



5 Tools and Tricks I Learned from Teaching AutoCAD Civil 3D to Caltrans Employees

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@BeGeez



Key learning objectives

At the end of this class, you will be able to:

- Learn the hidden tips and tricks embedded in surface DTM routines
- Discover tips and tricks to implement data shortcuts for your organization
- Learn profile creation commands that you might not know
- Learn hidden alignment commands

Class summary

- Caltrans implementation
- Two tiered Data Shortcuts
- DSSYSVAR
- Resolve Crossing Breaklines
- Floating Curve (From entity, through point, direction at point)
- Solve Tangent Intersection
- Intersection Frequency

Who is Gaurav Bagga

Gaurav Bagga

- Senior Application Specialist Infrastructure
- Works at Ideate, Inc in San Francisco
- Autodesk Certified Implementation Expert and Autodesk Certified Instructor
- Consult/Implement Civil Infrastructure solutions for ENR 500 firms – for the last 15 years.
- Caltrans implementation & training
- @BeGeez

Caltrans Implementation

Caltrans Implementation

Unique:

- Custom Civil 3D Launcher
- Civil 3D with Microstation
- Caltrans standards
- Caltrans training

Custom Civil 3D Launcher

- Caltrans started Civil 3D 2012
- Civil 3D Launcher

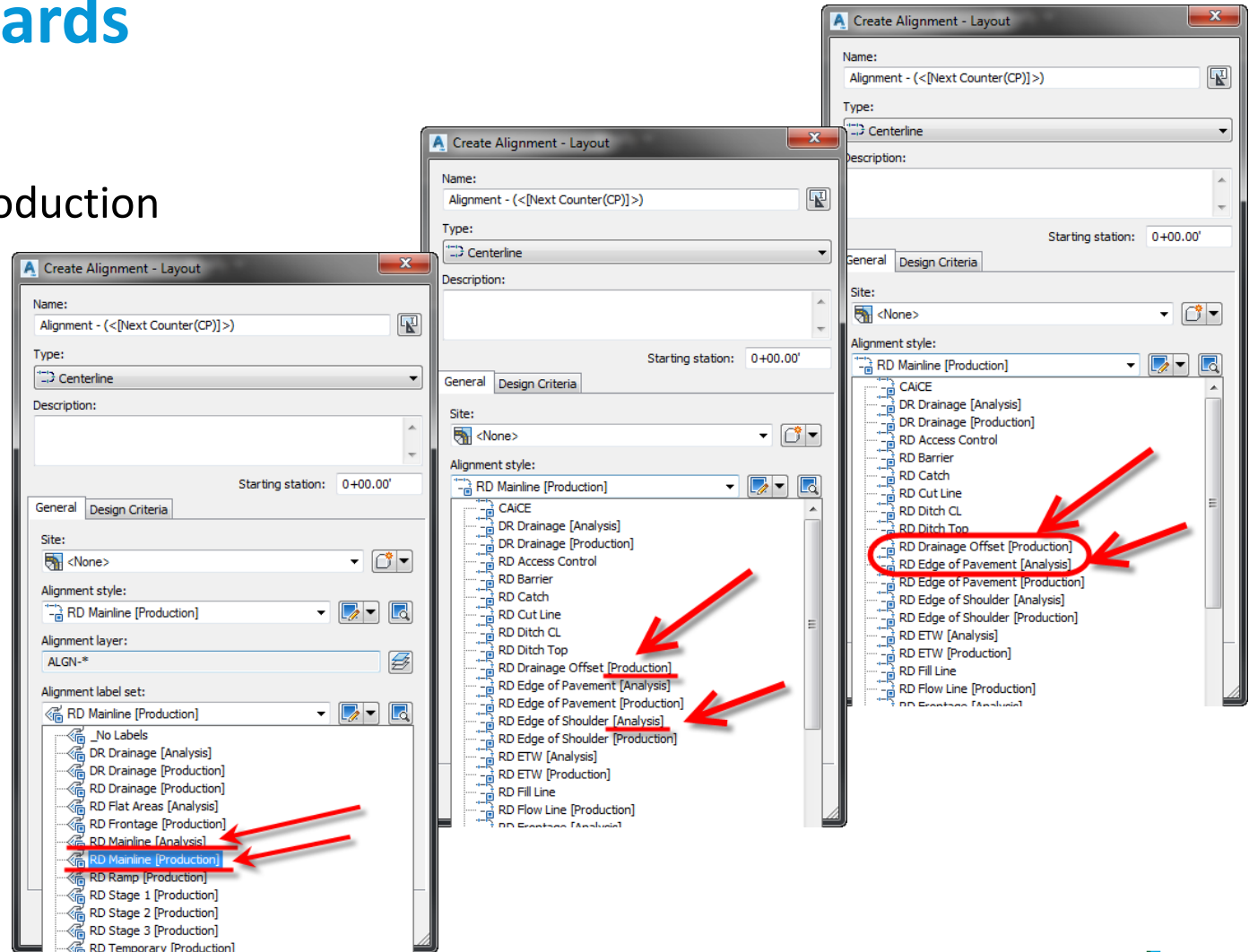


Civil 3D with Microstation

- Design in Civil 3D – replaces CAiCE
- Drafting in Microstation

Caltrans Standards

- Analysis & Production



Caltrans Subassemblies

- Caltrans created new subassemblies
- Resource File packet does not contain custom subassemblies
- You will get errors when you rebuild a Caltrans created corridor object

Caltrans Standards

- http://www.dot.ca.gov/hq/oppd/cad/rsc_files/webpage.php

Scale_of_Cells.pdf	March 2007	Caltrans Base Scale Using Cells	24
Metric_borders_cells.pdf	March 2007	Metric Borders for Consultant Use	13
RWMetric.cel	July 2010	Right of Way Metric Cell Library (V7)	877
Non Geographic Seed files			
