



DevCamp 2013

The Revit 2014 API

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About the Presenter

Jeremy Tammik

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Jeremy is a member of the AEC workgroup of the Autodesk Developer Network ADN team, providing developer support, training, conference presentations, and blogging on the Revit API.

He joined Autodesk in 1988 as the technology evangelist responsible for European developer support to lecture, consult, and support AutoCAD application developers in Europe, the U.S., Australia, and Africa. He was a co-founder of ADGE, the AutoCAD Developer Group Europe, and a prolific author on AutoCAD application development. He left Autodesk in 1994 to work as an HVAC application developer, and then rejoined the company in 2005.

Jeremy graduated in mathematics and physics in Germany, worked as a teacher and translator, then as a C++ programmer on early GUI and multitasking projects. He is fluent in six European languages, vegetarian, has four kids, plays the flute, likes reading, travelling, theatre improvisation, yoga, carpentry, loves mountains, oceans, sports, dancing, and especially climbing.

Agenda

- Revit 2014 API news
- New SDK samples
- Additional highlights

Revit 2014 API News

Revit 2014 API News

- Copy and paste API – within or between documents, incl. view specific elements
- Project browser API – commands, macros, selected elements
- Schedule API – formatting, read-write data items
- Command API – launch macro, add-in and built-in
- Displaced elements API – exploded views
- Join geometry API – create, remove and control joins
- FreeForm element API – modification of imported solids
- Site API – editing of topography surface points and sub-regions
- Add-in API – loading and execution
- Macro API – list, create, delete and execute
- MEP calculations in external services
- Structural Analysis SDK
- Direct API access to rendering pipeline

More on Revit 2014 API News

- First introduction
 - Revit 2014 API highlights
 - DevDays presentation, recording and sample code

<http://thebuildingcoder.typepad.com/blog/2013/03/revit-2014-api-and-room-plan-view-boundary-polygon-loops.html#2>

- What's New
 - Detailed overview of all enhancements

<http://thebuildingcoder.typepad.com/blog/2013/04/whats-new-in-the-revit-2014-api.html>

Structural Analysis Software Development Toolkit

- Code checking framework
 - Facilitate cc workflows
 - For both users and developers
 - Complete extensible add-in
 - User interface, report generator, data storage
 - Documentation, samples, Visual Studio templates
- Results builder framework
 - Store and access results data in Revit
 - High-level API for consumption, exchange, remote providers

<http://thebuildingcoder.typepad.com/blog/2013/06/structural-analytical-code-checking-and-results-builder.html>

