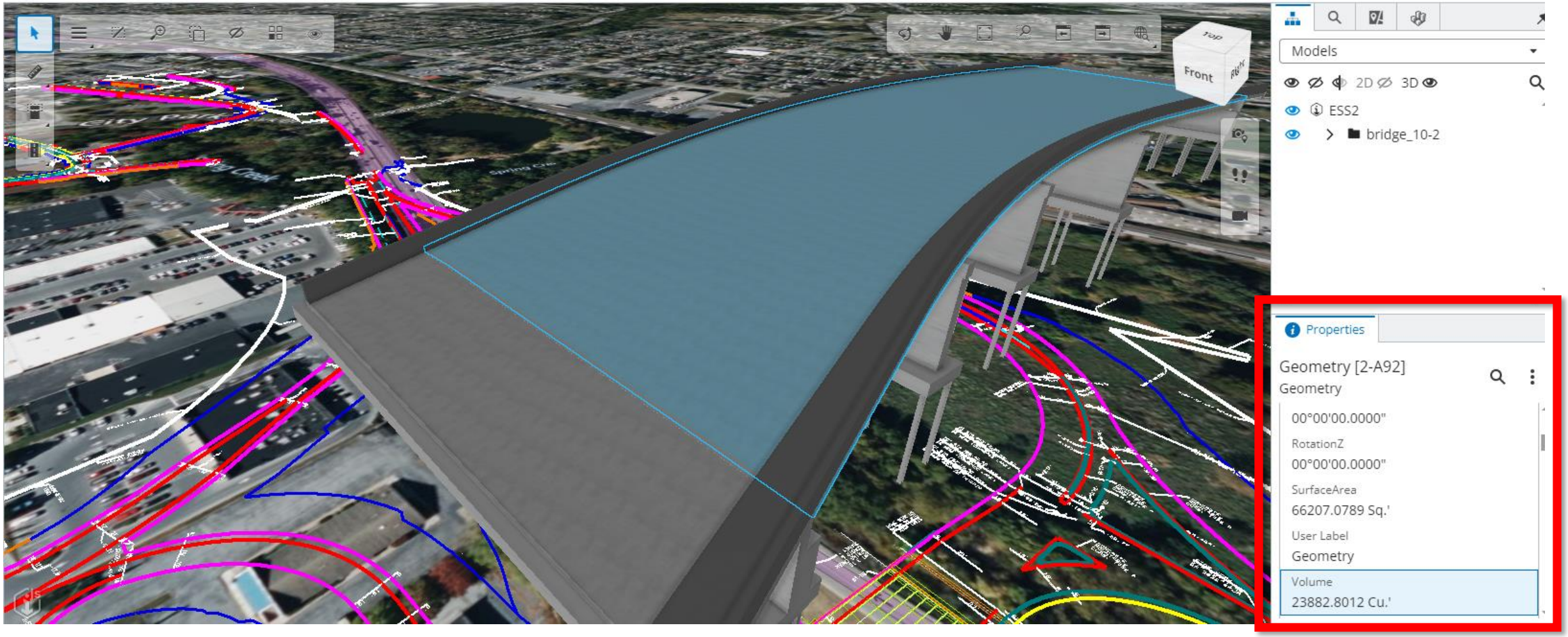
TRANSPORTATION SYMPOSIUM

iTwin Review – Section Cuts



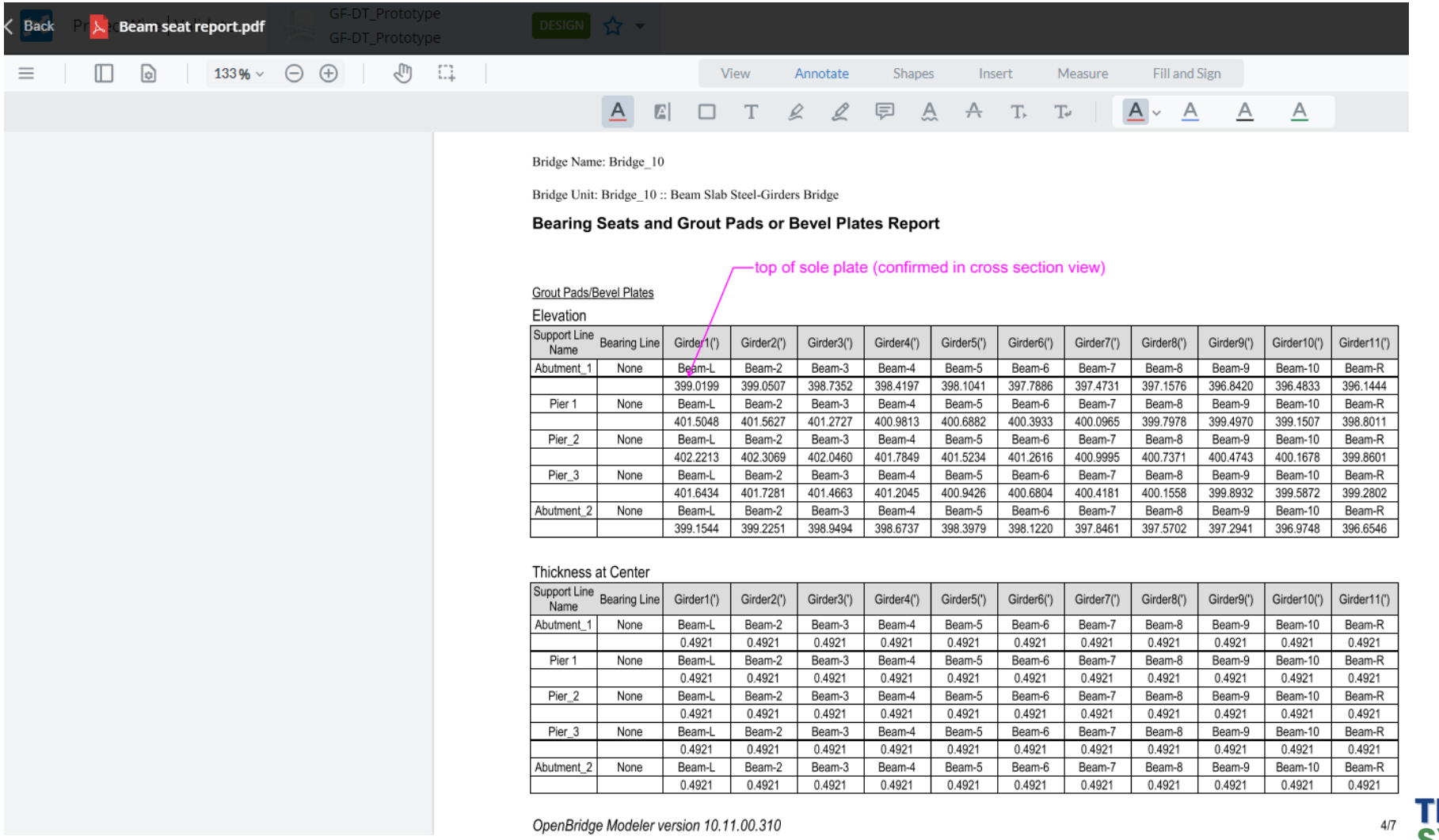
TRANSPORTATION SYMPOSIUM

iTwin Review – Quantities & Properties



TRANSPORTATION SYMPOSIUM

iTwin Review – Document Review



Bridge Name: Bridge_10

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

Bearing Seats and Grout Pads or Bevel Plates Report

top of sole plate (confirmed in cross section view)

