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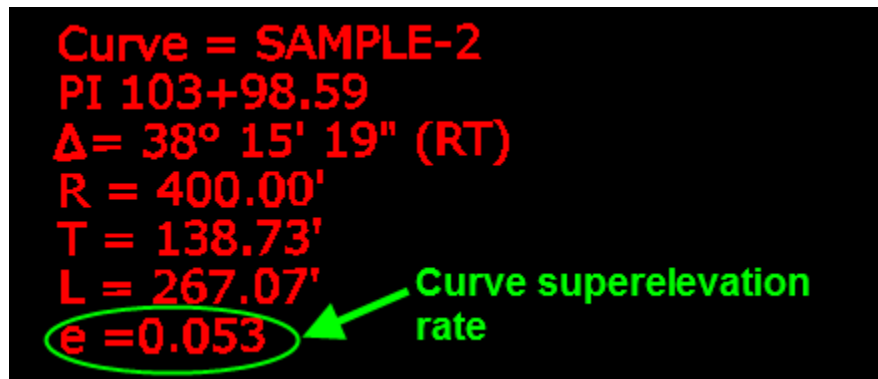
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## CRAM 31: Labeling Superelevation Rates on Horizontal Curves

### Summary and Overview

#### Introduction

This is a guideline for procedures to place superelevation rates on an alignment's curve labels in a more automated fashion. This can be done since the FLH database files (.ddb) have been set up to allow an "e" value. This suggested process is not fully automated, however for specific projects; it could be a time saver. The previous and common method was to place this information by "hand edits".



#### Primary Work Flow

The more automated way of placing superelevation data can be broken down into a few basic steps. These are bulleted below:

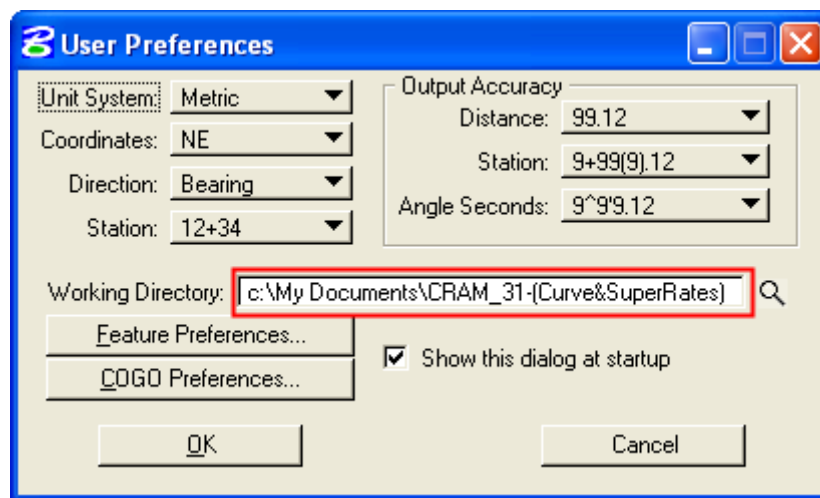
- Create a horizontal alignment or "Geopak chain".
- Create a Superelevation input file. (This can be from the Geopak Automated Shape Generator, or one that is typed in manually.)
- Store the super rates into Coordinate Geometry or "COGO" (There are two methods for doing this)
  - Method 1: Create a COGO input file to load all curves/super-rates at once.
  - Method 2: Use the COGO key-in and manually load/read the curves/super-rates.
- Draw the alignment and curve information w/super-rates using the Design and Computation Manager (D&C).

## Example 1: Labeling Superelevation Rates using a COGO input file

**Description:** This example will demonstrate the process for labeling superelevation rates on curve labels using a COGO input file (Method 1 as mentioned above).

