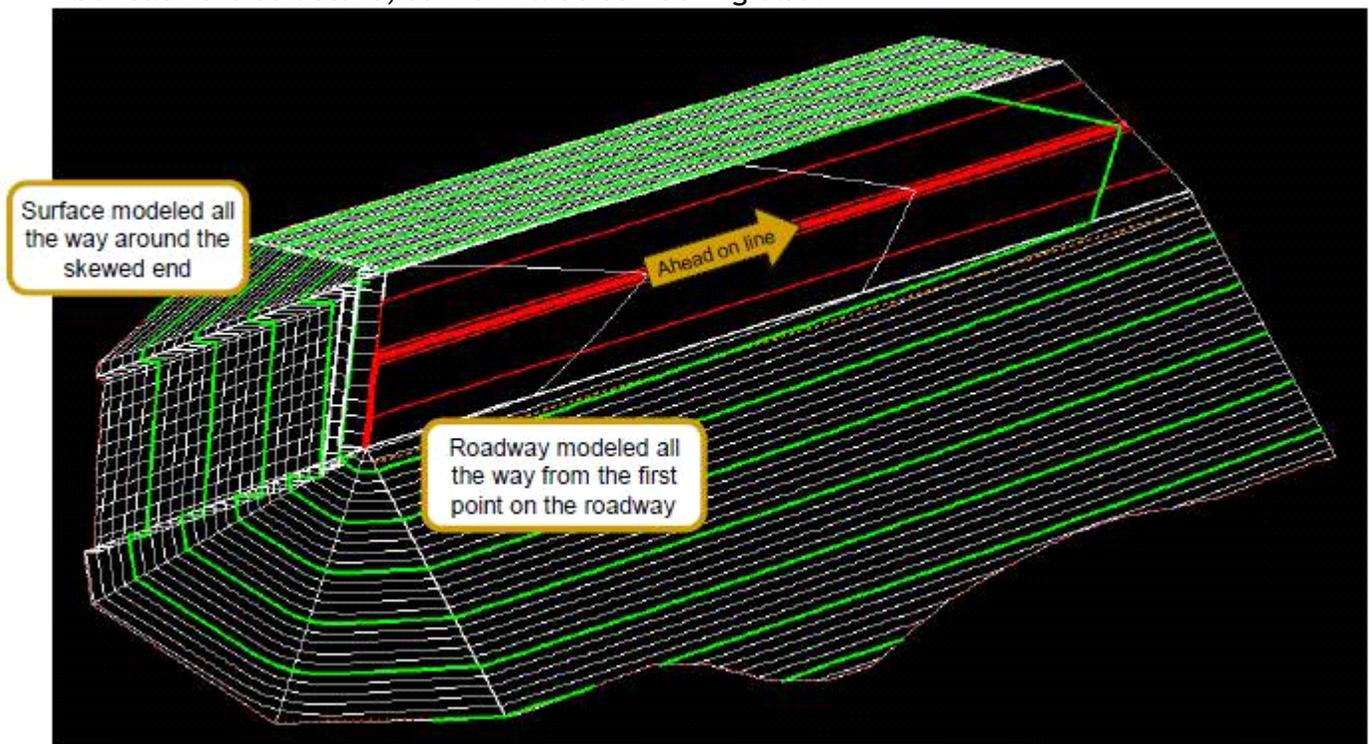


2/3/2016 - Ideas for Skewed Bridge Ends

Wouldn't it be nice if all of our bridges met the roadway at nice right angles and on a horizontal tangent? Lennie Torgerson will present a sample project that has the roadway ending (or beginning) at a bridge bent that is not perpendicular to the roadway alignment. Issues that we will overcome are:

1. the requirement for the impact panel (roadbed) to widen from a point on one side instead of simply appearing full width, and
2. we cannot model perpendicular to the roadway alignment for the fill slope beneath the structure, so we will do something else!



This session may be beneficial to roadway designers who would like more information about template constraints that do not use the CL as the uber-parent and parametric constraints with labels.

Session Script:

Open 2016.dgn, load Skew.alg (J active alignment and Bent), 13957le.dtm, Skew.itl, Skew.ird
Will create corridor named Demo using J alignment, Station limits 1932+48.044 to 1934+25.000
Use Templates - EP_R Control; J_CL_nul_ValEqn, Bent, and Bent1 from Templates folder, and Mixed Bag in Sample Templates folder
Can import Parametric Constraints from demo_PC.txt
Panel.dtm was created during session of Roadway on skew
Under_Trans.dtm was created during session of area beneath the bridge

In Alignment model - explain givens: alignment, the typical roadway: 4' median, 14' lanes, 8' paved shoulder, standard aggregate shoulder wedge and fill.