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

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

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FEA to IFC for QA/QC

iTwin Review – Data Connectors

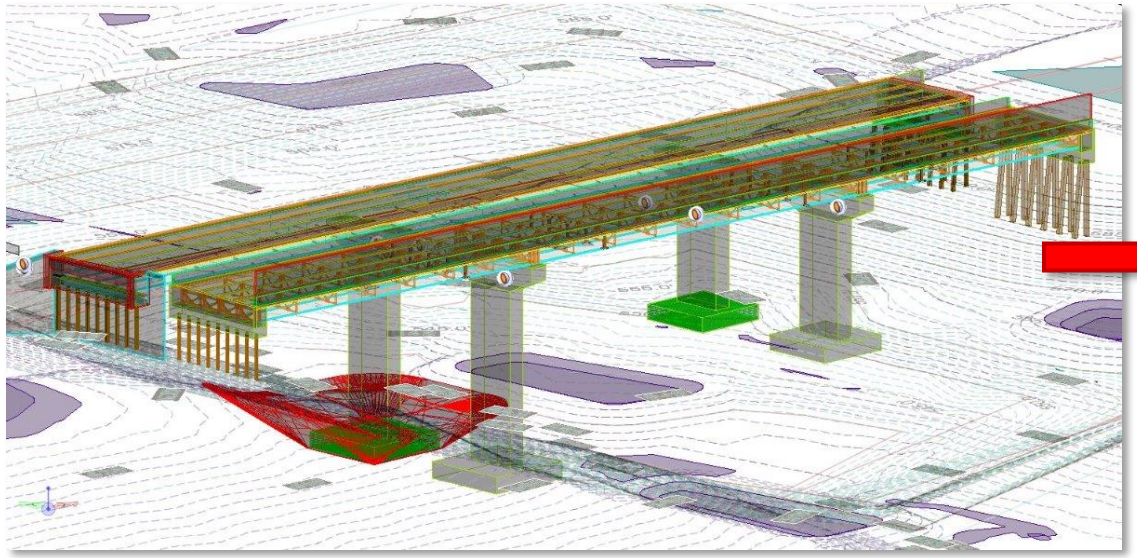
Third Party applications

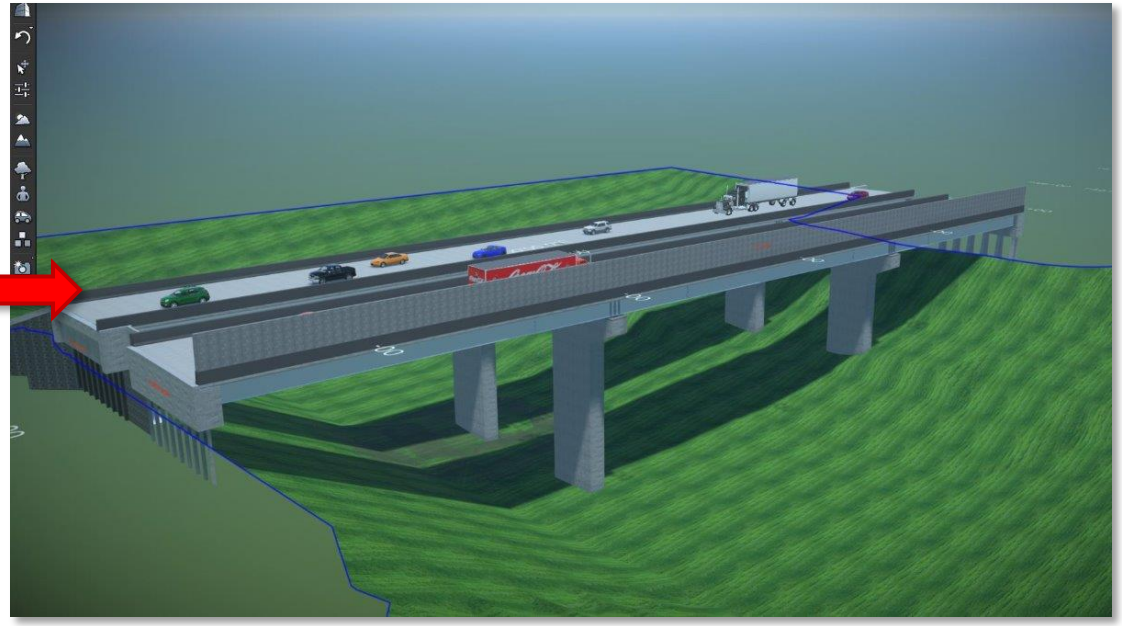
Application	Connector
3D Studio	MicroStation
AutoCAD	AutoCAD Dwg
Civil 3D	Civil3D
Intergraph Smart 3D Review	VUE
Intergraph Smart P&ID	SmartPlant P&ID
Navisworks	Navisworks
Revit	Revit
Rhino	MicroStation
Sketchup	MicroStation

