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MicroStation V8i Training Manual 2D Level 1

Twenty pages of Module 11 are shown below. The pages are typical for all Modules - they provide the Module title and set out the learning objectives. The suggested time for completion of the Module is given at the end of Page 11-3.

Please note the “Tool Tip” box on page 19; these are located throughout the Manual to emphasize a technique or to add specific points of information.

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MicroStation V8i 2D LEVEL 1

Module ***11***

SMARTLINE

Module Information

Prerequisites:

Module 10 MicroStation - 2D

Introduction:

SmartLine, designed for use with AccuDraw, automatically draws *complex chains* and *shapes*. A complex chain (also called a *line string)* is a *connected* series of line segments that *act* as one line, while a shape also consists of connected line segments but which *return to the starting vertex* to form a *closed* shape.

SmartLine has options that connect or disconnect the line segments, draws lines or arcs in the same line string, and sharp, rounded, or chamfered vertices. You will typically use SmartLine when you need closed shapes (as for patterning), where it is advantageous to draw a connected line that contains arcs or chamfers (as for sidewalks or piping), or where a simple connected line string is needed.

Objective(s):

11.1 Recognize and adjust setting for SmartLine.
11.2 Recognize and apply sharp, rounded, and chamfered vertexes to closed shapes.
11.3 Recognize and apply dimensional, angle, and closed shape options.
11.4 Apply vertex types to line strings.
11.5 Recognize and apply arc segments to line strings and shapes.
11.6 Recognize and apply individual arc segments.

Time:

This Module should be completed within 1.75 hours.

THIS SAMPLE STARTS ON PAGE 11-3 AND DISCUSSES THE SETUP AND USE OF SMARTLINES.

DISCUSSION:

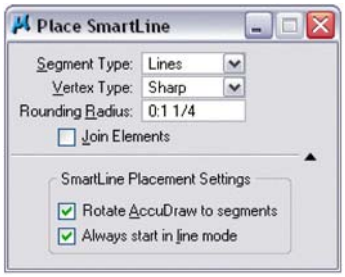
Open your *Start-E* or *Start-M* drawing.

It is often extremely advantageous to draw a series of line segments that act together as a single line. In other words, a series of lines that are "grouped" into a *line string* or a *shape* and which can be *edited as one line*. It is also very useful to be able to draw a line string or shape that contains *arcs* and *rounded* or *chamfered vertices* and not have to change drawing tools to do so. It is, of course, entirely possible to draw these elements using a combination of lines, arcs, and blocks, and then use various editing tools to create the arcs and chamfers. SmartLine is designed to avoid this line and shape building process by drawing such elements in one operation.

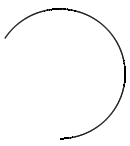
First, let's look at SmartLine's settings box:

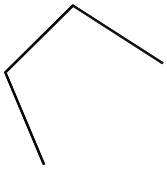
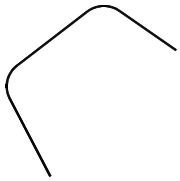
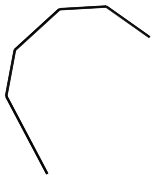
11.1 SETTING SMARTLINE OPTIONS

To open the settings box for SmartLine, simple start the SmartLine tool. Click on the *SmartLine* icon in the *Linear Task* tool box. Expand the Tool Settings window.



The *Tools Setting* box now shows the SmartLine options. *Click on each option* as they are described below:

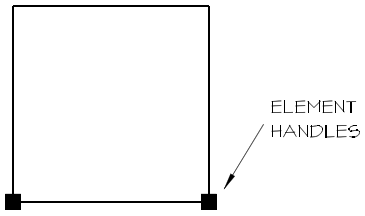
Tool Setting	Action	Examples
Segment Type:		
Line	Draws line segments.	
Arc	Draws arc segments. Line and arc segments can be *combined* to draw a *complex chain.*	

Tool Setting	Action	Examples
Vertex Type:		
Sharp	Draws sharp corners.	
Rounded	Draws rounded corners to the radius set in the "Rounding Radius" box.	
Chamfered	Draws chamfered corners with the chamfer offset dimension set in the "Chamfer Offset" box.	
Join Elements	When *ON*, line segments are joined. When *OFF*, line segments are placed as individual elements (but can still be defined as a string for some editing operations).	
SmartLine Placement Settings:		
Rotate AccuDraw to segments	By default, AccuDraw's compass will rotate to line up with each segment when placed. When this switch is OFF, the compass remains aligned with the view axes.	
Always start in line mode	When OFF, SmartLine will start in the mode last used.	

