

The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

April 2010

FEATURED COMMAND

Profile Plotting
from Points



Application Description

An interesting question was posed to us recently. Can we plot a profile from a series of points? Our **CEDRA-AVland** software, as some of you may know, can create profiles from contours, TINs, polygons, polylines but, at that point of time, not points.

As it turns out, the points in question were from a GPS survey denoting corrosion locations along a natural gas pipeline. In addition to coordinate information, the GPS points also contained information reflecting the degree of corrosion. Shown in Figure 1 is a schematic of what the user would see in an ArcMap display (just a series of points).

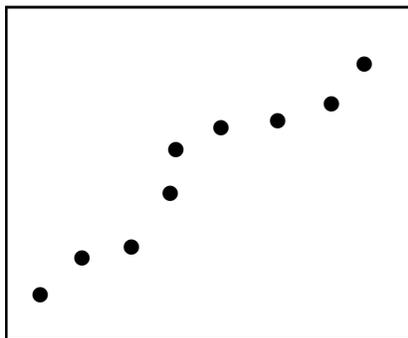


Figure 1
Plan View of GPS Points for Profiling

In addition to creating a profile, it was also desired to superimpose the GPS points upon the profile with the added requirement that the profile points contain some of the attributes of the plan points. In so doing, the user could identify a point on the profile and see the exact same information that is available with the plan point.

The CEDRA Solution

To address this issue, the [Plot Profile from Points] command within the CEDRA-AVland Cross-Section/Profile-Commands combo-box, shown in Figure 2, was added. This new command has been recently added to address this specific application, as well as, provide general functionality for creating a profile from a series of point features.

Plot Profile from Points Overview

Similar to the [Plot Profile from Polyline] command, the user first activates the appropriate layer and selects or highlights the desired points to be processed. Note, at least two points must be selected.

Command Of The Month bulletin

This month's issue discusses how to generate a profile from a plan view of selected point features, superimposing the points upon the profile.

The user then specifies where the station and elevation values for the points are to be taken from. The user has the option of using information that is associated with the point feature itself, such as a Point M or Point ID value, or attribute data that may be attached to the feature.

Once this information has been specified, the typical profile plotting multi-input dialog box is used from which the user specifies the plotting parameters.

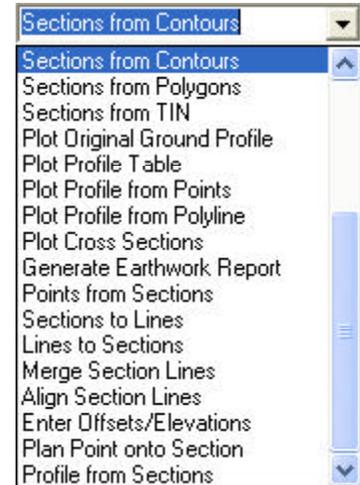


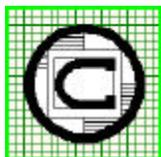
Figure 2
Cross-Section/Profile Commands
ComboBox

Plot Profile from Points Operation

- 1 Scroll down in the **table of contents area**, and **select** the point layer that contains the point features to be processed.
- 2 **Select** with the  *Select Features from Active Layers* tool the point features to be processed.
- 3 **Scroll** down in the {Cross-Section/Profile Commands} menu combo box, and **select** the [Plot



Figure 3
No active layer error message



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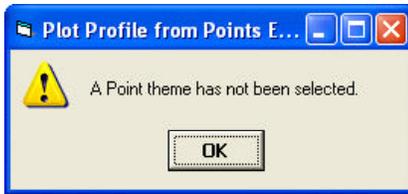


