The CEDRA Corporation's

COMMAND OF THE MONTH

A monthly information bulletin   **June 2009**

Application Description

In dealing with geometric layouts of subdivisions and the like, users will sometimes come across the application of having to project a point, perpendicularly or radially, upon a baseline. A baseline being defined as a line or curve feature to be used by some geometric command or tool in its processing.

Examples of baselines include: a street centerline, a right-of-way feature, or simply any line or curve feature that "fronts" a point location.

In addition to projecting a point upon a baseline, there may be instances where a line or curve feature does not exist, but rather, there are two point features or endpoints of existing features that can be used to define a baseline. In this scenario, an "implied baseline" is being defined. The word "implied" denoting an imaginary feature, rather than an actual feature that resides on disk.

Therefore, the question becomes how does one account for both cases. One where a feature exists and the other where a feature does not.

The CEDRA Solution

To address the application described above, the Point 5 tool, [icon] *Project a point on a line or curve feature* tool (see Figure 1) can be used.

With the [icon] *Project a point on a line or curve feature* tool, the user is able to project a point on a line, polyline, circu-
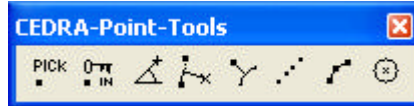

Figure 1
CEDRA-Point-Tools Toolbar

lar curve or polygon feature, and establish a new point feature at the point of projection, see Figures 2 through 5.

Note that the point of projection need not be within the limits of the selected line, polyline or curve. In the case of a line or curve, the line or curve is considered to be extended.

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This month's issue discusses how point features can be created by projecting a pick upon a baseline (existing or implied).

Furthermore, projecting the center of a curve on the curve itself, the point of projection will always be located due west of the curve's center. In the case of a polyline, it is the start or end segment that is extended, depending upon which endpoint the point of projection is closest to. In the case of a polygon, this is of no consequence.

Additionally, projecting a pick on a line, polyline, curve or polygon feature, the user can select a point feature (denoting the base point), and then select two other points to define an imaginary direction from the first point towards the second, see Figure 6. Points may then

be projected on an implied baseline originating at the base point and progressing along said imaginary direction.

To project a point on a line, polyline, curve or polygon feature, having set CEDRA-AVcad snapping tolerance and extended data properties, the user should:

➤ **1** **Click** at the [icon] *Project a point on a line or curve feature* tool.

➤ **2** **Click** in the ArcMap display at, or near a line, polyline, curve or polygon to define the feature upon which points are to be projected.

If the click is made where there is no nearby feature, nothing happens, and the command is still active to repeat the above step, else continue.

➤ **3** **Confirm, or not** the selection of the feature by clicking the appropriate button that is displayed in the standard feature confirmation query dialog box.

If the confirmed features is a:
• Point feature, the user should continue with the next step.
• Near an endpoint of a line, polyline, curve or polygon feature, branch to **Step 6**.

➤ **4** **Click** at or near a point feature, or endpoint of a line, polyline or curve, or vertex of a polyline or polygon to define the **start point**
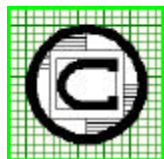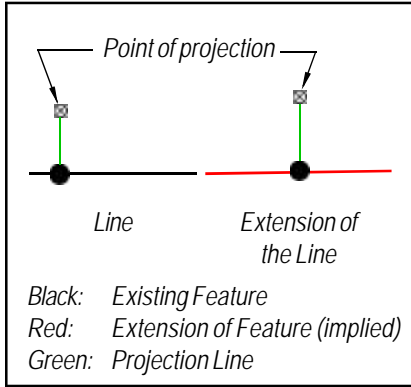
Figure 2
Perpendicular Projection
on a Two-Point Line
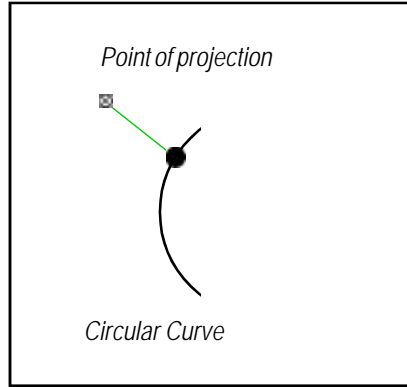
Figure 4
Radial Projection
on a Circular Arc
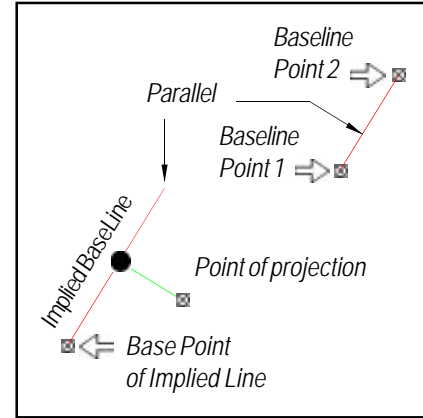
Figure 6
Perpendicular Projection
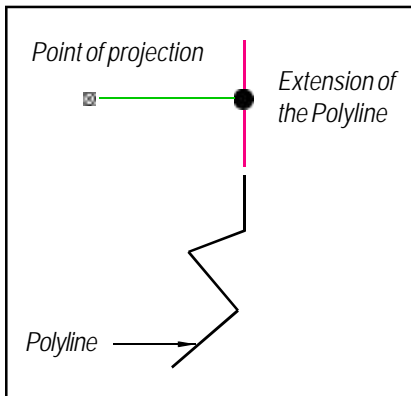**on an Implied Baseline**