Note: *AccuSnap* is designed to work closely with *SmartLines* and you will find that it will locate more tentative points on SmartLines than on regular lines, reducing the need to manually tentative-point.

11.2 DRAWING WITH SMARTLINE - VERTEX TYPES

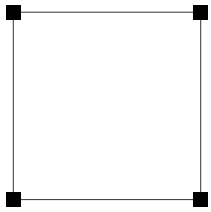
Initially, drawing with SmartLine seems very similar to drawing with the *Place Line* tool. The differences occur when you use the options for vertex types. To get a general idea of how the tool works, start with some simple *shapes* and draw the following squares with *SmartLine* and *AccuDraw* active. In each case, draw the first side 1'-0" (300) long make use of the *distance recall* feature of AccuDraw to quickly draw the other three sides.



Unconnected Elements

Step 1 Select *Lines* and *Sharp,* with *Join Elements OFF*.
Step 2 *Data-point* to start the shape.
Step 3 *Data-point* each corner using *distance recall*.
Step 4 *Snap* to the starting point.
Step 5 *Reset* to stop SmartLine's action.

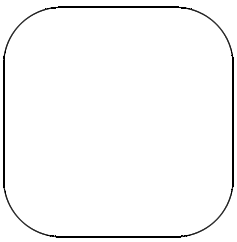
Each element in the square is a separate entity. To prove this, click on each side with the *Element Selection* tool and note that the element handles only appear on one line.



Connected Elements

Step 1 Select *Lines, Sharp,* with *Join Elements ON*.
Step 2 *Data-point* to start the shape.
Step 3 *Data-point* each corner using *distance recall*.
Step 4 *Snap* to the starting point. Be sure that the *Closed Element* option is *ON* before you accept the tentative point.
Step 5 *Reset* to stop SmartLine's action.

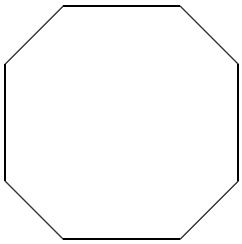
The square is a single element and a *closed shape.* Click on any side with the *Element Selection* tool and note that the element handles appear on all sides.



Rounded Corners

Step 1 Select *Lines, Rounded,* and *Join Elements*. Set the Rounded *value* to 3" (75)
Step 2 *Data-point* to start the shape.
Step 3 *Data-point* each corner using *distance recall*.
Step 4 *Snap* to the starting point.
Step 5 *Reset* to stop SmartLine's action.

SmartLine automatically rounds each corner, including the starting corner.



Chamfered Corners

Step 1 Select *Lines, Chamfered,* and *Join Elements*. Accept the Chamfer *value* of 3" (75)**.**
Step 2 *Data-point* to start the shape.
Step 3 *Data-point* each corner using *distance recall*.
Step 4 *Snap* to the starting point.
Step 5 *Reset* to stop SmartLine's action.

SmartLine automatically chamfers each corner, including the starting corner.

Note that a vertex will default to a sharp corner if the rounding or chamfer value is too large for the line segment under construction.

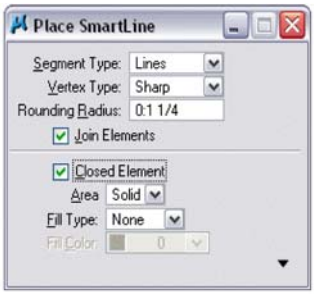
11.3 SMARTLINE'S OPTIONS

Now let's look at the options that are available *during* the drawing of a SmartLine shape when the *join elements* switch is *on*.

SETTINGS BOX OPTIONS - CLOSED SHAPES

You have already seen two of these in the extra part of the settings box that appeared when you Data-pointed or snapped to the *starting point*. To see these again set *Vertex* to *Sharp, Join Element On*, and start drawing another square. When you return to the starting point, locate a *tentative point* at the vertex but *do not* Data-point to accept the point. You can now see the additional options that are available at this part of the drawing process.