Figure 4
No active point layer error message



Figure 5
More than 1 active layer error message



Figure 6
No selected features error message

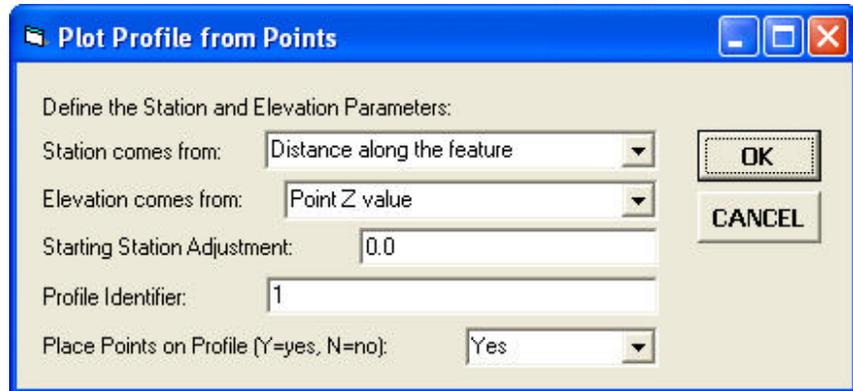


Figure 7 - Plot Profile from Points Command Multi-Input Dialog Box

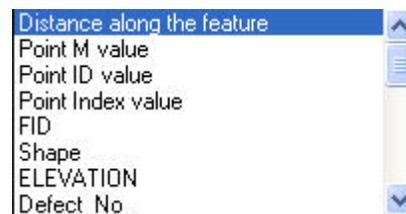


Figure 8
Station comes from: choice list

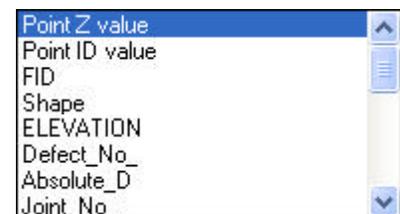


Figure 9
Elevation comes from: choice list

Profile from Points] menu command. If the prerequisites, as outlined above, for using this command are not met, one of the error messages shown in Figures 3 through 6 will appear. If the requisites are satisfied, the multi-input dialog box of Figure 7 will be displayed.

- 4 **Scroll** down in the *Station comes from:* data field, and **select** the:
 - **<Distance along the feature>** option to indicate that the station value is derived by computing the distance from the current point to the first point. The coordinates of the points are used in this calculation.
 - **Point M** option to indicate that the station value is derived from the M attribute that is associated with the feature.
 - **Point ID** option to indicate that the station value is derived from the ID attribute that is associated with the feature.

- **Point Index** option to indicate that the station value is derived by using the sequential index value of the point (1, 2, 3, etc.). That is to say, the first point is at station 1, the second point at station 2 and so forth.
- **Attribute** that contains the station value that is associated with the point.
- 5 **Scroll** down in the *Elevation comes from:* data field, and **select** the:
 - **Point Z** option to indicate that the elevation value is derived from the Z attribute that is associated with the feature.
 - **Point ID** option to indicate that the elevation value is derived from the ID attribute that is associated with the feature.
 - **Attribute** that contains the elevation value that is associated with the point.

- 6 **Enter** in the *Starting Station Adjustment:* data field the numeric value to be added to the station values. This parameter enables the user to offset the profile horizontally.
- 7 **Enter** in the *Profile Identifier:* data field the text to be used in identifying the profile. This text is used in the name of the new data frame that is created, as well as, in the name of the personal geodatabase that is created to contain the features representing the profile.
- 8 **Scroll** down in the *Place Points on Profile:* data field, and **select** the:
 - **Yes** option to indicate that point features are to be placed on the profile reflecting the points that are being processed.
 - **No** option to indicate that no point features are to be superimposed upon the profile.

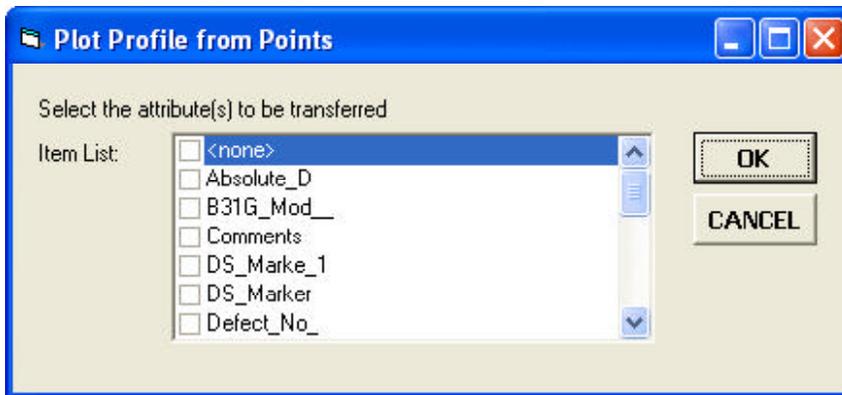


Figure 10 - Attributes to be transferred choice list

- 9 Click at either the **OK** button to continue, or click at the **Cancel** button to abort the command.

If the Yes option was selected for the *Place Points on Profile:* parameter, the choice list dialog box shown in Figure 10 will appear.

If the No option was selected, proceed to Step 12.

When the choice list dialog box of Figure 10 is displayed, the user should:

- 10 Scroll down in the *Item List:* data field, and select the:
 - **<none>** option to indicate that no attributes are to be transferred from the plan points to the profile points. Under this scenario, it is as if the user had selected the No option for the *Place Points on Profile:* parameter.
 - **the attribute(s)** to be transferred from the plan points to the profile points.

