

Intermediate Engineering Graphics

7th Week Lecture Notes

Instructor: Edward N. Locke

Topic: AutoCAD Tools and Drawing Sectional View in AutoCAD

1st Subject: Editing Tools in AutoCAD (Offset, Array, and Mirror)

Offset: duplicates an object parallel to the original object at a specified distance away. The new object retains the same properties (color, layer, and linetype) of the original. Press Modify toolbar Offset tool button, go to Modify/offset pull-down menu, or type “offset”; this command needs offset distance, original object, side where the duplicate of the original should appear.

Command: offset

Specify offset distance or [Through] <0.5000>: [press Enter to accept]

Select object to offset or <exit>: [pick an object]

Specify point on side to offset: [pick a point on the chosen side]

Select object to offset or <exit>: [pick the offset object]

Specify point on side to offset: [pick a point on the chosen side]

Mirror: this tool is very useful for drawing symmetrical objects. To access this tool: press Mirror icon button on the Draw toolbar, go to Modify/Mirror pull-down menu, or type “mi”; it needs an original object, the first and second points on the mirror line, and choosing yes/no on Delete Original options.

Command: mi MIRROR

Select objects: Specify opposite corner: 5 found [select the original object or objects to be mirror-copied]

Select objects: [Press Enter to end selection]

Specify first point of mirror line: [Pick a point]

Specify second point of mirror line: [Pick another point]

Delete source objects? [Yes/No] <N>: n [Type n to keep the original, or y to delete the original]

Array: press Array icon button on the Modify toolbar, go to Modify/Mirror pull-down menu, or type ar or array to access this tool.

A. Rectangular Array: this option needs selection of an original object, number of rows and columns, offset distance between rows and columns (Positive distance values cause the arrayed objects to go upward or rightward; negative distance values cause the arrayed objects to go downward or leftward), and Angle of Array.

B. Polar (Circular) Array: this option needs selection of an original object, a center point, an angle to fill (+ =ccw, - =cw), number of objects to be generated by the command, Angle Between Items, choosing yes/no on Rotate Arrayed Object option.

2nd Subject: Basic Tools in AutoCAD (Division and Measurement)

To divide a line or arc into equal parts: Type div or divide, go to Draw/Point/Divide pull down menu, or to Draw toolbar.

Command: div

DIVIDE

Select object to divide: [Pick the line or arc object]

Enter the number of segments or [Block]:

Requires an integer between 2 and 32767, or option keyword.

Enter the number of segments or [Block]: 5

This command VISUALLY divides an object by the number of segments designated. The object divided is NOT broken into segments.

Recommended: select Point Style first (Format/Point Style).

Measurement: measures an object by the length designated. The object divided is NOT broken into segments. Type me (DO NOT TYPE measurement, it is a system variable), go to Draw/Point/Measurement pull down menu, or to Draw toolbar.

Recommended: select Point Style first (Format/Point Style). The side where the selection point is placed is also where the measurement will start.

3rd Subject: Drawing Sectional View in AutoCAD

Use of Hetch tool:

Boundary Hatch: type bh or h, press Hatch icon button on the Draw toolbar, or go to Draw/Hatch... pull-down menu to access this tool. Make selections in the Boundary Hatch dialogue box. This command works with objects with closed boundary.

Hatch pattern can be exploded. **Hatch patterns can be:**

A. Predefined: stored in acad.pat and acadiso.pat files, developed by Autodesk and other companies. Greatly increase the size of the file. They include Pattern, Swatch, Angle, Scale settings).

B. User Defined: simply draw continuous line. They do not increase the size of the file; their settings include Swatch, Angle (0-180 degree), Spacing (distance between each line), and Double (criss-crosses at 90 degrees the first set of hatch lines).

Angle and scale can be changed (for scale, use the scale factor of the drawing. If the drawing will be plotted at 1/4" = 1, 4 is the scale factor)

Hatch compositions include:

- A. Associative composition (hatch shape changes automatically with the change of the shape of the boundary object) and
- B. Nonassociative composition (hatch shape does not changes automatically with the change of the shape of the boundary object).

To edit hatch patterns: type he, Modify/Hatch... pull down menu, or press the Edit Hatch icon button on the Modify II toolbar. Click the hatched object, change the hatch pattern in the Hatch Edit dialog box and press OK button.

Command: [Type he to access the Hatch Edit command]

Command: he *HATCHEDIT*

Select associative hatch object: [Click the hatched object, change the hatch pattern in the Hatch Edit dialog box and press OK button]

To draw the cutting-plan line: use Polyline tool with Width option to draw arrows