Interchange formats

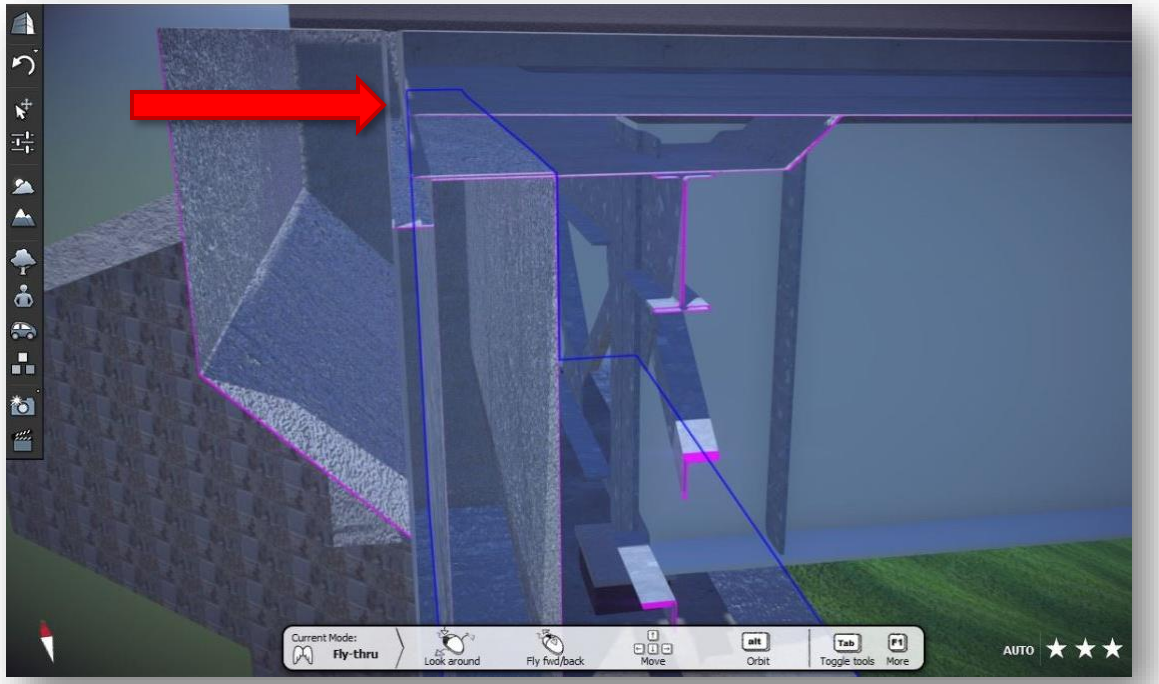
Interchange Formats	Connector
ACIS	MicroStation (via dgn)
ArcGIS Feature Service	Geo
Autodesk 3DS Max	MicroStation
CGM	MicroStation (via dgn)
Collada	MicroStation (via dgn)
Hidden edges	MicroStation
DXF	AutoCAD
FBX	MicroStation
Geojson	Geo
IFC	IFC
IGES	MicroStation (via dgn)