- 11 Click at either the **OK** button to continue, or click at the **Cancel** button to abort the command.

At this point, the profile plotting multi-input dialog box shown in Figure 11 will appear. Additionally, in the low left corner of the application window, the command will display the minimum and

maximum station and elevation values, see Figure 12. The user can use these values as a guide when specifying the values for the top four plotting parameters.

- 12 Enter the appropriate values for the profile plotting parameters shown in Figure 11.
- 13 Click at either the **OK** button to generate the profile, or click at the **Cancel** button to abort the command.

Beginning at the top of the multi-input dialog box, the profile plotting parameters include the following:

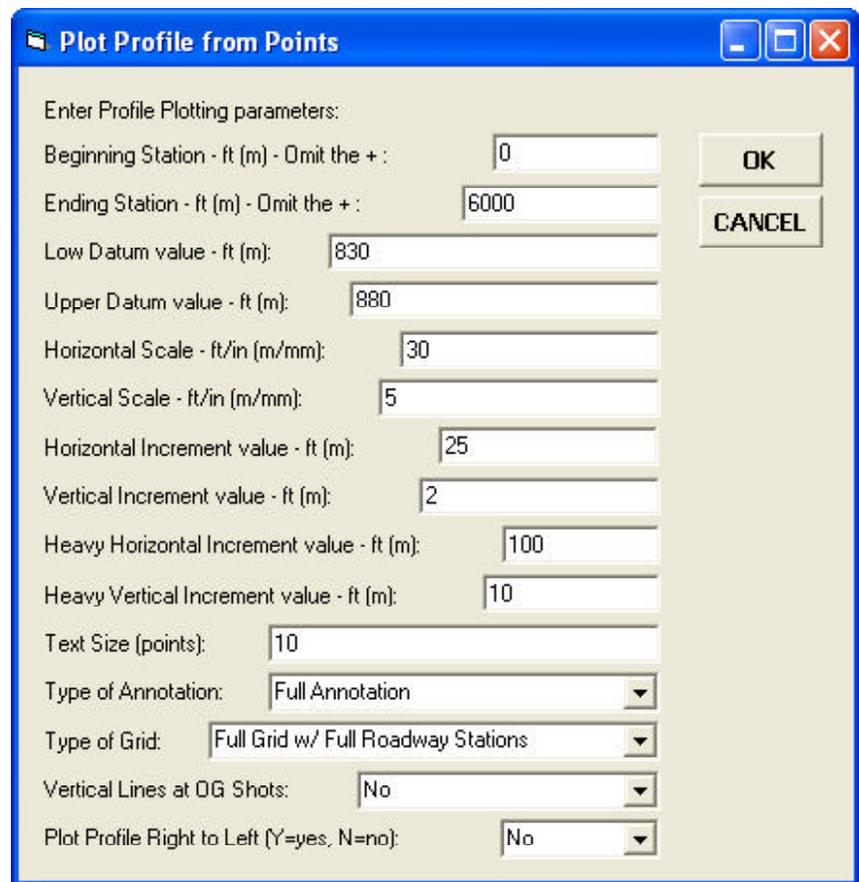


Figure 11 - Profile Plotting Multi-Input Dialog Box

Min. Station: 0.000 Max. Station: 5385.220 Min. Elevation: 835.659 Max. Elevation: 871.097

Figure 12 - Display of minimum and maximum station/elevation values

Data Field 1 - Start Station

This field represents the starting station of the profile grid. Note that the + sign is omitted. For example, the station 9+00 would be entered as 900.

Data Field 2 - End Station

This field represents the ending station of the profile grid. Note that the + sign is omitted as was the case with the starting station value.

Data Field 3 - Low Datum

This field contains the low datum value for the profile grid. This value denotes the lowest elevation of the profile grid.

Data Field 4 - Upper Datum

This field contains the high elevation value for the profile grid. This value denotes the highest elevation of the profile grid.

Data Field 5 - Horizontal Scale

This field contains the desired horizontal scale expressed in feet per inch (meter per millimeter).

Data Field 6 - Vertical Scale

This field contains the desired vertical scale expressed in feet per inch (meter per millimeter).

The next four parameters (Data Fields 7 through 10) pertain to intermediate and heavy vertical and horizontal intervals and grid lines or tick marks (see Data Field 13 below).

A horizontal interval creates vertical lines or tick marks (stations), while a vertical interval creates horizontal lines or tick marks (elevations). The terms intermediate and heavy pertain to the line weight or thickness value that is assigned to the grid lines. Intermediate lines or tick marks are assigned a PEN attribute value of 11, while heavy lines or tick marks are assigned a PEN attribute value of 10.

