# Preparing for the New Superelevation Standards in the Connect Edition

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#### A Look Back

GEOPAK - \*.sep

InRoads - \*.sup

#### MX - \*.srl



50 states in the United States = 51 ways of doing super 196 countries in the world = to many ways to count



### **Requirements for NEW Superelevation**

- Include ALL legacy functionality
- Customizable
  - Formulas & Tables
  - Key Stations
  - User Defined Inputs
- Can be modified by the "Average User"
  - Universal Format
  - Editing Tool
  - Customizable without a Developer

LandXML Translator - Enable Cross Section		Apply
Persist Site Modeler Addin		
Use Mesh Algorithm for Cross Section Components		Close
Customer-specific:		
File - Ignore regional settings for decimal separator		Help
Survey - Convert SDMS Notes to Attribute Code		
Survey - Add Prefix to Generated Points		
Survey - Dual Coded Points in Survey Data to Surface		
Survey - Extend Alignment Attributes		
Survey - JPT Parsing Configuration		
Survey - Modifications to Trimble DC Import		
Modeler - 1% Superelevation Points		
Modeler - Constant Grade Change for Outside EOP		
Modeler - Normal Crown to Full Super Reverse Parabolic Transition		
Rail - Remap Turnout Description		
Rail - Display Tumout Branch Radii		
Tumouts - Alternative connecting alignment naming in Create Connection		
Rail - LRM Reporting in Dutch		
Geometry - View Stationing Ticks		
General - Enable Italian localizations	=	
General - Enable UK localizations		
Storm and Sanitary - Ignore Access Hole Plunging Flow Correction Factor		
Cross Section - Enable customized slope		
General - Enable Project Access Control		
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Description		
Changes the way Crown Removed and Reverse Crown Points are calculated w	hen u	ising the table
wizard to rotate about the inside edge such that the outside EOP grade change	is cor	nstant along the

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### Currently

**OpenRoads Designer CONNECT Edition** 

EAP – December 2016

#### **Commercial Release – 2017**



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#### **Superelevation Process**

- 1. Create Superelevation Section
- 2. Create Superelevation Lanes

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- 3. Calculate Superelevation
- 4. Assign to Corridor







### **NEW Technology and Tools**



#### **One Step Superelevation**

- When creating the Superelevation section(s), pick the Corridor instead of the Alignment
  - Creates Superelevation Sections
  - Creates Superelevation Lanes
  - Calculates Superelevation
    - Uses 'default settings'
  - Assigns to Corridor
    - Corridor must be in the same file.





#### **Superelevation Lanes by Template**

Creates lane configurations based on templates

- Uses Superelevation points in template to identify lanes





#### **Pivot Methods**

#### **All** Legacy Pivot Methods now supported

E	Calculate Superelevation -	
Standards File Name	D:\Civil Presentations\2016\Learn Conference\Superelevation\Files from	m Joe∖A …
e Selection	AASHTO 2004 Imperial 4%	<b>v</b>
L Selection	Speed Table	<b>v</b>
Design Speed	15	<b>v</b>
Pivot Method	Crown	•
Open Editor		
	Inside Edge	
	Outside Edge	
	Left Edge	
	Right Edge	
	Divided Inside	
	Center Line	

Sõ



#### Superelevation Calculation Report

		Report Cr	reated: Friday, November 4, 2 Time: 5:18:22 PM	016
	Fi Input G	le Name: rid Factor:	Note: All units in	n this report are in meters unless specified otherwise.
	Section Name:	Lanes by Template-1	XXXXX	X X X X X X X X X
	Base Horizontal Name:			
	Standards Filename:	C:\ProgramData\Bentley\OpenRoads Metric\Standards\Superelevation\Met	Designer CONNECT 10.00.00 ric.xml	\Configuration\WorkSpaces\OpenRoads -
	Design Speed:	120		
	Pivot Method:	Divided Inside		
	E Selection:	10%		
	L Selection:	Speed Table		
	Calculation Units:	meter		
2	Lane Set:			
	Left Offset:	-40.66		
	Right Offset:	-33.34		
	Curve Set: 1	Outside Lane: EOP_RM - CL_L	Start Station: 0+000.000	End Station: 0+000.000
		Global Variables:		
		NRotatedLanes	2.0	
		PivotType	5 (Divided Inside)	
		WidthLane	3.657607319	
		InitialCrossSlope	-0.0199999998961069	
		UseSpiralLength	false	
		PercentOnTangent	0.7	
		LengthsAreTotalTransition	false	
		UseRunoutLength	false	