mseed.dgn	Sept 2004	2D Metric DGN Seed file (V7)	23
mseedz.dgn	Sept 2004	3D Metric DGN Seed file (V7)	25
Geographic Seed files (California Coordinate System - Metric)			
Metric_Seed_Files.exe	Nov 2006	18 Metric Seed files, zipped (V7)	944

Support Files for Structures Projects (English)			
File Name	Release Date	Description	Size (KB)
Structures_English_Cell.zip	July 2009	Structures English Cell Library (V7)	238
stbr001.dgn	June 2009	Structures English Borders and Seed Files for Consultants (V7)	711

Support Files for Structures Projects (Metric)			
File Name	Release Date	Description	Size (KB)
stcelm.cel	March 2008	Structures Metric Cell Library	552
Currently not available	August 2005	Structures Metric Borders and Seed Files for Consultants	850

Caltrans Customized Resource Files for Civil 3D

Customization Files for Roadway Projects(English)			
File Name	Release Date	Description	Size (KB)
Caltrans_C3D_resourcefiles.zip	June 2016	Various resource files including but not limited to Color books, fonts, templates, etc.	18,017

Caltrans Customized Resource Files for CAiCE Visual Transportation

TABLES, MACROS, VBA LIBRARIES (English and Metric)			
File Name	Release Date	Description	Size (KB)
Calfrags.zip	June 2011	Fragment resource and descriptions folder	6,421
Cavbalib.zip	June 2011	Visual Basic Applications, macro library folder	28,555
Ftb.zip	June 2011	Element feature and annotation databases folder	1,549
IniFiles.zip	June 2011	Project, workspace, and plot initialization files	95
Super Elevation.zip	June 2011	Cross Slope and Runoff tables folder	40
Table.zip	June 2011	Design, CAD, and other miscellaneous files	11
SlopeStake.zip	June 2009	Caltrans' slope stake macro and files	1,019
VTUSER.exe	June 2011	All resource files	41,965
Microserver_files.zip	June 2011	Caltrans' customization of CAiCE's data exchange with MicroStation	1,745

Caltrans Customized Resource Files for GIS

IDF2000 GIS Application (Metric)