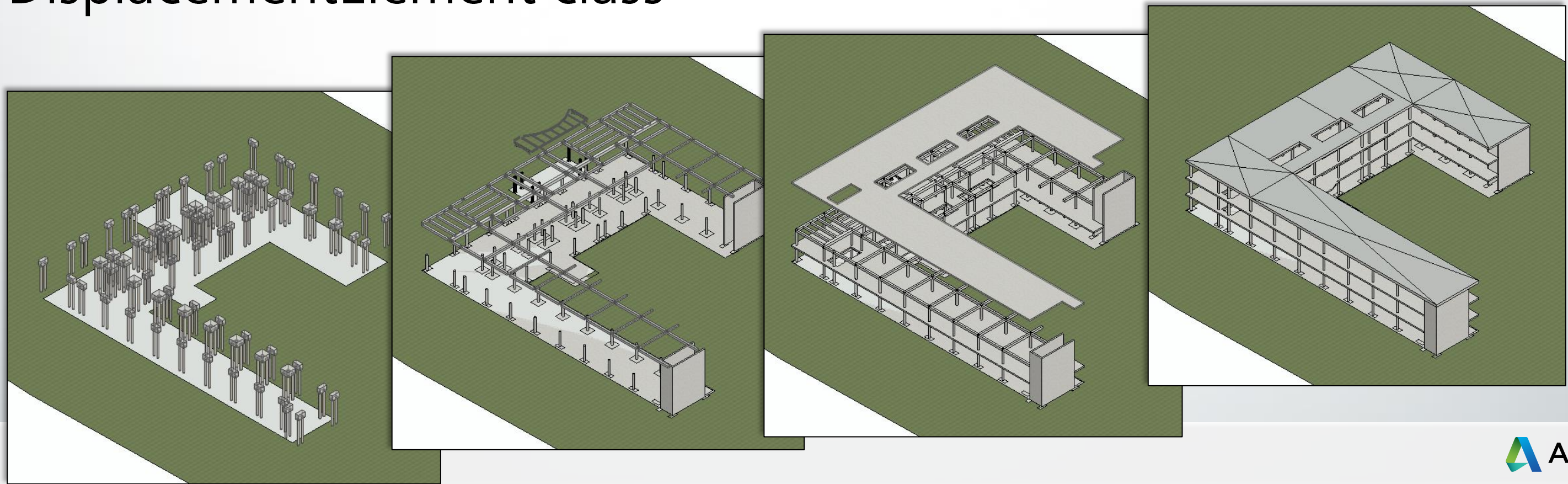
New SDK Samples

New SDK Samples

- DisplacementElementAnimation
- DockableDialogs
- DuplicateViews
- ExtensibleStorageUtility
- FreeFormElement
- PostCommandWorkflow
- ScheduleAutomaticFormatter
- ScheduleToHTML
- SinePlotter
- Site
- Units
- WinderStairs

DisplacementElementAnimation

- Programmatically drive element displacement
- Animated exploded view using Idling event
- Sort members into groups based on category and level
- Displace from actual position at the command begin
- Animate group by group back to original position
- DisplacementElement class