### **Preliminary Steps**

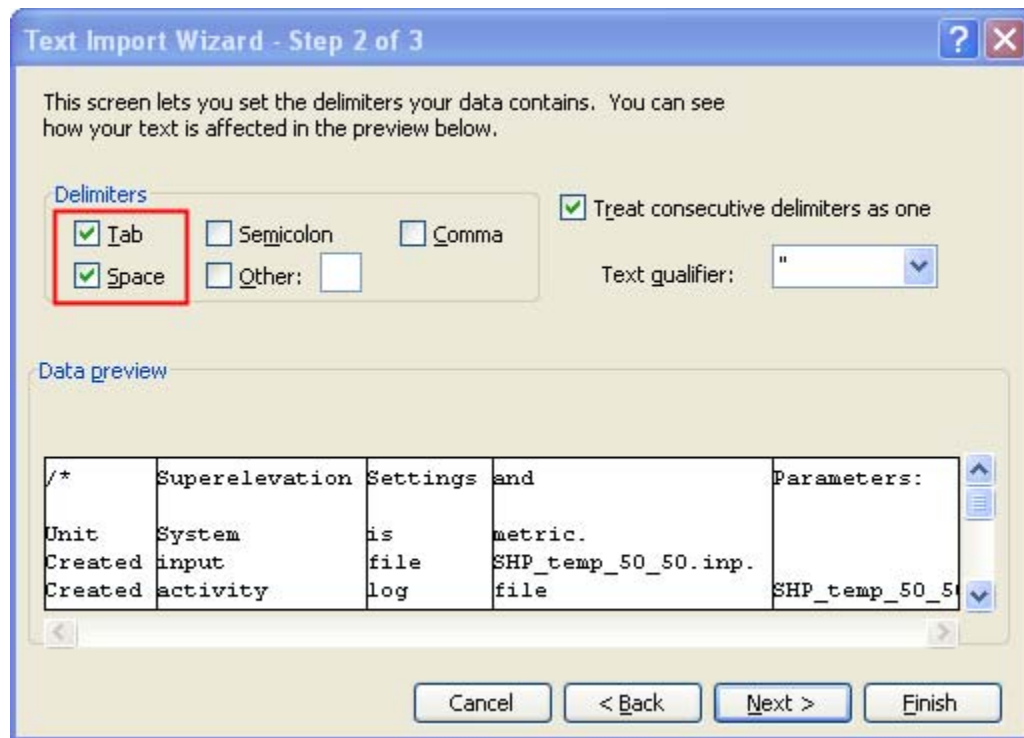
1. **Download** from the cflhd.gov website, or **Copy** directory K:\CADD Coordinator\4A\_Training & Presentations\CRAM Sessions\CRAM\_31 to the local C:\My Documents\ directory.
2. **Open MicroStation** in the **X30\_Metric** workspace. **Open** MicroStation File C:\My Documents\CRAM\_31-(Curve&SuperRates)\ **ALI(Hyampom)\_01.dgn**
3. **Set the Working Directory** to the C:\My Documents\ CRAM\_31-(Curve&SuperRates)\ directory through the **User Preferences**.



**Note:** This example assumes that a Geopak chain and superelevation input file is already completed and will not cover those steps.

## Exercise Steps

1. **Create a curve/superelevation rate COGO input file:** This step will illustrate or guide the end user on how to best create a COGO input file.
  - 1.1. **Open the Superelevation Input file** using the Microsoft Excel (**editing can be done in UltraEdit.exe application or other text editor, but Excel is the best**). Use the Text Import Wizard to load the shape file with the following settings and to be in column format.



- 1.2. **Save the file as CSRhyamXXX.iYY.** Where “XXX” denotes the .gpk number (in this case 133), and “YY” denotes the operator code (in this case DR). So, the file name would be **CSRhyam133.idr**. **This format must be followed for COGO to recognize the file for loading/reading.**
- 1.3. **Edit the COGO input file:** COGO can read the super elevation rates and store them to specific curves with the following command key-in: **S CUR “CURVE NAME” S “SUPER RATE”**. For Example with a curve named main-1, with a super elevation rate of 4.5%; the command key-in would be **s cur main-1 s .045**. (short for “store curve = value, super-rate = value)

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**1.3.1. Remove/delete** information that is not needed. The only information that is needed from the superelevation input file is one half (left or right side) of the station ranges with superelevation rates at curve locations. (See figure below).