Superelevation Calculation Report

### **Superelevation Model**

- Super Diagram in a managed model (*e.g. profiles, cross sections*)
- Editable
- Rules/Relationships









### **Superelevation Rules File**



#### **Superelevation Rules File**

#### Replaces all former preference files XML Format





### **Superelevation Rules File**

1( 1) 

- Everything is in the XML - No other files required
- Edit through Interface or any XML editor

	Filo	1	Create/	/Edit Superelev	ation Rule File	-	
2 2 [ 3 3 4 5 5 5 [ 3 3 4 7 7 [ 3 3 4 5 5 5 5 7 7 3 3 9 9 0 1 2 2	<pre> </pre> </td <td>General Rate Calculations Transition Calculations Transition Options Custom Key Stations User Variables</td> <td>XML File: Units Length: Meter Default Setting e Selection: L Selection: Pivot Method: Design Speed:</td> <td>itandards in the CO ers v s (optional) 12% Speed Table Crown 40 v</td> <td>NNECT Edition \Metric xml</td> <td>New New New</td> <td></td>	General Rate Calculations Transition Calculations Transition Options Custom Key Stations User Variables	XML File: Units Length: Meter Default Setting e Selection: L Selection: Pivot Method: Design Speed:	itandards in the CO ers v s (optional) 12% Speed Table Crown 40 v	NNECT Edition \Metric xml	New New New	
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#### General

- Units
- Rounding Values
- Default Settings
  - For "One Step" Superelevation

<b>`</b> a	Create/	Edit Superelev	ation Rule File	-	
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	Default Settings e Selection: L Selection: Pivot Method: Design Speed:	s (optional) 12% Speed Table Crown 40 V File		Save	✓ ✓ ✓

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<<Units length="meter" stationRoundingValue="1" crossSlopeRoundingValue="0.01" />

<DefaultSettings eSelection="12%" ISelection="Speed Table" designSpeed="40" pivotMethod="Crown" />

### **Rate Calculations**

#### Create Rate Tables

- Create Manually
- Import from SUP or SEP

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	Display XML File	•	<pre></pre>
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### **Rate Calculations**

#### Create Rate Tables

- Create Manually
- Import from SUP or SEP

#### Create Rate Equations

	<b>a</b>	Create/Edit Su	perelevation Rule F	ile -	. 🗆 🗙	
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<	Variable name="Mag	ERate" equation=	"0.08"/>			
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<	Variable name="Mix	Radius" descript	ion="Minimum rad	ius" equation=	"Speed*Spee	d/(15*(MaxERate+frict
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	Variable name="mid	Speed equation-	20.0 / 20.0			
	Variable name-"mic	speed equation-				
<	variable name="nig	inspeed equation	-~80.0~/> 			
<	Variable name="s1"	equation="(HPI	* rP1) / 5729.58	"/>		
<	Variable name="s2"	'equation="(fric	tionFactor - hPI	) / (5729.58*)	((1/MinRadiu	s) - (1/rPI)))"/>
<	Variable name="rPl	[" equation="(run	ningSpeed * runn	ingSpeed) / ((	).15 * (100	* MaxERate) "/>
<	Variable name="hPl	[" equation="((Ma:	xERate * Speed *	Speed) / (rur	nningSpeed *	runningSpeed)) - Max
<	Variable <mark>name="M</mark> O'	' equation="(5729	.58/rPI)* ((1/Mi	nRadius) - (1/	/rPI)) * ((s	2 - s1)/2) * MinRadiu
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<TableEntry inputValue="45" outputValue="5930"/>