Data shortcuts – Tips & tricks

Data Shortcut Workflow Recap

In the Source drawing

1. Set Working Folder – Tell Civil 3D where are Projects
2. Set Data Shortcuts Shortcut Project folder – Tell Civil 3D which Project
3. Create Data Shortcuts

In the Target drawing

4. Create Reference

Two Tiered

- Lower Tier for intra departmental collaboration
- Upper tier for final deliverable

Project

20161006

_Shortcuts

Design

Hydraulics

Structures

Surveys

C3D_20161006

_Shortcuts

_Survey_Database

Deliverables

Field_Surveys

RW

Structures_PI

DSSysVar

Very Important:

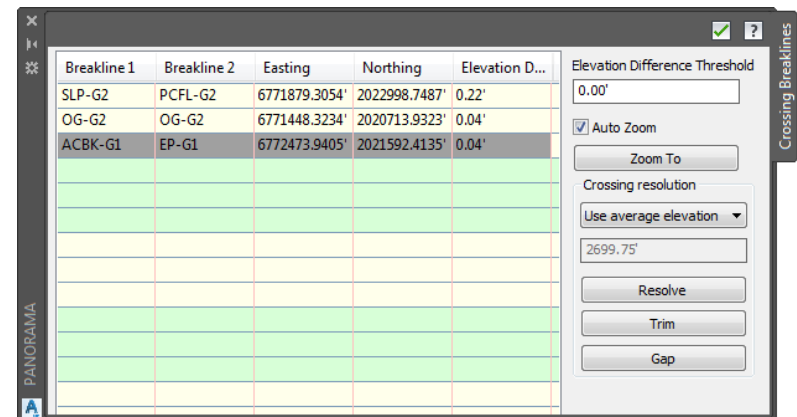
- Makes Path relative

```
<!-- PLEASE DO NOT EDIT THIS FILE! -->
<ProjectInfo>
  <ProjectDesc/>
  <Shortcuts>
    <Shortcut name="C:\Civil 3D Projects\20161007\Design\Base.dwg:Existing Ramp">
      <DwgRelPath path=". \20161007\Design\Base.dwg"/>
      <Criteria>
        <File name="%DSSysVar%\20161007\Design\Base.dwg"/>
        <ObjectTypeInfo description="" type="AeccDbAlignment" useType="-1" name="Existing Ramp" useName="-1" version="0" useVersion="0"
          handleLow="66060" handleHigh="0" useHandle="-1" parentHandleHigh="0" parentHandleLow="0" parentAlignmentShortcutName=""
          lastValidateResult="-1" visible="-1"/>
        <DisplayProperties layer="ALGN" useLayer="0" color="1" useColor="0" lineType="ByLayer" useLineType="0" lineWeight="-1" useLineWeight="0"/>
      </Criteria>
    </Shortcut>
  </Shortcuts>
  <Dependencies/>
</ProjectInfo>
```