	A	B	C	D	E	F	G	H	I
1		16+450.00	-3.4						
2		16+460.00	-2 /*		added	by	Mike	Daigler	*/
3		16+473.11	-2						
4		16+498.66	5.2 /*		Curve	HYAM-1	*/		
5		16+516.59	5.2 /*		Curve	HYAM-1	*/		
6		16+555.62	-5.8 /*		Curve	HYAM-2	*/		
7		16+558.54	-5.8 /*		Curve	HYAM-2	*/		
8		16+618.43	5.8 /*		Curve	HYAM-4	*/		
9		16+626.68	5.8 /*		Curve	HYAM-4	*/		
10		16+664.15	-4 /*		Curve	HYAM-5	*/		
11		16+665.79	-4 /*		Curve	HYAM-5	*/		

**1.3.2. Remove/delete** rows with station ranges that are on tangents. It is not necessary, but the user may want to remove one row for each curve (there are two rows per curve, one at each Full Super Station) as shown below. (This can be a tedious step for long & winding roads)

	A	B	C	D	E	F	G
1		16+498.66	5.2 /*		Curve	HYAM-1	*/
2		<del>16+516.59</del>	<del>5.2 /*</del>		<del>Curve</del>	<del>HYAM-1</del>	<del>*/</del>
3		16+555.62	-5.8 /*		Curve	HYAM-2	*/
4		<del>16+558.54</del>	<del>5.8 /*</del>		<del>Curve</del>	<del>HYAM-2</del>	<del>*/</del>
5		16+618.43	5.8 /*		Curve	HYAM-4	*/
6		<del>16+626.68</del>	<del>5.8 /*</del>		<del>Curve</del>	<del>HYAM-4</del>	<del>*/</del>

**It is optional to delete extra rows per curve.**

**1.3.3. Edit the columns:** Remove the column with station ranges, and cut and paste the super rates so the column is after the curve labels.

	A	B	C	D	E	F
1	s	Curve	HYAM-1	s	5.2	
2	s	Curve	HYAM-1	s	5.2	
3	s	Curve	HYAM-2	s	-5.8	
4	s	Curve	HYAM-2	s	-5.8	
5	s	Curve	HYAM-4	s	5.8	
6	s	Curve	HYAM-4	s	5.8	
7	s	Curve	HYAM-5	s	-4	
8	s	Curve	HYAM-5	s	-4	

**1.3.4. Find/replace text strings:** Replace text “/\* Curve” with “s cur”, and replace “\*/” with “s”. Also, the rates need to be in decimal format (not percentage values), and the negative values need to be removed. Replace the “\_” values with “\_”. After this step the file will be ready for input.

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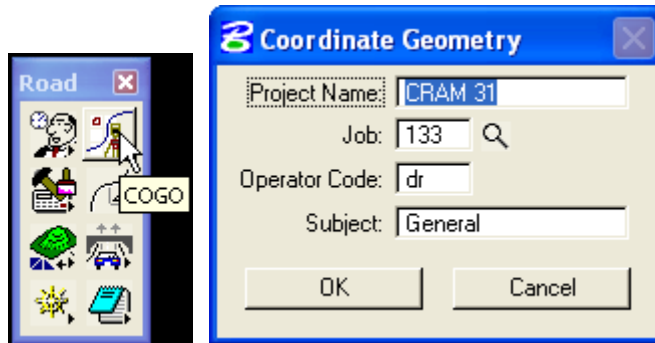
	A	B	C	D	E	F
1	s	Curve	HYAM-1	s	5.2	=E1/100
2	s	Curve	HYAM-1	s	5.2	
3	s	Curve	HYAM-2	s	5.8	
4	s	Curve	HYAM-2	s	5.8	

	A	B	C	D	E
1	s	Curve	HYAM-1	s	0.052
2	s	Curve	HYAM-1	s	0.052
3	s	Curve	HYAM-2	s	0.058
4	s	Curve	HYAM-2	s	0.058
5	s	Curve	HYAM-4	s	0.058
6	s	Curve	HYAM-4	s	0.058
7	s	Curve	HYAM-5	s	0.04
8	s	Curve	HYAM-5	s	0.04

*FILE IN FINAL FORMAT, READY FOR INPUT*

**2. Load and read the input file into COGO:** These steps will read the created input file and store the curve super elevation rates in the Coordinate Geometry (COGO) database file (.gpk).