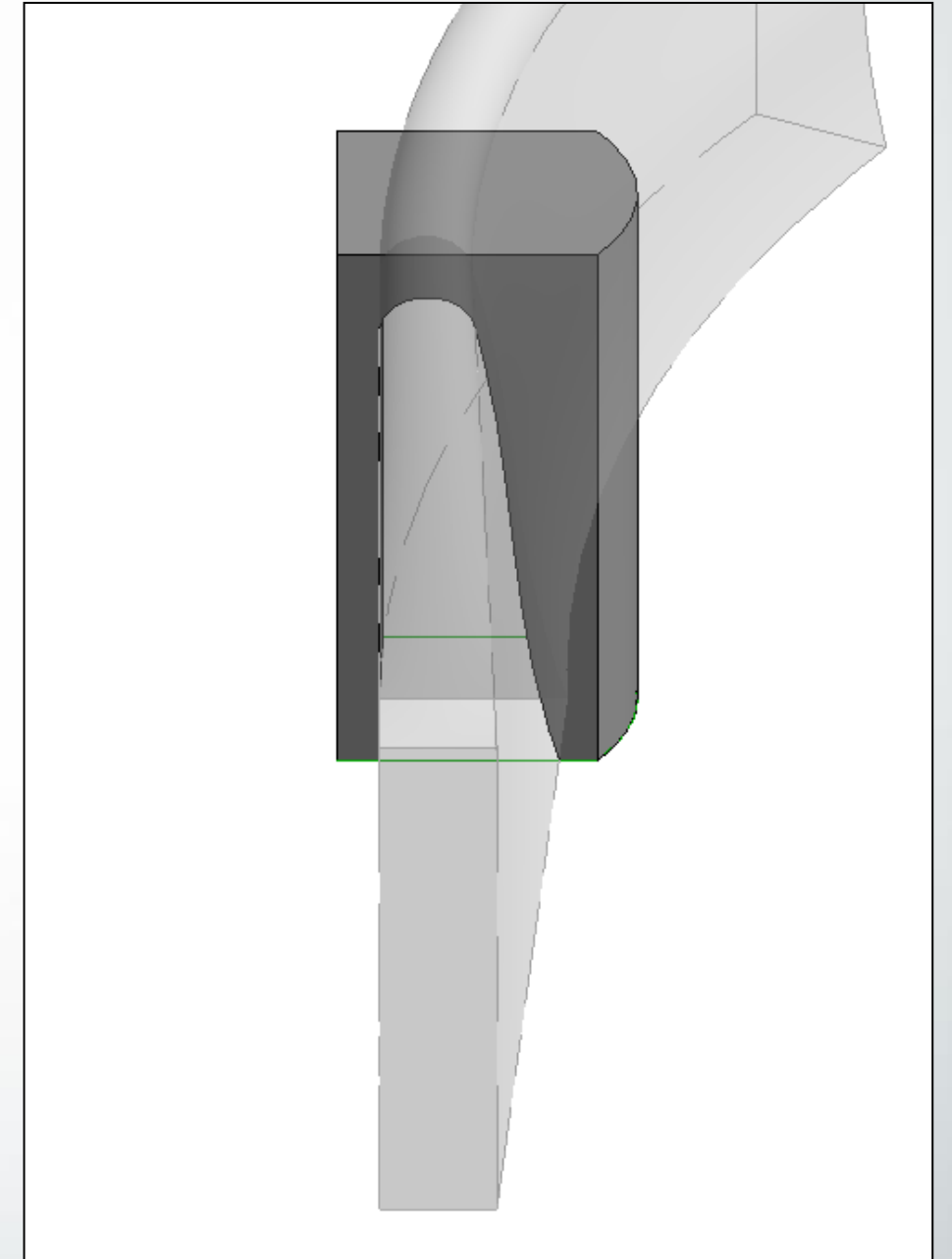
DockableDialogs

DuplicateViews

ExtensibleStorageUtility

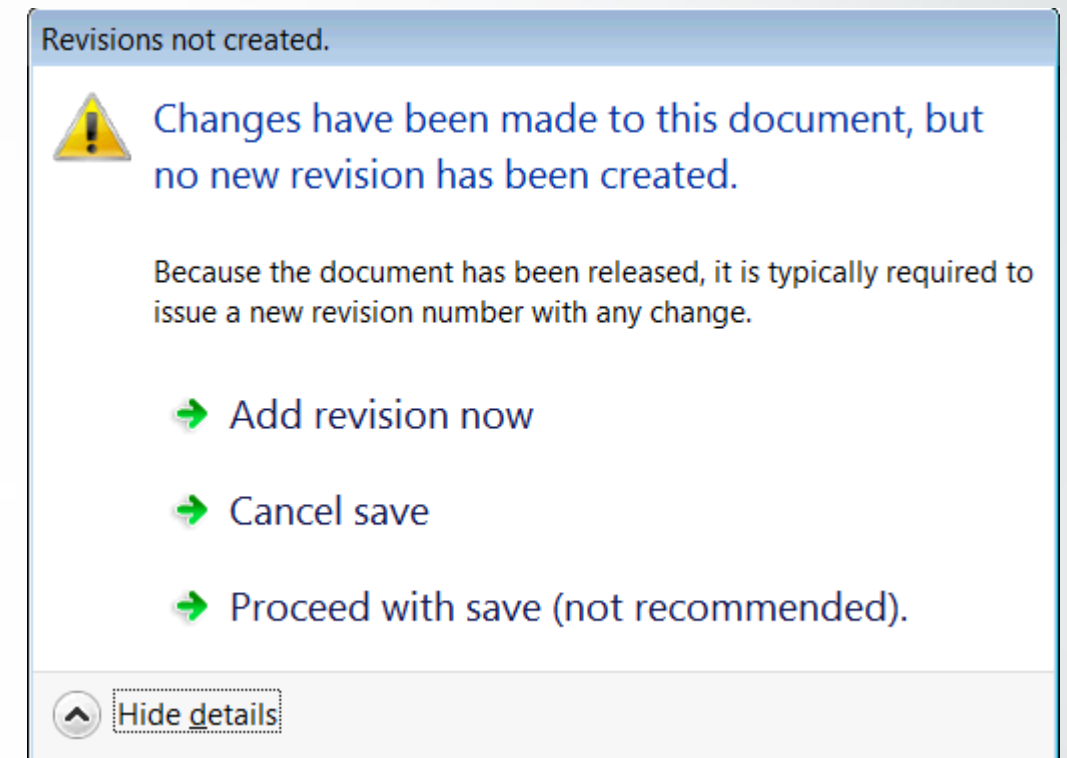
FreeFormElement

- Create a new family document
- Create a FreeFormElement
 - Non-parametric geometry A copied from input geometry
 - Extrusion of a selected profile B
 - Subtraction of A from B
- Load the family into current project
- Exercise Create method on FreeFormElement class



PostCommandWorkflow

- Demonstrate custom workflow after command execution
- Handle DocumentSaving event
- Modify save behaviour based on number of revision elements
- Implement complex workflows with custom events
- Custom event type implements IExternalEventHandler



ScheduleAutomaticFormatter

- Colour format alternating columns of a schedule table
- Format columns of active schedule in alternating colors
- Store formatting data in extensible storage
- Use dynamic updater to auto-reformat columns
- TableCellStyle and TableCellStyleOverrideOptions

