Bentley and Transoft Integration

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Outline

• This session highlights how to maximize the value from Bentley’s OpenRoads technology as well as Transoft Solutions’ AutoTURN Pro3D and TORUS Roundabouts.

• It will cover an introduction of the OpenRoads technology and the workflows when transitioning between packages through a series of cases:
   Processing Point Cloud Data in Bentley
   Analyzing 3D Swept Path with AutoTURN in point cloud environment
   Designing Intersections in Bentley OpenRoads
   Verifying the design through 2D and 3D Swept Path in AutoTURN
   Designing a roundabout with TORUS Roundabouts
   Completing the grading design in Bentley OpenRoads
What is OpenRoads?

OpenRoads is not a product – it is the name of the common technology for the V8i SELECTseries 3 and V8i SELECTseries 4 releases of the Bentley Civil products (InRoads, GEOPAK, MXROAD, and Power Civil for Country).
DGN Based

- Terrain Model
  - DGN Based

- Geometry
  - DGN Based

- Modeling
  - DGN Based

- DGNLIB Based Standards
  - Features
  - Design Standards

Undo / Redo!
User Experience

- Graphical and Intuitive
  - Heads-Up Prompts
  - In-Place Editing
  - Context Toolbars
Design Time Visualization

• Easy
• Immediate Results
• Realistic
  – Grass, Concrete, Pavement, etc.
• Work in 2D, Get 3D for Free
Design Time Visualization

*OpenRoads* preserves the rules and relationships creating during the design process in order to maximize the downstream benefits of automated updates.

Therefore, changing one value or parameter allows related elements to update themselves automatically yet intelligently.
Civil Cells

Civil Cells are a mechanism that allows a user to pre-configure commonly used 2D and 3D geometric layouts while maintaining all design intelligence.

*Intersections, Medians, Roundabouts, Driveways, etc.*

These Civil Cells will then commonly be stored in DGNLib files for re-use across multiple projects.
OpenRoads is software built to model.

• Designed by engineers for engineers, the technology advances what’s possible in road design, construction and operations through the use of several industry-leading innovations.

• Whether it’s existing, sub-grade or proposed finish grade, OpenRoads allows you to create your models and then pass those along to other disciplines such as traffic analysis, drainage and construction.
OpenRoads

Point Clouds

Building surface models from point clouds data.
→ Transoft Solutions

Clearance Analysis

Using AutoTURN Pro 3D to perform clearance analysis.
Clearance Analysis

*AutoTURN pioneered 3D Swept Path Checking*

- Point cloud data has become increasingly common and popular but what can you do with it?
  - AutoTURN Pro 3D can be utilized for analyzing and visualizing clearances (3D Swept Path Envelope).
- Possible scenarios:
  - Clearance at Driveways
  - Clearance at Overpasses
    - Oversized loads/Permitting
OpenRoads

Parametric Modeling

OpenRoads provides the right tools for the job.
OpenRoads

Civil Cells

Eliminating the redundancy in modeling.
Using AutoTURN Pro 3D to perform 3D swept path analysis.
3D Swept Path Analysis

Performing 3D Swept Path Checks is as easy as 2D Swept Path Checks

• The design workflow doesn’t need to be completely changed if you decide to check 2D and 3D Swept Paths.

• The next example is a scenario where an intersection is being designed in Bentley OpenRoads and AutoTURN is used for swept path checking.

• Both AASHTO Bus 40 and WB-50 are used as checking vehicles.
Transoft Solutions

Conceptual to Detailed Design

Using TORUS and NEXUS to plan and conceptually design roundabouts and intersections.
Conceptual to Detailed Design

Take a Conceptual Design in TORUS to Detailed Design

• TORUS and NEXUS can assist in the planning and conceptual design of roundabouts and intersections. The design can be passed to OpenRoads for further grading design and analysis.

• In this scenario, we will illustrate the workflow of designing a roundabout in TORUS and transitioning the design to OpenRoads.
Basic Workflow – Step 1

Define Approach Legs
Basic Workflow – Step 2

Select Design Guideline
Basic Workflow – Step 3

Place ICD & Central Island
Basic Workflow – Step 4

Adjust Sizing of ICD
Basic Workflow – Step 5

Set Approach Legs & Lane Configurations
Basic Workflow – Step 6

Edit Approach Legs
Basic Workflow – Step 7

Set Entry Path Radius, Reverse Curve Entry (optional)
Set Refined Edges – Best Fitted Edges to VEM™
Basic Workflow – Step 9

Grading Design using TORUS tools
Basic Workflow – Step 10

Set Cross Slopes for All Regions
Basic Workflow – Step 11

Set Cross Slopes for All Regions
Basic Workflow – Step 12

Define Vertical Profile
TORUS to OpenRoads

**Exporting from TORUS**

- Export Grading Design in LandXML format or 3D Break Lines

**Importing into OpenRoads**

- OpenRoads has the ability to read 3D break lines and create a surface from it. We’ll use this ability to bring in a roundabout from TORUS.
Summary

Key Takeaways:

✓ Process Point Cloud Data in Openroads
✓ Perform 2D & 3D Swept Path checking with AutoTURN Pro 3D
✓ Pass conceptual designs of roundabouts from TORUS to OpenRoads for detailed grading design
✓ Use these workflows to maximize the value from the tools