Figure 3
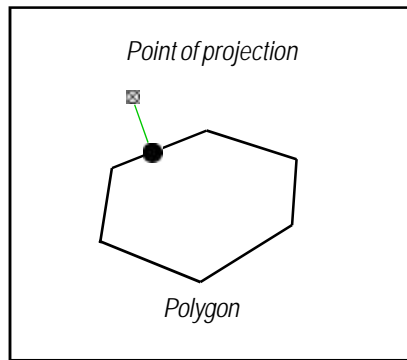**Perpendicular Projection**
on a Polyline

Figure 5
Perpendicular Projection
on a Polygon

Identify the existing feature

1. Select the line feature by making a pick on or near the line, see Pick #1 in Figure 7.

2. Click the Yes button to confirm the selection of the feature.

Identify the point to be projected

3. Make a pick in the map area on top of the point or endpoint to be projected , see Pick #2 in Figure 7.

4. Make a pick in the map area on top of the point or endpoint to be projected , see Pick #3 in Figure 7.

Terminate the command

5. Select another command.

of the imaginary baseline direction.

➤ **5** **Click** at or near a point feature, or endpoint of a line, polyline or curve, or vertex of a polyline or polygon to define the **end point** of the imaginary baseline direction.

➤ **6** **Click** at or near a point feature, or endpoint of a line, polyline or curve, or vertex of a polyline or polygon to define the point which is to be projected, and create a point feature at the point of projection.

The point which is created is stored in the current active layer.

The command remains active to select additional points to be projected on the same element. That is to say, Step 6 can be repeated until another command is selected.

Example #1:

The following demonstrates how a point can be created using the [icon] *Project a point on a line or curve feature* tool.

In this example, an existing line feature will be selected, after which, two points will be created by perpendicularly projecting two picks onto the line.
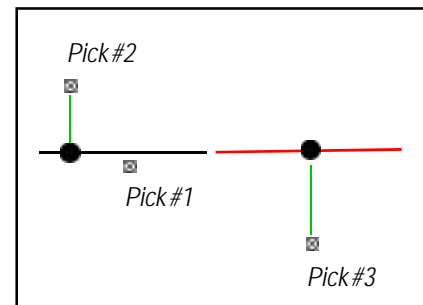
Once the tool has been selected:

Figure 7
Perpendicular Projection
of two Picks
on a Two-Point Line

Example #2:

This example is similar to the previous example with the exception that an implied baseline will be defined.

Identify the base point of the implied baseline

1. Make a pick in the map area on top of the point that is to serve as the base point of the implied baseline, see Pick #1 in Figure 8.

2. Click the Yes button to confirm the selection of the feature.

Identify the implied baseline

3. Make a pick in the map area on top of the point or endpoint to serve as Point 1 of the implied baseline, see Pick #2 in Figure 8.

4. Make a pick in the map area on top of the point or endpoint to serve as Point 2 of the implied baseline, see Pick #3 in Figure 8.

Identify the point to be projected

5. Make a pick in the map area on top of the point or endpoint to be projected , see Pick #4 in Figure 8.

Terminate the command

6. Select another command.

Notes:

1. When projecting a point on a polyline, the tool projects the point onto every segment comprising the polyline, using the projection that has the smallest offset value.

2. When projecting a point on a polygon, the exact same process that is used in processing a polyline is also used in processing polygons.

3. After the baseline (implied or not) has been identified the tool remains active until another command is
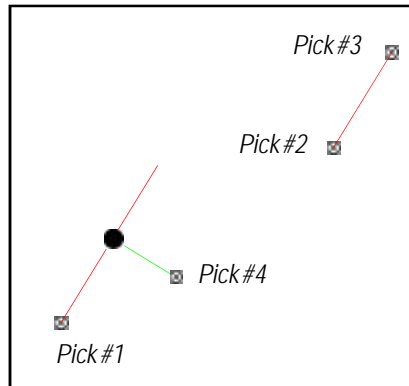
**Figure 8
Perpendicular Projection
of one Pick
on an Implied Baseline**

selected. In so doing, multiple points can be projected on the same baseline.

4. When an implied baseline is to be defined, the feature that is initially selected with this tool must be a point feature.

5. When an implied baseline is to be defined, it is possible for the start point of the baseline direction to match the base point. That is to say, Pick #1 and Pick #2 in Figure 8 can be the same

Summary

In the last two month's issue of Command of the Month we discussed the Point 3 and Point 4 tools, which enabled the user to define points by specifying: (a) angles and distances and (b) plus and offset values, respectively. The Point 5 tool in conjunction with the Point 3 and 4 tools provide the user a valuable suite of point creation tools.

As always, should the reader have any suggestions on functionality that should be featured in Command of the Month, please feel free to forward them on to us.

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