<Door Schedule>						
A	B	C	D	E	F	G
Door #	Size		Hardware Group	Frame		Comments
	Width	Height		Type	Material	
101A	6' - 8"	7' - 0"	3	1	Alum.	
101B	6' - 8"	7' - 0"	3	1	Alum.	
101C	6' - 8"	7' - 0"	3	1	Alum.	
101D	6' - 8"	7' - 0"	3	1	Alum.	
102	5' - 8"	7' - 0"	1	3	Wood	
103	3' - 0"	7' - 0"	(none)	3	Wood	
104A	3' - 0"	7' - 0"	(none)	3	Wood	
104B	3' - 0"	7' - 0"	(none)	3	Wood	
105A	3' - 0"	7' - 0"	(none)	3	Wood	
105B	3' - 0"	7' - 0"	(none)	3	Wood	
106A	3' - 0"	7' - 0"	(none)	3	Wood	
106B	3' - 0"	7' - 0"	(none)	3	Wood	

<Door Schedule>						
A	B	C	D	E	F	G
Door #	Size		Hardware Group	Frame		Comments
	Width	Height		Type	Material	
101A	6' - 8"	7' - 0"	3	1	Alum.	
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101C	6' - 8"	7' - 0"	3	1	Alum.	
101D	6' - 8"	7' - 0"	3	1	Alum.	
102	5' - 8"	7' - 0"	1	3	Wood	
103	3' - 0"	7' - 0"	(none)	3	Wood	
104A	3' - 0"	7' - 0"	(none)	3	Wood	
104B	3' - 0"	7' - 0"	(none)	3	Wood	
105A	3' - 0"	7' - 0"	(none)	3	Wood	
105B	3' - 0"	7' - 0"	(none)	3	Wood	
106A	3' - 0"	7' - 0"	(none)	3	Wood	
106B	3' - 0"	7' - 0"	(none)	3	Wood	

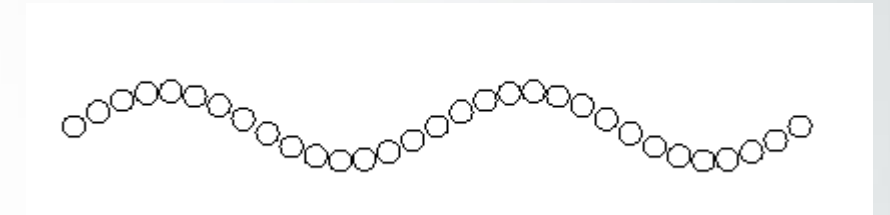
ScheduleToHTML

- Export and display schedule in formatted HTML
- Handle header, body, background color, bold, italic, underline, horizontal alignment, merged cells
- Exercise ViewSchedule, TableData, TableSectionData, TableCellStyle and TableMergedCell classes

Door Schedule						
Door #	Size		Hardware Group	Frame		Comments
	Width	Height		Type	Material	
101A	6' - 8"	7' - 0"	3	1	Alum.	
101B	6' - 8"	7' - 0"	3	1	Alum.	
101C	6' - 8"	7' - 0"	3	1	Alum.	
101D	6' - 8"	7' - 0"	3	1	Alum.	
102	5' - 8"	7' - 0"	1	3	Wood	
103	3' - 0"	7' - 0"	(none)	3	Wood	
104A	3' - 0"	7' - 0"	(none)	3	Wood	
104B	3' - 0"	7' - 0"	(none)	3	Wood	
105A	3' - 0"	7' - 0"	(none)	3	Wood	
105B	3' - 0"	7' - 0"	(none)	3	Wood	
106A	3' - 0"	7' - 0"	(none)	3	Wood	
106B	3' - 0"	7' - 0"	(none)	3	Wood	
108A	3' - 0"	7' - 0"	(none)	3	Wood	
108B	3' - 0"	7' - 0"	(none)	3	Wood	
109	3' - 0"	7' - 0"	(none)	3	Wood	
110	3' - 0"	7' - 0"	(none)	3	Wood	
112	3' - 0"	7' - 0"	(none)	3	Wood	
113	3' - 0"	7' - 0"	(none)	3	Wood	
114	3' - 0"	7' - 0"	(none)	1	Alum.	
115	6' - 0"	7' - 0"	(none)	3	Wood	
116	3' - 0"	7' - 0"	(none)	3	Wood	
117	3' - 0"	7' - 0"	(none)	3	Wood	
119A	3' - 0"	7' - 0"	(none)	2	HM	
120	6' - 0"	7' - 0"	(none)	1	Alum.	
121A	6' - 0"	7' - 0"	(none)	1	Alum.	