Surfaces – Tips & tricks

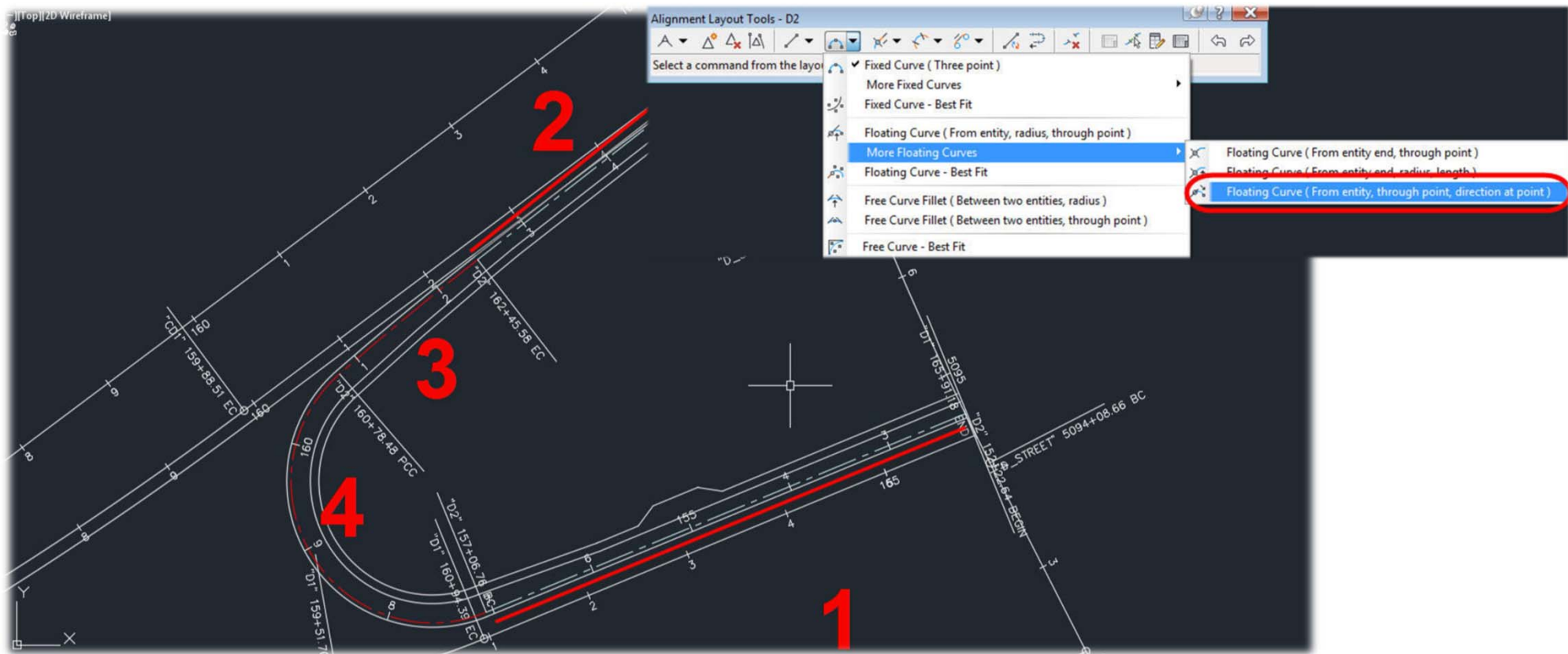
Resolve Crossing Breaklines

- Data from **Database** is displayed in **Drawing**
- **Fix database via drawing**
- Survey Points make Survey figures
- Survey figures live in Survey database
- Civil 3D Surface is created from **feature lines** in the **drawing**
- This tool updates the **drawing not database**