For example, if the horizontal grid interval is 20, and the horizontal heavy interval is 100, the lines or tick marks at stations 10+00, 11+00, 12+00 and so on will be thick (assigned a PEN value of 10), while the in-between stations at +20, +40, +60 and +80 will be thin (assigned a PEN value of 11).

A similar analogy may be inferred for the vertical grid interval (elevation) lines or tick marks.

Note that this command automatically classifies the layer containing the profile grid lines according to the PEN attribute.

Data Field 7 - Horizontal Grid Interval

This field contains the horizontal (station) grid interval, also referred to as the intermediate horizontal interval. This value is applied to the start station of Data Field 1 to introduce along the X axis a vertical line or tick mark.

Data Field 8 - Vertical Grid Interval

This field contains the vertical (elevation) grid interval, also referred to as the intermediate vertical interval. This value is applied to the low elevation datum of Data Field 3 to introduce along the Y axis a horizontal line or tick mark.

Data Line 9 - Horizontal Heavy Interval

This field contains the interval along the X axis (station) where a heavy grid line or tick is to replace an intermediate line or tick mark. It is these locations where a test string, representing the station value, will appear when station annotation is generated.

Data Line 10 - Vertical Heavy Interval

This field contains the interval along the Y axis (elevation) where a heavy grid line or tick is to replace an intermediate line or tick mark. It is these locations where a test string, representing the elevation value, will appear when station annotation is generated.

Data Field 11 - Font Size

This field contains the desired text size (in points) for the annotation of the station values, along the X axis, and the elevation values, along the Y axis, on both sides of the profile grid, to be generated by the command.

Data Field 12 - Type of Annotation

This field contains the types of profile grid annotation that are available. The available options include:

Full Annotation which annotates the stations and elevations, and displays the horizontal and vertical scales.

No Annotation which does not generate any annotation.

Elevations which annotates the elevation values only.

Station and Scales which annotates the station values and the horizontal and vertical scales only.

Data Field 13 - Type of Grid

This field contains the various types of profile grids that can be created. As can be seen, the user has the ability to create a full grid or a grid with ticks marks. In addition, the user is able to control the manner in which the station values are annotated.

Data Field 14 - Draw Vertical Lines

This field contains a Yes/No choice list with which the user can indicate if a vertical line at every point in the profile surface should be created. This line will be drawn from the profile surface down to the low datum of the profile grid.

Data Field 15 - Profile Plotting Direction

This field contains a Yes/No choice list with which the user can indicate if the direction of the profile is to proceed left to right, or right to left. The default option is to plot the profile left to right.