SinePlotter

- Sine curve representation
- Array of prism family instances
- Prism family types
 - Cylinder
 - Rectangular
 - Regular Polygon
 - Isotriangle
- Modifiable settings
 1. Curve Period: 0.1 to 3.0
 2. Curve Cycles: > 0.0
 3. Curve Amplitude: -4.0 to 4.0
 4. Number of partitions: > 0.0

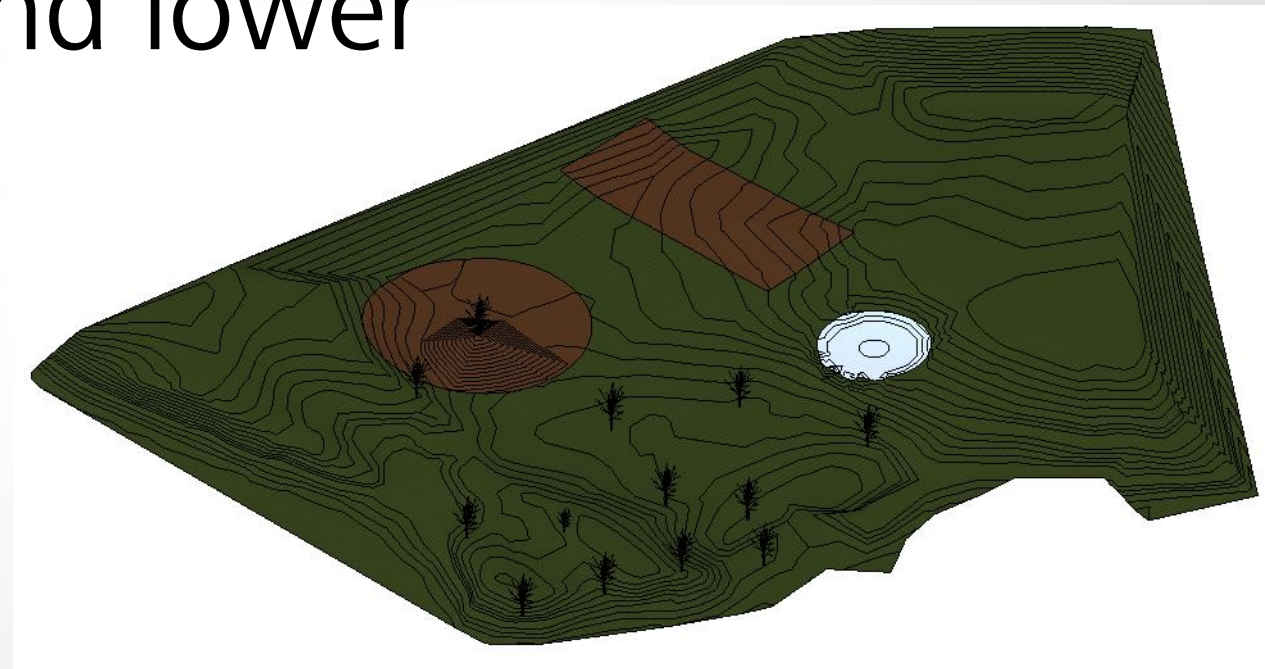


curve period:	0.2	number of partitions:	3	cylinder prism	 run
curve cycles:	10				
curve amplitude:	3				
ArrayPrismsOnASineCurve					

Note: Hit "Enter" key for the text box edits to be accepted

Site

- Edit topography surface and site sub-region
- Create a circular retaining pond topography family at user specified location
- Move sub-region and points, raise and lower subregion terrain
- Normalize sub-region terrain
- Delete sub-region and its points
- TopographySurface, SiteSubRegion, TopographyEditScope classes



Units

- Demonstrate Units API
- List units in current project
- Display format information
- Modify format options for each unit type

Project Unit

Discipline: Common

GroupBox

Units	Format
Length	376296
Area	115 m²
Volume	34.96 m³
Angle	70735.53°
Number	1234.56789
Sheet Length	376296.2929 mm
Site Angle	70735° 31' 47"
Slope	89.95°
Currency	1234.57
Sheet Length	376296.2929 mm
Mass Density	12500.25 kg/m³

Options

Decimal symbol: Dot Digit grouping amount: Three Digit grouping symbol: Comma

Decimal symbol/digit grouping: 123,456,789.00

OK Cancel

WinderStairs

Additional Highlights

Additional Highlights

- CustomExporter – access graphics rendering pipeline

CustomExporterXml

- Export all accessible rendering pipeline data to XML

CustomExporterCollada

- Export model geometry to Collada – www.collada.org

The End is just the Beginning...