It will be critical to know the stations at which the roadway components begin and finish forming (I will use this for parametric constraints) - used InRoads Tracking in Alignments model to annotate intersection of lane lines with Bent. - View 2, Alignment Views in 2016.dgn - this view has a 180° rotation so that ahead on line is up the screen and left is my left.

Explain: Co-parent of the J_CL_nul_ValEqn template is the right EP - the entire roadway grows away

from the right EP. Parent is CL_null (unconstrained) placed at 0,0 in the template - 0,0 is what follows the HZ and VT alignment.

The point CL is just another constrained point (yes at 0,0) that will follow the co-parent EP_R.

Open Template Editor

Use **Mixed Bag** - to explain the parent point concept.

In a normal template, the CL at 0,0 is the parent point that everything in the template is constrained to - use Move Point on CL to illustrate.

Use **EP_R Control** there are two parents - CL_null at 0,0 - yes, but a every other point is tied to the EP_R point. - use Test Point Controls>Vertical - EP_R is considered a co-parent.

In the final template for this skewed impact panel, we need the lanes and the median to hold off forming until a certain **station** - which means the CL (feature that is created) will not be at the centerline location for its entire life - so CL cannot be the parent. The parent must be the first point on the hard surface backbone that is created. That point in this situation is EP_R.

Use **J CL nul** show that points are constrained to follow the point next to them - all coming from EP_R Note CL (red) and CL_nul (green). CL_nul is the parent, EP_R is the co-parent, but CL is just another point with constraints and a label that will allow us to grow the median in the modeler!

Look at constraints and Labels on CL MedianWidth_Rt (FROMRT) means it is hz constrained to the point to its right - Med_R - look at a couple other point constraints.

We can grow the components using parametric constraints - but this template will require super controls on multiple points! Test Point Controls on TL_L or TL_R

Use **J CL nul ValEqn** show that points are constrained to follow point next to it for HZ dist, but follows slope of only one point on each side. Use Test Point Controls>Vertical on Med_L and EP_R to point out that those points will control the super for each side.

Edit EP_R - to show label for HZ control from CL_null - the slope value can be overwritten by any superelevation control.

Edit Med_R - to show Value Equation pointing to slope between CL_null and EP_R - whatever that slope winds up being - match it.

Edit Med_L to show a regular slope value that can be overwritten by a super control.

Edit EP_L to show Value Equation pointing to slope between CL_null and Med_L - whatever that slope winds up being - match it.

Open the Roadway Designer - create a new corridor - named Demo, using J alignment, Station limits 1932+48.044 to 1934+25.000

Add template - J_CL_nul_ValEqn, interval 1' to see the components grow

Create a NC **super control line**; copy it mirroring values for superleft use Point Controls and apply to EP_R referencing CL_null. This will create a shed roof panel, supered to the left 2%

Begin with **Corridor>End Condition Exception** - so I don't have a fill on the left until I am at full width - this station is 1932+78.783

Tools>Parametric constraints

Use Alignment Views, View 2 that shows the label names with Sta. Off and Labels

All values will be NEGATIVE - widening to the LEFT

Note that the template uses a 6' shoulder and I want an 8 foot shldr.

Lane component was only 12' wide - I want 14, median is 8, and I want 2

I entered a few parametric constraints, then deleted them all and imported demo_PC.txt

Create skewed roadway surface named Panel.

Use **Surface>Update 3D/Surface Display** to display the contours of the Panel surface in the Default model. Also choose a feature filter of TRIANGULATED FEATURES, turn on the lock, then select all

features in the list to display the features - deselect the Exterior Boundary.

UNDER BRIDGE:

Explain Bent alignment is U-shaped to go around the corner - starts on West side, goes north 0.1 feet to the roadside edge of the bent, follows the Bent to the East edge, then goes South for 0.1 feet
Left-side templates will be used: Bent1 = fill slope to tie into roadside; Bent = benches to create a couple of benches and maybe a slope paving area. (don't look at this at all for bridge design - it is just an exercise)

In the Roadway Designer use the corridor named Bent

Note in the Corridor definition - PI Rounding Tangent = 0.050 specifies the tangent length used to round PIs for processing when there is no curve defined

Note in the Bent template (in the IRD) and the first bench is not constructed. It will still create a feature on the top of the panel at the front (Back) edge of the bent, but I am not going to deal with that in this session - something you could deal with in a real situation.

Create the surface named Under_Trans from the Bent corridor - CHECK USE TRANSVERSE FEATURES!

Add the display of contours from Under_Trans in the Default model using **Surface>Update 3D/Surface Display**.