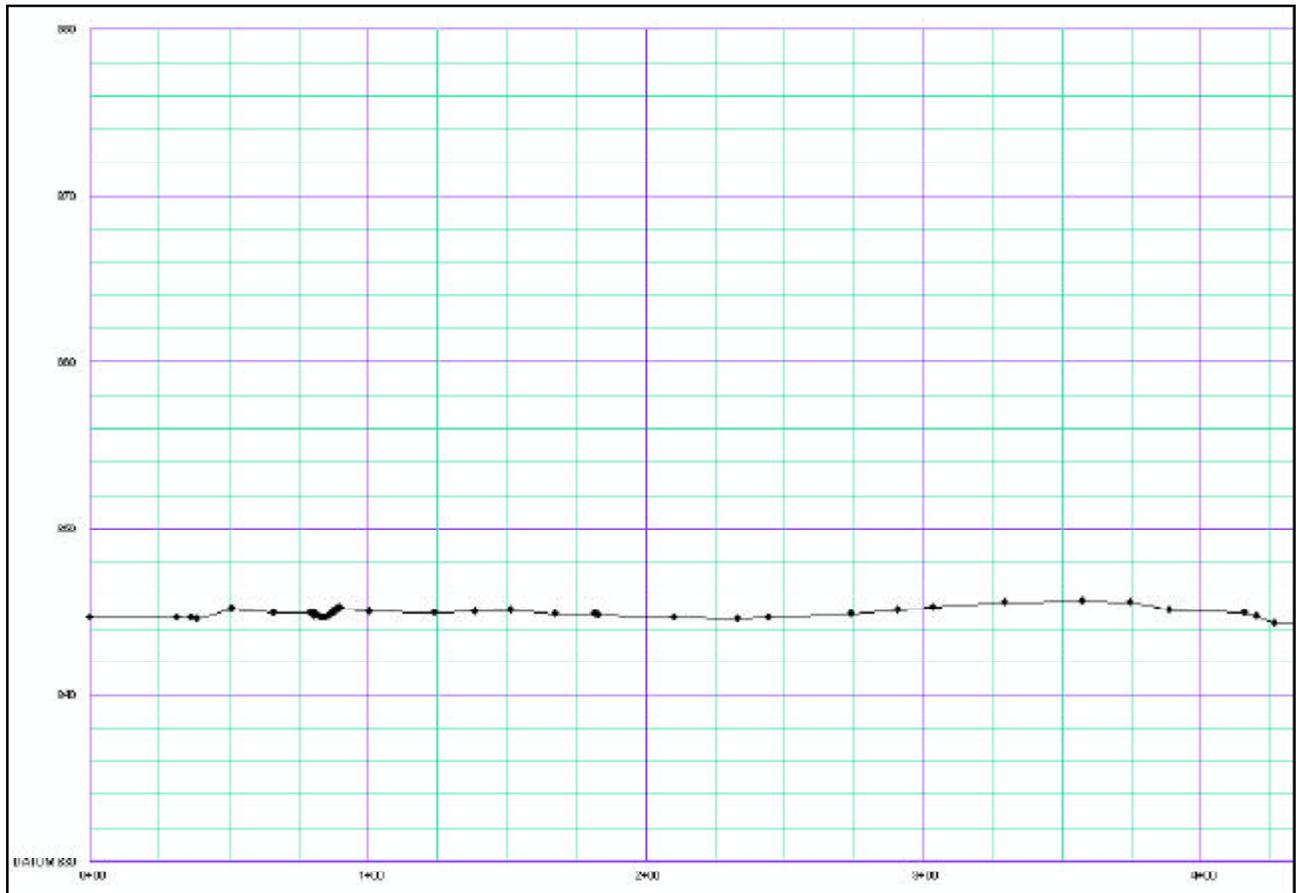


Figure 13 - Sample of Profile creating using the Plot Profile from Points command

Once the user has specified the desired information, the *OK* button can be selected to generate the profile drawing.

In creating the profile, a new data frame is established using the Profile XX naming convention. The characters XX represent the profile identifier text as specified by the user, see Figure 7.

Shown in Figure 13 is a sample profile that was created using this command. In this figure, the option to create profile points was selected (these are the black dots along the profile surface). The profile points are stored in a layer that follows the naming convention pro_XXln, where XX denotes the profile identifier.

Shown in Figure 14 is the Table of Contents for the new data frame containing the sample profile shown in Figure 13. Note that the profile grid layer, grd_1ln, is classified using the PEN attribute. At

this point, native ArcMap functionality or any of the pertinent CEDRA-AVland commands/tools can be used to modify the profile as desired.

Notes

- a. In using the *Station comes from:* parameter, if one of the top four options is selected, the command sorts the selected point features according to their OID. That is, the points are processed in a sequentially increasing OID order.
- b. In using the *Station comes from:* parameter, if one of the point's attributes is selected, the command sorts the selected point features in an ascending order according to the selected attribute. That is, the points are processed in a sequentially increasing attribute order. Under this mode of operation, the OID of the feature is ignored.

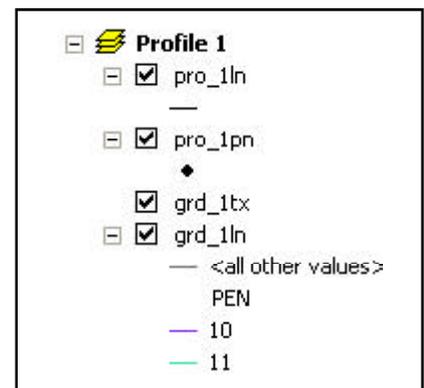


Figure 14
Classification of the Profile in the Table of Contents

- c. In using the *Profile Identifier:* parameter, the text that is entered will appear in the name of the new data frame and in the name of the personal geodatabase that is created. For example, if the profile identifier is A, the name of the new data frame will be **Profile A**, while the name of

the personal geodatabase will be **ProfileA.mdb**. There is no limit to the number of characters that may comprise the profile identifier.

- d** When the command transfers the attributes from the plan points to the profile points, the command will use the same characteristics of the plan point attribute. That is to say, if the plan point contains an attribute A which is of type double, the command will create an attribute A of type double in the profile point layer.

Summary

Those users who are involved with pipelines, be it gas, oil or any other material will find this new functionality a great benefit. Using this new command, users now have the ability to quickly and easily create an annotated profile from a series of plan points.

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 suggestion 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.