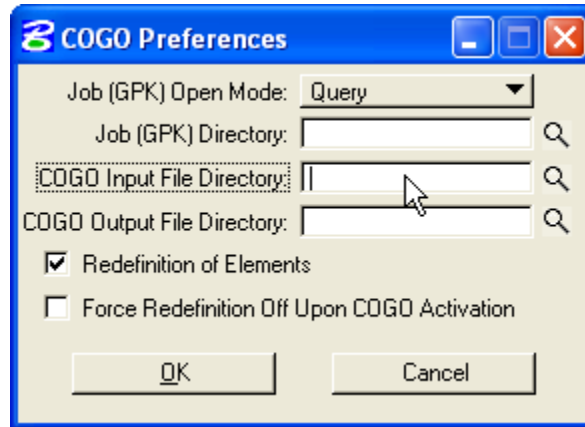
**2.1. Open MicroStation and COGO.** COGO can be loaded by the COGO icon on the Road tools as shown below, or from the MicroStation main menu **Applications>Geopak Road>Geometry>Coordinate Geometry**. *Remember it is important to set the Operator Code with the corresponding input file naming convention.*



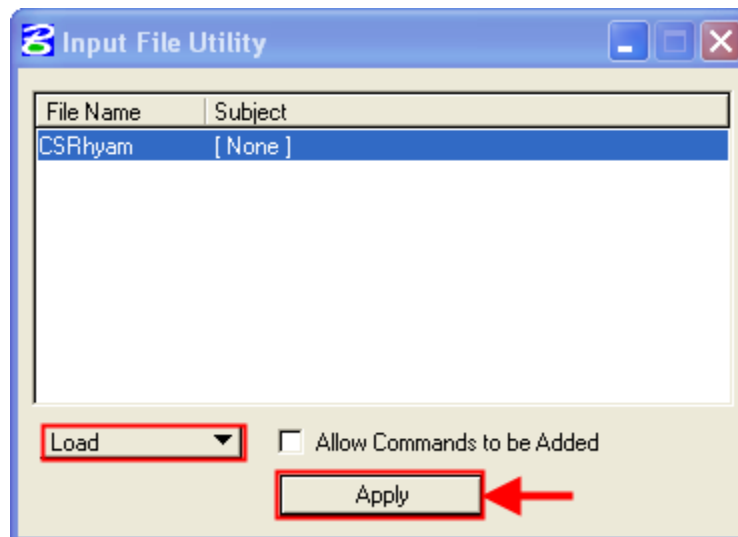
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**2.2. Open the Input File Utility.** This can be done from the COGO dialog by selecting the Input File Utility icon or by **File>Input File Utility**. A list of available input files will appear in the dialog. **Note** that Geopak will look in directory that is specified in the user's or project's GOGO Preferences. If none is selected, Geopak will default to the working directory or opened file directory. See Below.

