Geometry Update

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Geometry Update

Let’s hear about new capabilities within InRoads geometry. In addition, let’s look at some capabilities within InRoads geometry that may be new or puzzling to you.
Updated Interface

- Implement *tree view* and *grids* for various geometry view commands
  - View Closed Areas
  - View Stationing
  - View Station & Offset
  - View Curve Set
  - View Vertical in Plan
  - View Switch Height Plan
  - View Turnouts
  - …

- Consistency
- Enables the next step!
A few more
And even some for rail users!
Updated Interface

- Implemented configurable list view
  - Check Integrity
  - Edit / Review Regression Points
  - ...

- Enabled by right clicking the title
Explorer

- View All
  - Horizontal alignments
  - Turnouts (rail only)
  - Rails, Joints & Keepers (rail only)

- Hilite

- Fit & Hilite

- `<Ctrl>` Active
  - Set an alignment active by selecting the graphics

- `<Ctrl>` Delete
  - Delete an alignment by selecting the graphics
Horizontal Curve Set Commands

- If you can create it with the curve set commands then you can edit it with the same
  - Primarily aimed at Move PI & Insert PI and SCSCS curve-sets
# AREMA Transition Spiral

- **Chord definition**
- **Simple & compound**
  - Available in *Bentley Rail Track*

### AREMA Transition Spiral Information

<table>
<thead>
<tr>
<th>Element: AREMA</th>
<th>IS</th>
<th>SPF</th>
<th>SC</th>
<th>Enter Radius</th>
<th>Exit Radius</th>
<th>Length</th>
<th>Angle</th>
<th>Constant</th>
<th>Loop Tangent</th>
<th>Short Tangent</th>
<th>Long Chord</th>
<th>DS</th>
<th>TPC</th>
<th>P</th>
<th>R</th>
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### Tangent Direction Information

- **Degree of Curvature (Chord):** 2° 00' 00" E
- **Length:** 415.5734
- **Length (Chord):** 415.2467
- **Tangent:** 625.5203
- **Chord:** 573.1673
- **Middle Ordinate:** 16.6338
- **External:** 37 1256

### Radial Direction Information

- **Direction:** S 31° 35' 16" E
- **Chord Direction:** S 31° 35' 16" E
- **Radial Direction:** S 31° 35' 16" E
- **Tangent Direction:** N 76° 44' 24.7" E

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Table Editors

- Simpler editing
  - No discontinuities, no compound curve sets

- We now honor the Tools > Options > Geometry
  - Define Transitions By Length or Constant
  - Spiral Definition Clothoid, AREMA, Bloss, etc.
  - Undocumented Tip - <Ctrl> right click
Vertical Alignment Healing

• An attempt to synchronize / update the vertical alignment when the horizontal alignment has changed.
  – The coordinate position of vertical PI’s will be held!
  – New in 'Athens'
Edit Horizontal Element

- Component Editor type of functionality
- *Maintain Element Connectivity with Minimum Movement*
  - Previous element is freed
  - Current element is fixed
  - Next element is freed
Multiple Element Connection Editors

- Edit beginning and ending elements
  - Change radii / direction
- Inclusion of cant (rail only)
Edit / Review Extended Descriptions

- Adding non-graphical data to the design data
  - Extending the data with long textual descriptions
    - Persisted with the .alg
  - Extending the data with an external file / digital images
Cogo Audit Trail Lock

- Similar to the Report Lock for cogo commands, but independent!
  - Writes a .atf file to the same folder as the active geometry file.
Design Checks

• Not just warnings!
  - Now it indicates that the geometry is **acceptable**!

Checking stopping sight distances for alignment ‘default’

- 145.590,000
- Classification: CEM Freeway Terrain; Rolling Speed: 60
- Warning: Desirable minimum stopping sight distance exceeded!
- Desirable minimum stopping sight distance: 205.000
- Desirable minimum length should be: 425.000
- Actual length: 300.000

145.590,000
- Classification: CEM Freeway Terrain; Rolling Speed: 60
- Acceptable: Actual length is greater than desirable minimum stopping sight distance.
- Desirable minimum stopping sight distance: 205.000
- Actual length: 300.000
Rail Related Geometry Enhancements

• Quick Regression
• Integrated Horizontal & Cant / Superelevation
• Turnouts
  – Inclusion of railway standards
  – Creation / editing enhancements
• Field to Design / Design to Field
  – Machine to design / Design to machine
• See Bentley Rail Design Update for complete details!
Tips
Useful things that you may not be aware of!
Tip #1: How to clone list view settings?
Tip #2: Multi-Center Curve

- Creates horizontal & optionally vertical geometry for 1, 2 & 3 center curves
Multi-Center Curve: Horizontal Geometry

- Horizontal
Multi-Center Curve: Vertical Geometry

- 2% cross-slope from mainline for 12’
- Tangential slope at PVC
But what if in a transition?

- Create a surface with *Roadway Designer* and use it in *Multi-Center Curve* for the vertical geometry.
  - Almost the same computations, except
    - Elevation at PC and PT are from the surface
    - Tangential slopes at PC and PT are from the surface
      - Compute an elevation slightly before the PC and slightly after the PC
      - Likewise for the PT
Tip #3: How to annotate features?

- File > Import > Geometry from Graphics
  - Import features as a horizontal & vertical alignment

- Geometry > View > Station Offset Annotation
  - Set method to Station Offset
  - Set from as baseline
  - Set to imported feature
  - Set stationing
  - Set interval
Tip #4: How to import textual data?

- Text Import Wizard
  - Horizontal as curve-sets
  - Vertical as curve-sets
  - Horizontal & vertical events
    - More in a moment!
  - Cogo
- Regression points
  - Data must be in order
  - Bypasses data checking available in Regression > Add Regression Points

- Wizards are persisted to the XIN
S+E & N+E Events from a Single .txt
Tip#5: Inversing

- **Display and Annotate** check box
  - Set **on** and you get lines and annotation based upon geometry style
  - Set **off** and you don’t get the line and annotation
Tip #6: Annotating MicroStation Graphics

• Utilizes geometry “styles” to annotate MicroStation lines, linestrings & circular arcs
Tip#7: Chord definition settings

• Arc / chord definition is persisted with the alignment
  – No you can not mix arc and chord in the same alignment!
  – We persist the radius not the degree of curve

• Other system settings are in the preference file, accessible from **Tools > Options > Geometry**
Tip #8: Alpha-numeric cogo points

• Graphical commands have always supported alpha-numeric points names.
  – Cogo Classic / Import ICS have never supported alpha-numeric point or alignment naming!

• What about Geometry > Utilities > Create / Edit Alignment by Cogo Points?
  – Emulates ICS, so the answer should be no, but it is yes!
Alpha-numeric cogo points

- Variable Manager
  - Lots of other options!
And while we are on Tools!

• **Application Add-ins** now only show the available add-ins for the running product.
Questions?