OBM to LumenRT





LumenRT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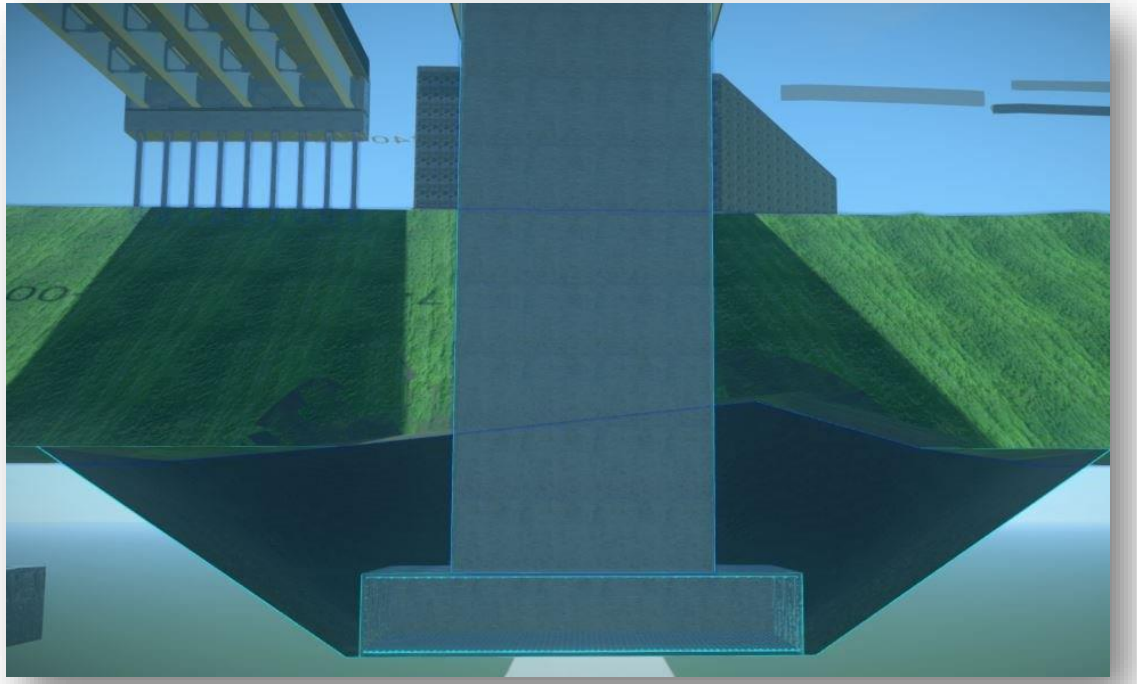
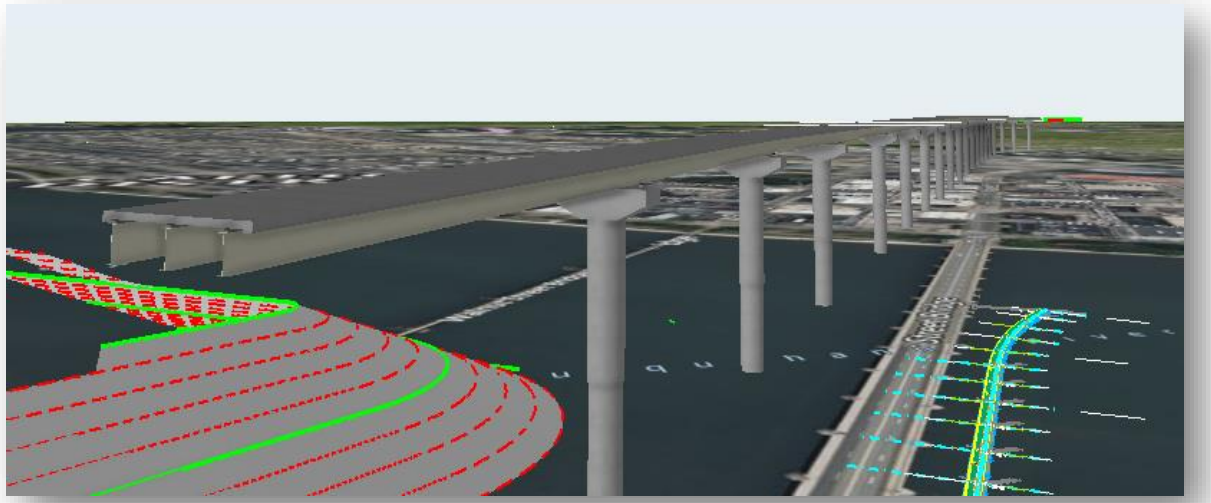
Fly-thru
Look around
Fly fwd/back
Move
Orbit
Toggle tools
More
AUTO



Lessons Learned

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



Safety Message

FDOT

TARGET ZERO
FATALITIES & SERIOUS INJURIES

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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/

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Contact Us

GANNETT FLEMING

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