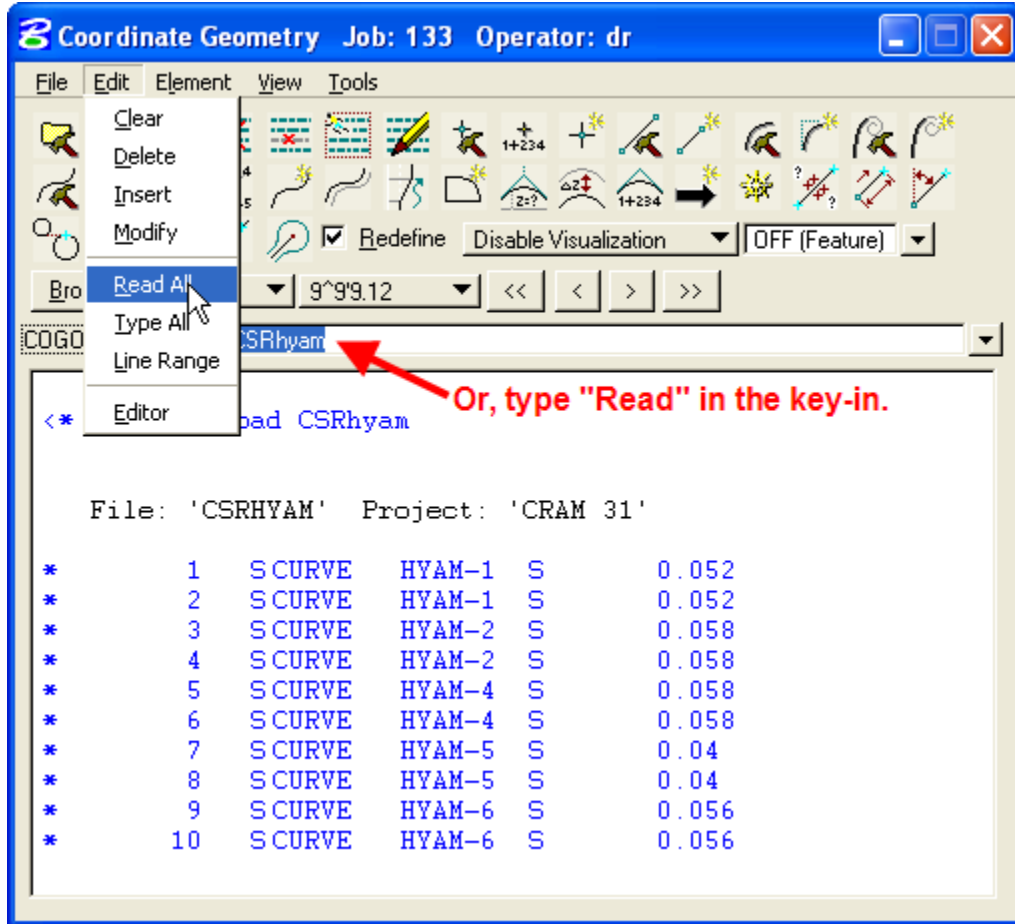


**2.3. Load and Read the input file.** Highlight/select the input file in the dialog window, choose **Load** from the dropdown menu, and then select the **Apply** button. This process loads the input file into COGO. The COGO dialog will now show the loaded file.



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2.3.1. In the COGO dialog Key-in, type **READ**. Or, select **Edit>Read All**.





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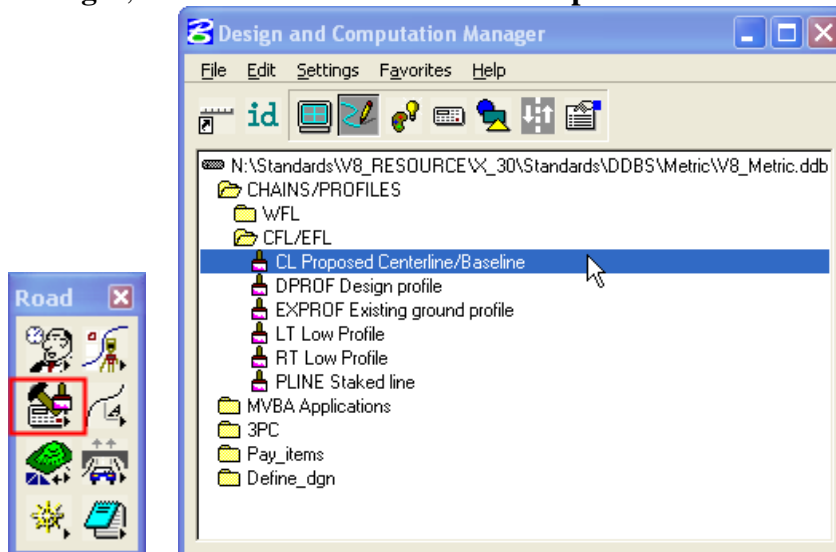
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**2.3.2. Verify and/or Correct** the input and values in the COGO navigator. It is possible to review and edit the information in COGO from the navigator. Open the navigator and choose the element type Curve. All curves and their features will be displayed. If a project has large radius or reverse crown supers, it is possible to add the information in at this point.