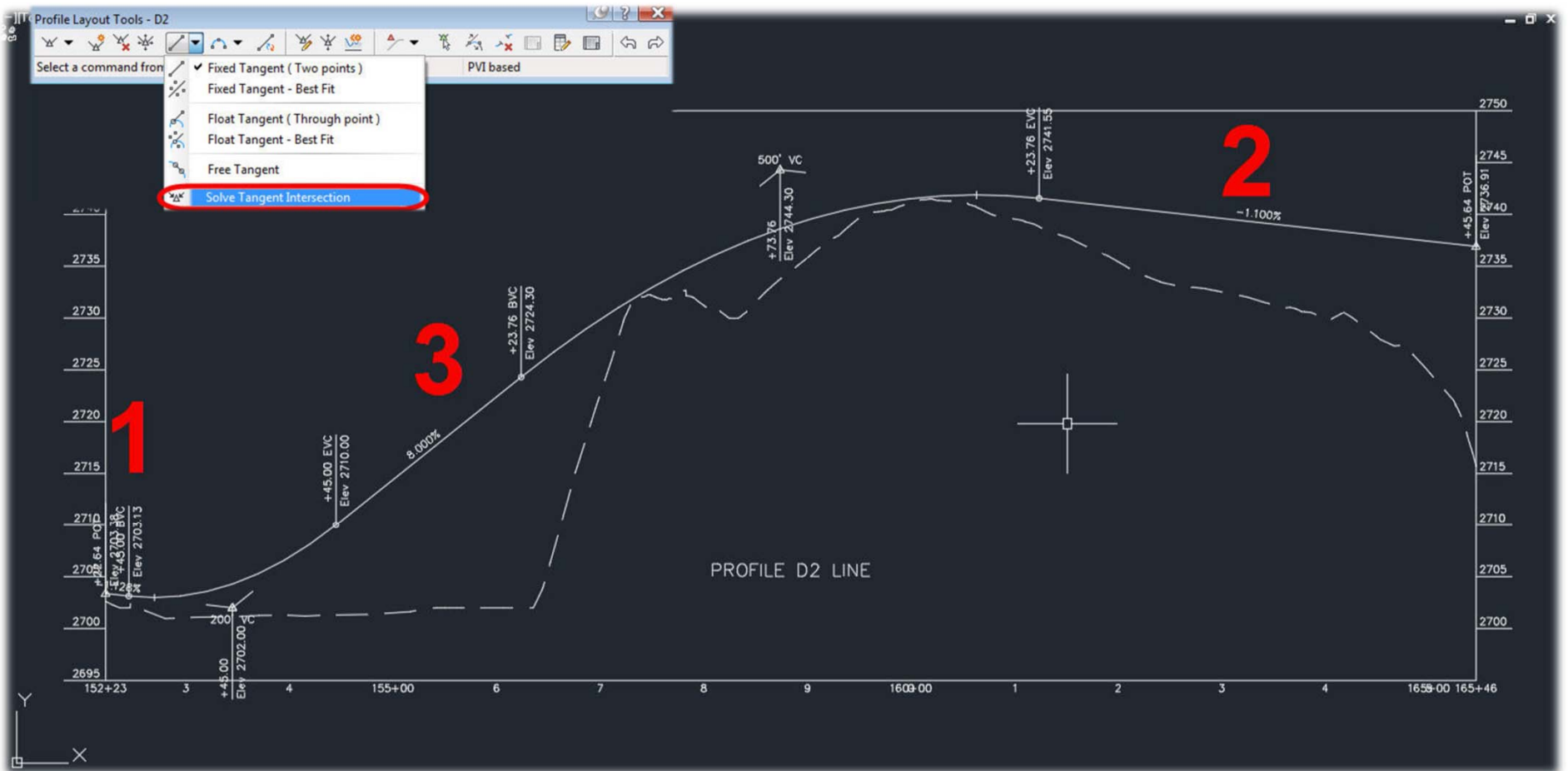
Alignments – Tips and tricks

Floating Curve (From entity, through point, direction at point)



