The CEDRA Corporation's

COMMAND OF THE MONTH

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FEATURED COMMAND

Toe of Slope Lines in Plan View

Application Description

A short while ago we were asked if it was possible to create toe of slope lines in plan view. For those unfamiliar with "toe of slope", this is the location where the slope abruptly changes to a much flatter grade.

For example take a roadside ditch. On the roadway surface as you head towards the side of the road there typically is a sharp drop-off from the roadway surface to the bottom of the ditch. The point where the ditch begins to level off is referred to as the "toe of slope".

Certain agencies such the Department of Transportation require that design plans indicate the location of the toe of slope. As such, it is quite helpful to be able to generate these lines, especially if you have a roadway that is several miles long.

The CEDRA Solution

To accommodate the application described above, the [Points from Sections] command located within the CEDRA-AVland-CrossSection Toolbar, see Figure 1, was modified.

Points from Sections Overview

With the *Points from Sections* menu command the user is able to create point and/or line features along the cross section lines that have been created with one of the three cross section menu commands appearing at the top of the drop-down list shown in Figure 1. The points that are created are positioned at each location that a cross section shot has been extracted. In essence, the user is creating a plan view of the points comprising all of the cross-sections. The line features which are created connect certain user-specified points on the various cross-sections. On a cross-section, the left-most point is point 1 and the point numbers increase sequentially by one, left to right.

In order to use this command, a cross-section data table must exist in the ArcMap document file. A typical original ground cross-section data table will be named *ogX_xsc*, a final or proposed ground cross-section data table, *pgX_xsc*, where *X* denotes the alignment number.

> ***Command Of The Month bulletin***
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> *This month's issue discusses how to create toe of slope lines by processing a cross-section data table and a design horizontal alignment.*

The contents of such a table are shown in Figure 2. If at least one such table does not exist in the ArcMap document, a warning message to that effect is displayed.

In addition, the document file must contain at least one horizontal alignment defined by the presence of the *Alignments-PIs, Alignments-Lines* and *Alignments-Points* layers, and the existence of the *HALIGNMENTData* table.

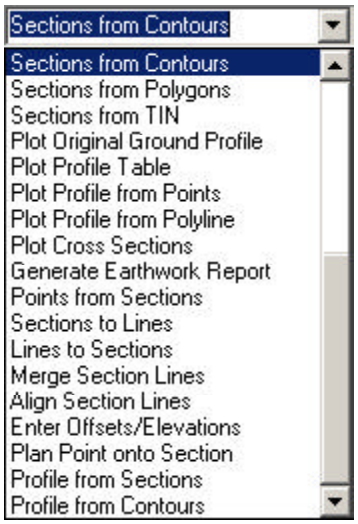

Figure 1
CEDRA-AVland-CrossSection Toolbar

If the above layers and tables are not present, an appropriate error message will be displayed. In this case, the user should click at the OK button to acknowledge, and then take the appropriate measures to remedy the situation.

The points, and lines if desired, that are created are saved in the current active layer. So that, if these features are to be saved in a special layer that does not exist in the Table of Contents, that name of the layer must be specified prior to invoking this command. In this case, the user should: (a) invoke the [Set Active Layer] menu command, (b) select the Entering New Layer option, click the OK button, and (c) specify the desired layer name and click the OK button.

Once the above requirements have been verified by the program, the command

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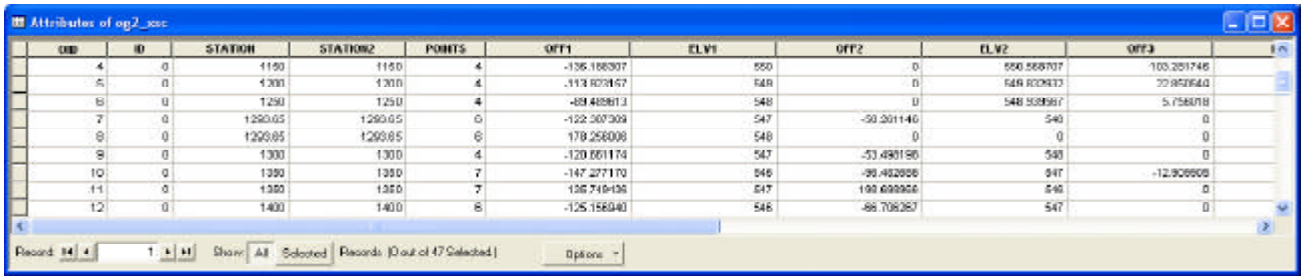

Figure 2 - Cross Sections Data Table

presents the dialog box of Figure 3 prompting the user for the required data.

Points From Sections Operation

Thus, having activated the subject command and after the command has verified the existence of the required data, the dialog box of Figure 3 is displayed. At this point, the user should:

➤ **1** **Scroll** down in the *Horizontal Alignment ID Number:* data field, and **select** the **alignment ID** value of the alignment for which the cross section data table is to be referenced to.

➤ **2** **Scroll** down in the *Cross-Section Surface:* data field, and **select** the **table** of the desired cross-section data table to be processed.

➤ **3** **Enter** in the *Connect Point(s):* data field the **cross-section points** at which lines are to be generated. For example, if the first and last points on a cross-section are to be connected, the user could enter 1 999, where 999 is a value greater than the number of points comprising a cross-section. A space, comma or tab must separate the individual cross-section point values. If no lines are to be generated, enter 0.