Name	P.C. Station	P.T. Station	P.I. Station	Tangent	Length	Radius	Delta	Degree of Curve
HYAM-1	164+89.44	165+25.82	165+08.99	19.56	36.38	40.00	52° 6' 46.88"...	143° 14' 22.02' 0.05
HYAM-10	168+99.28	169+53.54	169+26.45	27.17	54.26	421.00	7° 23' 3.07" ...	13° 36' 34.02" -0.02
HYAM-100	224+12.78	224+49.62	224+31.22	18.43	36.84	421.00	5° 0' 48.56" ...	13° 36' 34.02" -0.02
HYAM-101	224+49.62	225+16.85	224+87.95	38.33	67.22	56.00	68° 46' 49.6...	102° 18' 50.01' 0.05
HYAM-102	225+43.37	225+74.49	225+59.12	15.75	31.12	82.00	21° 44' 38.3...	69° 52' 22.45" 0.04
HYAM-103	226+14.83	226+63.37	226+39.83	25.01	48.54	82.00	33° 55' 9.59"...	69° 52' 22.45" 0.02
HYAM-11	169+53.54	169+69.22	169+61.40	7.86	15.68	96.00	9° 21' 39.37"...	59° 40' 59.17" 0.04
HYAM-12	169+87.27	170+07.24	169+97.46	10.20	19.97	40.00	28° 36' 23.9...	143° 14' 22.02' 0.05
HYAM-13	170+24.95	170+50.75	170+38.08	13.13	25.80	56.00	26° 23' 40.3...	102° 18' 50.01' 0.05
HYAM-14	170+67.20	170+88.16	170+77.80	10.60	20.96	56.00	21° 26' 42.9...	102° 18' 50.01' 0.05
HYAM-15	171+04.91	171+36.21	171+20.98	16.07	31.30	56.00	32° 1' 32.70"...	102° 18' 50.01' 0.05
HYAM-16	171+36.21	171+71.45	171+53.84	17.63	35.25	421.00	4° 47' 48.78"...	13° 36' 34.02" -0.02
HYAM-17	171+71.45	172+01.09	171+87.83	16.38	29.64	28.00	60° 38' 51.7...	204° 37' 40.02' 0.06
HYAM-18	172+19.59	172+34.58	172+27.13	7.54	14.99	56.00	15° 20' 19.4...	102° 18' 50.01' 0.05
HYAM-19	172+50.98	172+81.67	172+66.73	15.74	30.69	56.00	31° 23' 58.5...	102° 18' 50.01' 0.05
HYAM-2	165+45.34	165+68.83	165+57.83	12.49	23.50	28.00	48° 5' 4.42" ...	204° 37' 40.02' 0.06

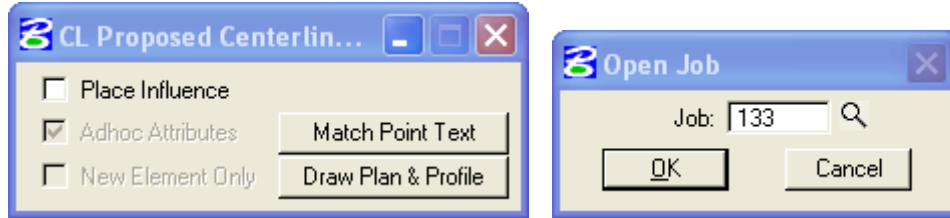
**3. Display the horizontal alignment with the superelevation rates:** This step will draw the alignment and curve information from COGO using the FLH database and the D&C Manager.

**3.1. Open the D&C Manager, and select the CFL/EFL CL Proposed Centerline/Baseline item.**



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3.2. Select **Draw Plan & Profile** and select the correct COGO .gpk file.



3.3. Select the Draw Plan and Profile **options** (Label Scale and Tick options) and place both **Stationing** and **Chains** information by selecting the appropriate Chain (**HYAM**) from the dialog list.

