Chapter Thirteen

Patterning

INTRODUCTION

THE PATTERNING TASK BAR

The tools on this task bar are used to pattern areas along linear elements. Patterning is the repeated placement for hatch lines or cells inside of a closed object. For example this tool could be used to create a pattern that would identify an area of concrete as compared to grass. You can find it on the main task bar or by clicking Tools menu > Patterning > Open as toolbox.

The available tools are:

- **Hatch Area** - This tool is used to hatch an area.
- **Crosshatch Area** - You can use this tool to crosshatch an area.
- **Pattern Area** - This tool allows you to pattern an area by tiling instances of the active pattern cell.
- **Linear Pattern** - You can use this tool to draw a pattern along a linear element.
- **Show Pattern Attributes** - This tool is used to display the angle and scale attributes of a pattern element.
- **Match Pattern Attributes** - You can use this tool to set the active pattern angle, scale, and delta settings to match the attributes of an existing pattern element.
- **Delete Pattern** - This tool is used to delete a pattern.
HATCH AREA TOOL

You can use this tool to hatch an area with lines. The various settings associated with this tool determine how the appearance of the hatching and what part of the drawing it will be inserted into. The available settings are:

- **Spacing** - This value is the space between the hatch lines. By default, this value is set to zero. Values are entered using working units.

- **Angle** - This value sets the angle at which hatch lines will be drawn. By default, this value is also set to zero. This results in a pattern that is ninety degrees to the object you are patterning. A more common value is 45 degrees. You enter the desired angle in this data entry box.

- **Tolerance** - When patterning along or inside a curved element, the curve is approximated with a series of line segments that are used as guides for patterning. The tolerance is the maximum distance between the element and these line segment guides. If the tolerance is small, the line segments conform closely to the curve and the approximation is more accurate, but processing time increases. If tolerance is large, line segments do not conform closely to the curve and the approximation is less accurate, but processing time decreases.

- **Associative Pattern** - If this check box is selected, hatching is associated with one or more elements used to define the pattern boundaries. Whenever the underlying elements are modified the pattern automatically updates to the new location of the modified elements. If the patterning method is intersection, union, difference, or flood, a complex shape (see description of these below under Method) that bounds the patterned area is created, and the hatch lines are associated to the complex shape.

- **Snappable Pattern** - If this check box is selected, you will be able to snap to the elements in the pattern. If unchecked, this means your hatch cannot be selected which, in many ways, is a good thing, especially in a busy drawing.

- **Method** - This setting determines the area that will be hatched. Icons are used to represent each method.

The items available on this option menu are:

- **Element** - The interior of a shape, ellipse, or closed B-spline curve, or between the components of a multi-line will be patterned.
- **Flood** - The minimum area enclosed by a set of elements will be patterned.
- **Union** - The union of two or more closed elements will be patterned.
- **Intersection** - The intersection of two or more closed elements will be patterned.
- **Difference** - The difference between two or more closed elements will be patterned.
- **Points** - An area defined by a series of data points will be patterned. Each specified data point defines a vertex.
- **Fence** - The area inside the fence will be patterned.

- **Max Gap** - This is the maximum distance, in working units, between the endpoints of enclosing elements when the Method is set to *Flood*.

**CROSSHATCH AREA TOOL**

This tool is very similar to the Hatch Area tool. The Tool Settings and the procedures are the same, except that there are two additional data entry boxes to specify the spacing and angle of the crosshatch lines. There are two ways that you can use the *Spacing* and *Angle* boxes for the crosshatch lines:

- You can enter the desired angle and/or spacing, in working units, in the appropriate data entry box.
- You can leave either value set to zero. If the spacing is zero, the crosshatch lines will have the same spacing as the hatch lines. If the angle is zero, MicroStation V8i will automatically calculate an angle for you. This angle will be 90 degrees from the angle that you specified for the hatch lines. For example, if you leave both *Angle* values set to zero, the hatch lines will be at 0 degree angles and the crosshatch lines will be at 90 degree angles.

**PATTERN AREA TOOL**

The *Pattern Area* tool is used to pattern an area by tiling instances of the active Pattern cell. There are several settings associated with this tool that determine what cell is used, how it will be spaced, and what area will be patterned. These settings are:

- **Pattern Cell** - The cell name that appears in this data entry box is the cell that will be used to create the pattern. You can select another cell by entering a different cell name in this box, or by using the *Pattern* button on the *Cell Library* settings box.
- **Scale** - This data entry box is used to set the scaling factor for the pattern cell.
- **Row Spacing** - You can specify the desired spacing between rows in this data entry box.

- **Column Spacing** - You can specify the desired spacing between columns in this data entry box.

- **Angle** - The angle specified in this data entry box is the angle at which instances of the pattern cell are placed.

- **Tolerance** - This value is the maximum distance between a curved element and the line segment guides used for patterning.

- **Associative Pattern** - This check box determines whether or not patterning will automatically adjust if the patterned element is modified.

- **Snappable Pattern** - This check box determines whether you can snap to the individual pattern elements.

- **Method** - You can specify the area that is patterned through this option menu. The individual items are described with the Hatch Area tool.

- **Max Gap** - This value sets the maximum distance between the endpoints of enclosing elements when the Method is set to Flood.

To pattern an area using the Element, Fence, or Flood method:

1. From the Patterning toolbox, select the Pattern Area tool (R3).

2. In the Tool Settings area for this tool, set all the desired settings including the required cell with which you want to pattern the area.

3. For the **Element** method, enter a data point to identify the element.

   For the **Flood** method, enter a data point inside the area enclosed by the set of elements.

   For the **Fence** method, skip this step.

4. Enter a data point to place the origin of one of the pattern cells.
THE DELETE PATTERN TOOL

This tool is used to remove an existing pattern.

To delete patterning:

1. From the Patterning task bar, select the Delete Pattern tool.

2. Enter a data point to identify the patterning that you want to delete.

3. Enter another data point to accept it.

HATCHING AROUND TEXT

To hatch around text inside of a closed element use the Flood method, select the down arrow in the lower right corner of the Tool Settings window to “Show Extended Settings”. Select the Locate Interior Text icon. Using this option will cause the hatching to go around the text within the closed element. If you use Flood method, you can also hatch around other elements inside your object by changing the extended settings.

I HATCH WALLS

1. Select File menu > Open. Select the Floor Plan. (floor.dgn)

2. Select the Hatch Area tool (R1) from Patterns toolbox.

3. Set spacing to 3” (0:3). Set angle to 45. Set Method to Element.

4. Turn on the Associative Pattern option.

5. Identify the multi-line wall by clicking anywhere on the wall. It will change color and prompt for accept-reject. Click anywhere on design file to accept.

The wall’s interior is patterned with a hatch pattern. This works the same for crosshatch or pattern fill.


7. Select Edit menu > Redo. The hatch pattern returns.

Next, scale your laboratory room to make it 1.5 times wider.
8. Place a Fence (21) around the right end of the laboratory.

9. Selecting the *Manipulate Fence Contents* tool (23).

10. In the Tool Settings window, change Operation to *Stretch*.

11. Data point to define the origin, use AccuDraw to enter 6’ along the X-Axis. Accept with a data point.

   The dimensions and the hatch pattern update to the new walls location. This is an example of associative dimensioning and associative patterning works.