There are three options:



1. If *Join Elements* is ON, you can choose to *close* the shape by checking the *Closed Element* check box.

2. You can change the *Area* type for the shape. The default is *Solid* and you should not change this setting in this Course.

3. You can *Fill* (use the *Opaque* fill type) or *Outline* the shape with a color. This will apply a color to the entire inside of the shape. Feel free to play with this option, but remember to reset this option back to *None* when you are finished. We will look at *Fill* in more detail in Module 12. To *see* the fill color, turn *Fill* on in the *View Attributes* box (*Ctrl-B)*.

When you have set the options, *Data-point* to *accept* the *snap location* and apply the settings.

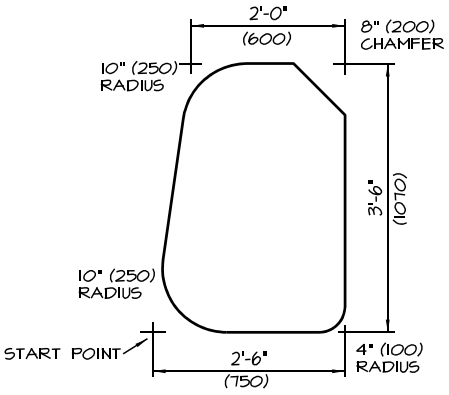
"ON-THE-FLY" OPTIONS

As with most MicroStation tools, you can change the tool's options *on-the-fly*. In SmartLine's case this means switching between *lines* and *arcs*, changing the *type* and *size* of the *corner options*, or switching from *joined* elements to *separate* line segments.

To change the options during a drawing process you simply move your pointer to SmartLine's settings box and make the changes. **Please note though, that *when you change* a rounding or chamfer size value, you must press *Enter* to *apply the new value*.**

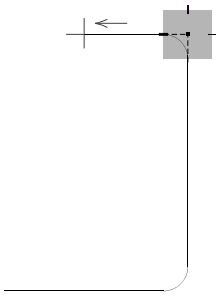
Also, you might find it necessary to *regain focus in AccuDraw's window* after entering a new value in the Tool Settings box. If this is the case, you should press the *space bar* or *click* in AccuDraw's window.

Let's deal with the type and size of corner options first.



Draw the shape at the right:

Step 1 *Set* SmartLine options to *Lines*, vertex *Rounded* with a *4" (100) radius*, and *Join Elements On*.



Step 2 *Data-point* at the starting corner and *toggle* AccuDraw's compass to *Rectangular*.

Step 3 *Drag* to the right and enter 2'-6" (750) in AccuDraw's X-axis box.

Step 4 *Data-point* to accept the line segment.

Step 5 *Drag* upwards and enter 3'-6" (1070) in the Y-axis box.

Steps 1 to 6.

At this point the 4" (100) radius has been created at the lower-right corner. If you now accept the upper-right corner you will also accept the 4" (100) radius at the lower-right corner.

Step 6 *Data-point* to accept the upper- and lower-right corner.

As you drag the line to the left you can see the 4" (100) radius again appearing at the upper-right corner. You can now change the vertex option to a chamfer.

Step 7 *Change* the *Vertex Type* to *Chamfer* and the value to 8" (200). Press *Enter* to apply the new value.

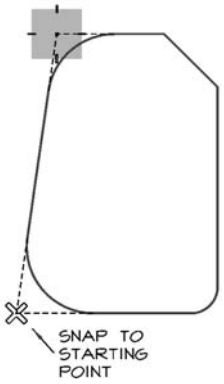
The upper-right corner now becomes a chamfered corner. *To confirm this change you must accept the location of the upper-left corner*.

Step 8 Still dragging to the left, *enter* 2'-0" (600) in the Y-axis box.

Step 9 *Data-point* to accept the upper-left corner and *confirm* the *chamfer* at the upper-right corner.

Step 10 *Change* SmartLine's options to *Rounded* and 10" (250) radius, then press *Enter* to accept the new value.

Step 11 *Snap* to the *starting point.*



Steps 7 to 11.

You have now both locked-in the rounded upper-left vertex and placed the final rounded vertex (which is the same as the upper-right corner).

In Step 11, if you wanted a different vertex at the starting point, you can *tentative-point* at the *starting point* (instead of snapping), and enter a new value or vertex type in the Tool Settings window. Data-point to accept the new setting and finish the string.