➤ **4** **Click** at the **OK** button to execute the command,
or
Click at the **Cancel** button to abort the command.

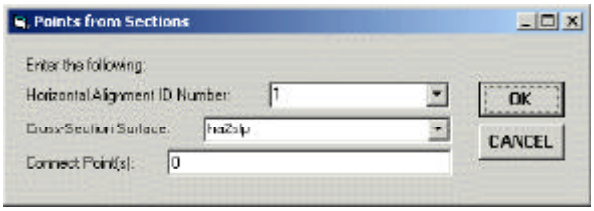

Figure 3 - Points From Sections Dialog Box

Having clicked at OK button, the command begins to generate the horizontal alignment stationing data. If unable to do so, an appropriate error message is displayed. Again in this case, the user should click at the OK button to acknowledge, and then take the appropriate measures to remedy the situation, and repeat the execution of the subject command from its beginning.

Once the horizontal alignment stationing data has been generated, the command creates a personal geodatabase (PGD) using the current active layer name mentioned above. The PGD is stored in the current working directory, which is controlled by using the [Set Working Directory] menu command.

After the PGD has been created, along with the feature datasets, the command will add the layers to the Table of Contents, if not present, and begin generating said point and if need be line features. This is done by converting a station and offset into X,Y coordinates. In creating the point features, the command stores the station, offset and elevation values of the cross-section shot as attributes in the point layer.

Shown in Figure 4 is a cross-section data table, in plan view, that has been processed with this command. The red lines indicate the location along a design horizontal alignment where a cross-section has been taken. In this example, 33 cross-sections appear in the cross-section data table.

The red plus signs indicate the location of a shot on a cross-section. This command will create a point feature at each of the red plus signs. The blue lines indicate that the first cross-section point has been connected. In this particular example, this is accomplished by entering the value 1 for the Connect Point(s) parameter in Figure 3.

Since in this example there is a variable number of shots per cross-section, should the user wish to connect the right-most point on each cross-section, the user could enter the value 999 or any value that is greater than the maximum number of shots appearing on a cross-section.

Notes

a. There is no limit to the number of values that can be specified in the Connect Point(s) parameter.

b. The line features that are created with this command are polyline features.

c. It is possible for the user to create a cross-section data table through other means. That is to say, native ArcMap functionality can be used

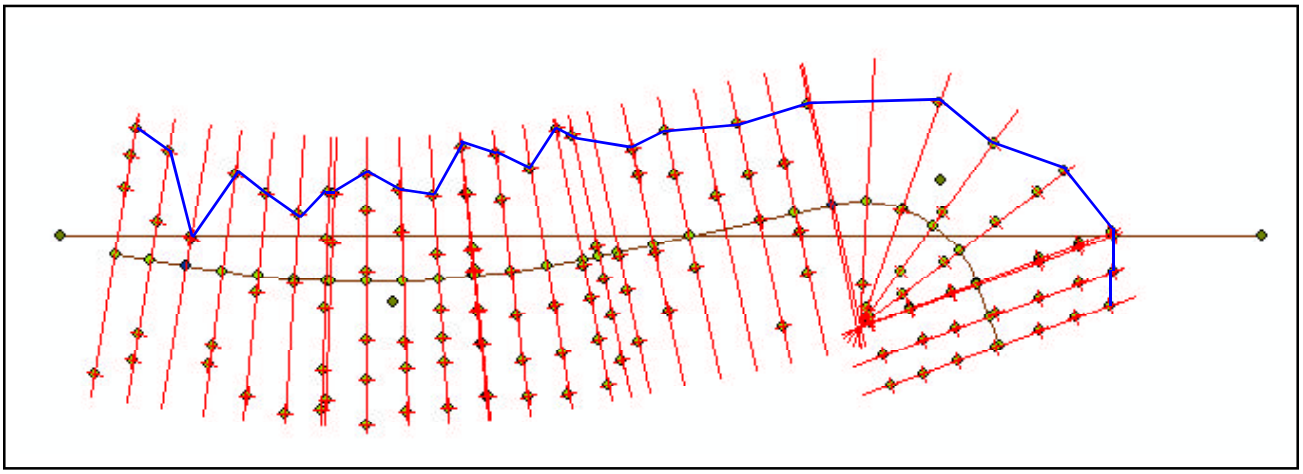

Figure 4 - Points at Cross Section Shots with Polyline Connecting First Shot on Each Cross-Section

to create and populate the table and then have the table processed by this command. The user simply needs to use the same field names as shown in Figure 2.

Summary

Those users who require the ability to create toe of slope lines will find the [Points from Sections] command extremely useful.

As mentioned at the outset of this publication, the implementation of this command was the direct result of a suggestion we received. So that, we encourage our users and those interested in our software to feel free to pass along their suggestions.

After all, if the software does not address the application being worked on, then there's no need for the software. As such, The CEDRA Corporation tries its best to deliver application solution products.

The modification to the [Points from Sections] command is a recent enhancement to the CEDRA-AVland-CrossSection toolbar. Users with a software support agreement should check with The CEDRA Corporation on how to obtain a software update so as to be able to utilize this new functionality.

As always, users who have a need for functionality that is not presently available in CEDRA software should feel free to forward these requests to CEDRA, as well as, any other comments or suggestions you may have.

If you have a request for Command Of The Month, feel free to phone, fax or e-mail your request to The CEDRA Corporation.