### **Transition Calculations**

#### **Create Transition Tables**

- Create Manually
- Import from SUP or SEP

**Create Transition Equations** 

	<b>b</b>	Create/Ed	it Superelevation Rule F	ile – 🗆 🗙
	General Rate Calculations Transition Calculations Transition Options Custom Key Stations User Variables	Create Transition File(s) Location:	Tables I From SUP Files Note: This will change the Rate Equation AASHTO	From SEP File  Tables SUP File Directory  Edit Delete
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### **Transition Options**

<b>*</b>	Create/Edit Superelevati	ion Rule File 🛛 🗕 🗖 🗙
General Rate Calculations Transition Calculations Transition Options Custom Key Stations User Variables	Runout Options         Fixed Length       Length:         Reverse Curve Adjustments         Adjustment       Minimum Transition Gap         Planar Transition         Shorten Transition         Slide Transition         Custom         CustomOptions:	Curve Curve Adjustments         Adjustment       Minimum Transition Gap         Planar Transition         Reverse Crown Transition         Shorten Transitions         Slide Transitions         Custom         CustomOptions:
	Transition Type:       Parabol         Non-Linear Curve Length:	ic  Percent on Tangent: ane Save Cancel

Misc Options		
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Non-Linear Curve Length:	Parabolic	
Non-Linear Guive Length.	Length: Parabolic  Length: Linear Igth Reverse Parabolic Linear Internation Reverse Cubic Reverse Parabolic Nonsymmetrical 1 Reverse Parabolic Nonsymmetrical 2 Reverse Parabolic Symmetrical 2 Reverse Parabolic Symmetrical 2 Reverse Parabolic Symmetrical 2 Reverse Parabolic Symmetrical 3	
Use Spiral Length	Reverse Parabolic	- 1
Se Spiral Length	Reverse Biquadratic	- 1
Rotate Inside Lane with Outside	Reverse Cubic	- 1
	Reverse Parabolic Nonsymmetrical 1	- 1
Lengths are Total Transition	Reverse Parabolic Nonsymmetrical 2	- 1
Interpolate Tables	Reverse Parabolic Symmetrical	_

<<TransitionOptions interpolateTables="false" percentTransitionOnTangent="0.7" useSpiralLength="false" lengthsAreTotalTransition="false" transitionType=
"Linear" nonLinearCurveLength="0" startInsideLaneRotationWithOutside="false" />

<<RunoutOptions isFixedLength="false" length="" />



### **Custom Key Stations**

#### **Default Cross Slopes**

- Normal Crown (e.g. 2%)
- Flat (0%)

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- Reverse Crown (e.g. 2%)
- Full super (e.g. 6%).

#### **Custom Key Stations**

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- Any cross slope
- For example, at 1%

	Create,	/Edit Superelevation Rule File	- 🗆 ×
General Rate Calculations Transition Calculations Transition Options Custom Key Stations User Variables	Create Custo Description: Criteria: Variable(s): CKStations(s):	om Key Station Equation(s) Edit Custom Key Station Variable New Edit Delete	Variables and Operators
	Equation: Type: Description:	Normal Crown	✓ Save Cancel

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\*\* Note: These can also be used in customized formulas

### **Custom Key Stations**



#### <CustomKeyStations description="MTO customizations">

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#### </CustomKeyStations>

#### **User Variables**

## Prompt the User for some value(s) before calculating theSuperelevation?Image: Superelevation Rule File

- String
- Integer
- Decimal
- Boolian

<b>a</b>	Create/Edit S	Superelevation Rule	File -	□ ×
General Rate Calculations Transition Calculations Transition Options Custom Key Stations User Variables	Create / Edit User Vari Name: Description: Type: Default Value: Selection Options: Import CSV Add Clear User Variables:	iable  String		Vew Delete Clear
	Variable	Туре	Description	Cancel

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Have a great conference!



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