If you need to *edit* a vertex *after* placement, use the *Modify Element* tool. This procedure is discussed in Module 15, Section 15-2.

Seems confusing? The key to creating a sharp, rounded, or chamfered corner is that a vertex will not be "locked-in" *until the next vertex is placed*. This gives you the feeling that you always seem to be one corner "behind" in the drawing process. This is true, but the process allows you to change the options before actually accepting the vertex.

Three additional important points:

> ***TOOL TIP !***
> Use *Undo* (Ctrl-Z) to undo a segment *without stopping* the SmartLine tool.

1. If you make a mistake in either the vertex or the segment length you can use *Control-Z* to *undo previous segments.* You can only do this *during* the drawing process, of course. If you use Control-Z *after* the shape is finished you will simply delete the whole shape.

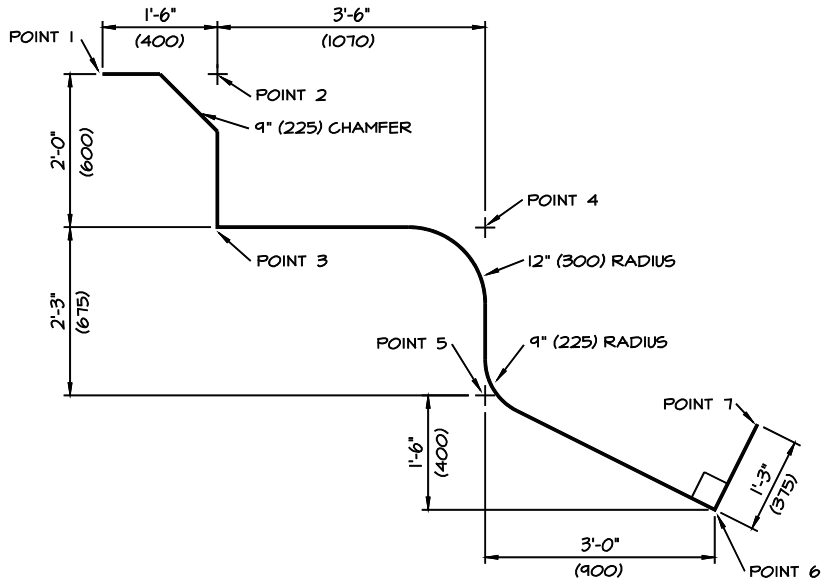
2. If you turn *Join Elements* off *before* or *during* the drawing process then the final vertex (at the starting point) will default to a *sharp vertex*, and the shape will consist of individual elements.

3. Keep in mind that, in a continuing line string, you can only change the type or size of a vertex *after* accepting its location.

11.4 DRAWING LINE STRINGS - VERTEX TYPES

You can apply the vertex options to line strings as well as shapes. The same rules apply regarding "locking-in" the *previous* vertex and using either *Enter* to *confirm* a new value and the Space Bar to switch focus. A line string is "open", of course, and only needs a *Data-point* and *Reset* to finish the line.

Try the following exercise. I have simplified the steps assuming you can use AccuDraw to enter all dimensions and can switch options in *SmartLine's* settings window without prompting.



Step 1 Set *Vertex* to a *Chamfer* of 9" (225) with *Join Elements* on.
Step 2 *Data-point* the line start at *Point 1*.
Step 3 *Data-point* at *Point 2*.
Step 4 *Data-point* at *Point 3*.
Step 5 *Set* vertex to *sharp*.
Step 6 *Data-point* at *Point 4*.
Step 7 *Set* vertex to *rounded* and a 12" (300) radius.
Step 8 *Data-point* at *Point 5*.
Step 9 *Change* the rounding *radius* to 9" (225).
Step 10 *Space Bar* to focus in AccuDraw (if needed).
Step 11 *Data-point* at *Point 6*.
Step 12 *Change* the vertex to *sharp*.
Step 13 *Data-point* at *Point 7*.
Step 14 *Reset* to stop the tool.

This is relatively complex line to draw, but the combination of AccuDraw and SmartLine makes the job quite easy provided you take a little time to think ahead throughout the drawing process. To draw this line string without AccuDraw and SmartLine would involve the use of several drawing and editing tools.