Profiles – Tips & tricks

Solve Tangent Intersection



Intersection – Tips & tricks

Frequency

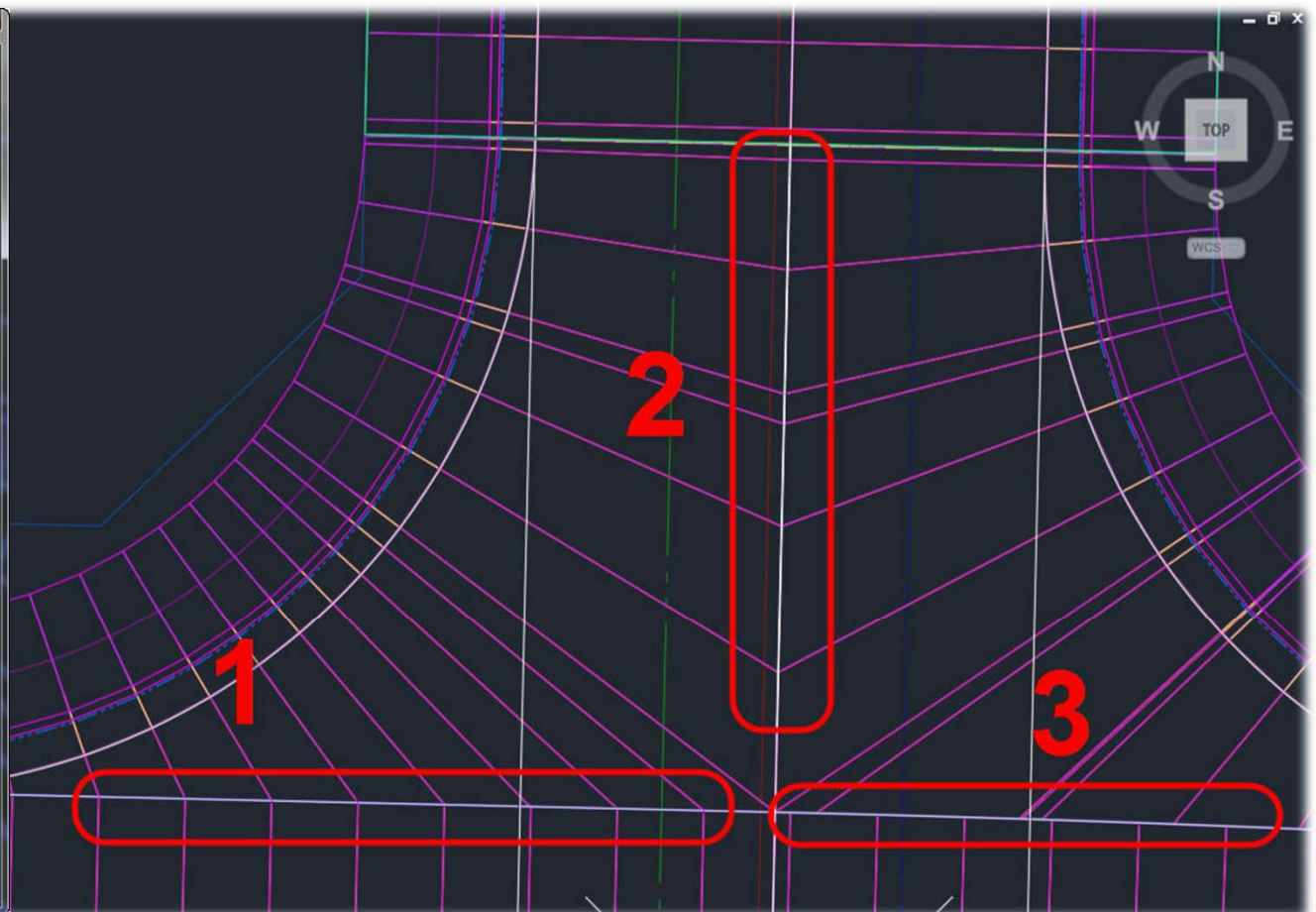
Frequency to Apply Assemblies

Property	Value
Corridor Information	
Horizontal Baseline	
Along tangents	1000.000'
Along curves	At an increment
Curve increment	1000.000'
Mid-ordinate distance to define curve...	0.100'
Along spirals	5.000'
At horizontal geometry points	No
At superelevation critical points	No
Vertical Baseline	
Along vertical curves	1000.000'
At vertical geometry points	No
At high/low points	No
Offset Target	
At offset target geometry points	No
Adjacent to offset target start/end	No
Along offset target curves	<None>
Curve increment	25.000'
Mid-ordinate distance to define curve...	0.100'

Station Description

0+40.10'	
0+45.04'	
0+49.14'	At Intersection Point
0+50.63'	
0+52.66'	
0+55.00'	
0+57.60'	
0+60.58'	
0+63.97'	
0+67.76'	
0+71.98'	
0+76.55'	
0+81.40'	

OK Cancel Help



Miscellaneous – Tips & tricks

Bonus Tips

- For material QTO divide the corridor at some logical point – Match line
- Merging – pasting 2 surfaces
- Export to DGN command – Output > Export – Civil 3D Drawing
- Coordinate Geometry Editor – Analyze > Ground Data > Survey

Review

- Caltrans implementation
- Two tiered Data Shortcuts
- DSSYSVAR
- Resolve Crossing Breaklines
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