

IV. Line work

Line Objects

The line is the basic object in AutoCAD. You can create a variety of lines;

- single lines
- multiple line segments with and without arcs
- multiple parallel lines
- freehand sketch lines

In general, you draw lines by specifying;

- coordinate points
 - x,y,z values
 - distances and angles
 - linetype
 - color
-

Types of line objects in AutoCAD:

Line *LINE* 

One segment or a series of connected segments
Each segment is a separate line object
Line width cannot be modified

Use lines if you want to edit individual segments.

Example: Individual line objects;



2D Polyline *PLINE* ('pē-līn) 

Connected sequence of line or arc segments
Created as a single object

Set width of individual segments, or entire object
Close to form polygon
Include arc segments

Use polylines if you want to edit all segments at once.

Example: Single polyline object;



lwpolyline

A 2D line of adjustable width composed of line and arc segments. Lightweight polylines are optimized to display more quickly than standard polylines and save system resources. The decision to use a lightweight polyline or a standard polyline is controlled by the PLINETYPE system variable.

3D Polyline

Connected sequence of lines with variable elevations (z coordinate)

Created as a single object

Only displays as CONTINUOUS linetype

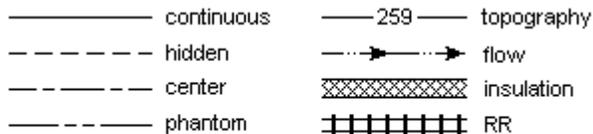
3D polyline width cannot be modified

Viewable in an isometric mode

Close to form polygon

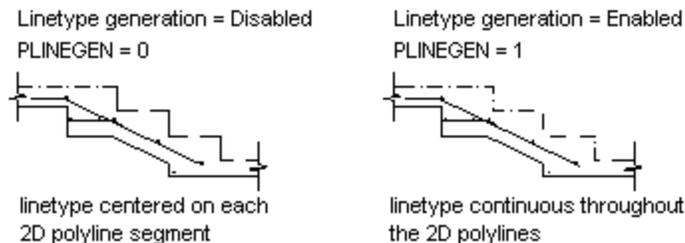
Linetypes

A linetype is a repeating pattern of dashes, dots, and blank spaces. A complex linetype is a repeating pattern of symbols along with dashes, dots, and blank spaces. The linetype name and definition describe the particular dash-dot sequence, the relative lengths of dashes and blank spaces, and the characteristics of any included text or shapes. You can create your own linetypes.



Examples of linetypes

You can specify whether a linetype pattern is centered on each segment or continuous throughout the entire length of a 2D polyline. You do this by setting the PLINEGEN system variable, or through the properties window with the Linetype generation setting.



Lines / Plines

The line is the basic object in AutoCAD. You can create a variety of lines: single lines, multiple line segments with and without arcs, multiple parallel lines, and freehand sketch lines. In general, you draw lines by specifying coordinate points, properties such as linetype or color, and measurements such as angles. The default linetype is CONTINUOUS, an unbroken line, but various linetypes are available that use dots and dashes.

Note: In all exercises, commands to be typed on the command line will be in bold. The symbol ↵ will be used to represent the return or enter key.

Exercises

Exercise (1a)

Using Pline to draw multi-segment lines using pointing device.
(Assign x, y values through digitized points, z value is assumed = 0 unless otherwise assigned.)

Start a new drawing (from scratch).

Make a New Layer (using the Layer Properties box)

- Layer Name: Mouse
- Current Layer: Mouse
- Layer Color: White
- Click OK

Pline ↵

- Pick the beginning point of polyline
- (set width of line = 10) **W** ↵; **10** ↵, **10** ↵
- Pick 4 points
- **A** (arc) (you should still be in the pline command)
- Pick point
- **L** (return to drawing a line within the pline command)
- Pick point
- Enter (↵) to terminate command

Save drawing using the Save command from the File pulldown Menu.

- Drawing name: exercises.dwg

(Teaching point: Pline entry using a mouse for straight and curved lines)

Exercise (1b)

Using Pline to draw multi-segment lines using coordinates.
(Assign x, y values through coordinate value, z value is assumed = 0 unless otherwise assigned.)

Open exercises.dwg if it is not already open.

Make a New Layer (using the Layer Properties box)

- Layer Name: Coords
- Current Layer: Coords
- Color: White
- Click OK

Pline ↵

- **144,2841** ↵
- **2319,3361** ↵
- **4850,2960** ↵
- **5702,3503** ↵
- **6955,2912** ↵
- Enter (↵) to terminate command

Save the drawing.

(Teaching point: Pline entry using typed coordinates. Opportunity to explore color properties, change layer colors for Mouse and Coords to Blue)

Exercise (1c)

Using Pline to draw multi-segment lines using bearing and distances.
(Assign x, y values through bearing and distance, z value is assumed = 0 unless otherwise assigned.)

Open exercises.dwg if it is not already open.

Make a New Layer (using the Layer Properties box)

- Layer Name: Bearing
- Current Layer: Bearing
- Layer Color: Blue
- Click OK

Pline ↵

- Pick the beginning point of polyline
- @1500<15 ↵
- @4239<315 ↵
- @6389<45 ↵
- @10560<170 ↵
- C (to close polygon)

Save the drawing.

(Teaching point: Pline entry using bearing and distances entered with the keyboard)

Exercise (1d)

Use digitized lines to find area and length of objects.

Open exercises.dwg if it is not already open.

List ↵

- Select a non-closed object
- Enter (↵) to end selection (area, length reported)

List ↵

- Select a closed object
- Enter (↵) to end selection (area, perimeter reported)

Save the drawing.

(Teaching point: Value of associated object properties)

Mline

Multiline MLINE 

The MLINE command creates two parallel lines separated by a distance specified by the user. Multilines can be used to easily draw a road, ditch, or any other feature that typically has 2 parallel edges. One drawback to using multilines is that they are very difficult to edit.

When you activate the mline command you will be prompted to select start point or chose justify, scale, or style. Justify changes the way the line offsets from the cursor, scale changes the amount of offset that is set up in style, and style changes the style of the line being drawn.

Construction Lines

Construction line XLINE 

The XLINE command creates an infinite line across the drawing through specified points. These lines can be very useful when establishing baselines in design drawings.

When you activate the xline command you are prompted to specify a point or horizontal, vertical, angle, bisect, or offset.

- Horizontal or vertical uses a point that you specify and creates a line parallel to the x or y-axis respectively.
- Angle can work in 2 ways. First, you can chose a reference line and then specify an angle from the reference line. Second, you can specify an angle from the x-axis and then choose a through point for the line.
- Bisect creates a construction line through a vertex that you choose that evenly divides the angle created by 2 lines that you choose.
- Offset creates a construction line parallel to a baseline that you specify. You first specify the offset distance, then choose the baseline, and then chose the direction to offset.
- You can also create a construction line by choosing two points for the line to pass through.