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INSTITUTE OF APPLIED TECHNOLOGY

AutoCAD 2D I

Module 12

Controlling the Drawing

PREPARED BY

IAT Curriculum Unit

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Module 12

Auto CAD Self-paced Learning Modules

AutoCAD 2D

Controlling the Drawing

Learning Outcomes:

When you have completed the module, you will be able to:

1. Describe drawing limits, extents, scale, and units.
2. Describe and apply the command ZOOM, PAN, REGEN, and VIEWRES to control the drawing.

Controlling the Drawing

Since the AutoCAD drawing is where you will be working most of the time, it is important for you to understand how it works and be able to control it to work for you rather than against you. In this module, limits, extents, scale, units, zooming, panning, and regenerating are covered.

Drawing Limits

The *drawing limits* are always a rectangular or square shape representing the drawing size. Simply, you can think of them as the size of the piece of paper you are drawing on. They can be any size you wish and the size can be changed at any time. The template files that you have been using in your lab exercises already have the limits set for drawing.

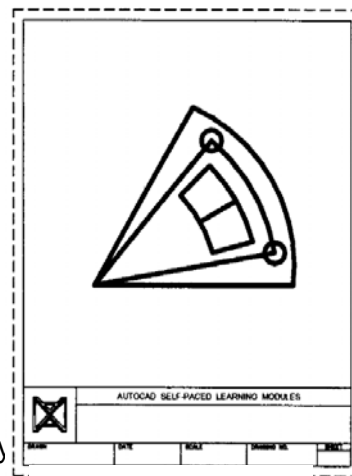


Figure 12-1

The Drawing Limits

Once set, all objects should be drawn inside the limits although it is possible to draw outside of them and there are times you must do just that. They are more of a guide and are useful in plotting and working with grids as you will see in future modules.

Drawing Extents



The *drawing extents* is the smallest rectangle that will fit around all the existing objects in the drawing. It is possible to draw outside the drawing limits and; therefore, an object(s) that is outside the limits may not be visible in the normal drawing display. By being able to display the drawing extents, you will be able to see all of the objects that exist in the drawing.

Figure 12-2

The Drawing Extents

Since AutoCAD allows a drawing to be very large, an object(s) is sometimes placed by accident, somewhere out in space. This can severely derogate the performance of the drawing. Sometimes the only way to work on a drawing that is derogated is to find the erroneous object(s) and erase it.

AutoCAD User Tip No. 12-1

If you are attempting to find all existing objects by displaying the drawing extents, ensure that all layers are visible and are not frozen or off.

Drawing Scale

The general rule, when drawing with a CAD system, is to always draw everything full scale or full size. Almost all the time scaling the drawing is done when it is plotted as you will see in future modules.

AutoCAD User “Must Know” No. 12-1

Always draw everything in full scale or full size regardless of its size. All scaling is done when the object is plotted.

Drawing Units

AutoCAD drawings are unitless. In other words, if you enter a unit of 1 into your drawing and the drawing was originally created in inches, then the 1 means 1 inch. From that point forward, all units entered into that drawing must be entered as inches. If in a second drawing, the operator creates a drawing and picks the units to be millimeters, then all numbers entered in that drawing are millimeters.

To sum up, when a drawing is first started, the operator must make a decision as to what units will be used for that drawing. There are ways to change the units of drawing but you will learn how to do that in later modules.

AutoCAD User “Must Know” No. 12-3

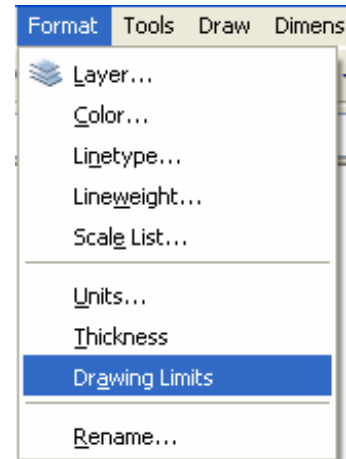
AutoCAD drawings are unitless. The operator who creates the drawing makes the decision of what units will be used for the new drawing. From that point forward, all units must be entered in those units.

AutoCAD Command: LIMITS

The LIMITS command is used to set the limits for the drawing.

Command Line Syntax:

Command: **LIMITS**

**Using the LIMITS Command**

Command: **LIMITS**

Reset Model space limits:

Specify lower left corner or [ON/OFF]<0.0,0.0>:

(Notice the lower left origin is X0,Y0. It should be left as is.)

Specify upper right corner<8.5,11.0>:**17,11**

(Enter the upper right limits to X17,Y11. The drawing limits are now set to 17X11 drawing units.)

Command:

Zooming and Panning**Zooming**

Zooming is the process of moving the drawing closer or further away from your eyes without actually changing the size of any existing objects. It is an important tool for the AutoCAD Operator and is used extensively in the drawing process. Drawing can be very large and therefore you must be able to zoom in to see what you are doing and back out again to work with the overall drawing. As you do this, you are not changing the size of the objects, you are simply adjusting the distance the objects are from your eyes.

AutoCAD User Tip No. 12-2

If you have a mouse with a wheel as the center button, you can use it to zoom in and out of your drawing by rotating the wheel forward or backward. Using the wheel to zoom will increase your drawing speed greatly. If you don't have a wheel mouse, you must use command to accomplish the same thing.

AutoCAD Command: ZOOM

The LIMITS command is used to move the existing objects closer or farther away from your eyes without changing their physical size.

Command Line Syntax:

Command: **ZOOM** or Command: **Z**



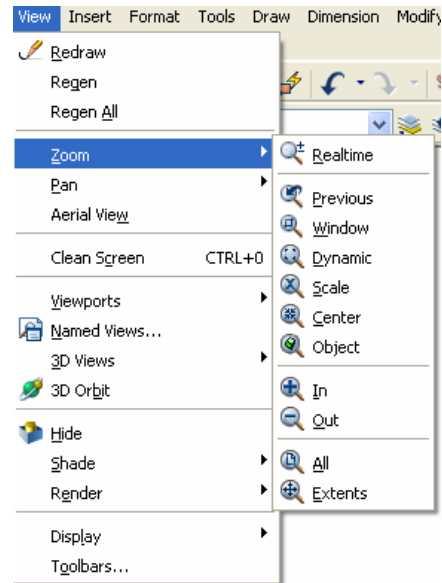
Zoom Window



Zoom Extents



Zoom All



Using the ZOOM Command

Command: **ZOOM**

Specify center or window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window]<real time>: **W**

Specify first corner: **PICK 1**

Specify opposite corner: **PICK 2**

(The window option allows me to pick two opposite corners of a window to zoom to.)

Command: **ZOOM**

Specify center or window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window]<real time>: **A**

(The All option zooms the drawing limits plus any objects that are outside the limits to fill the screen)

Command: **ZOOM**

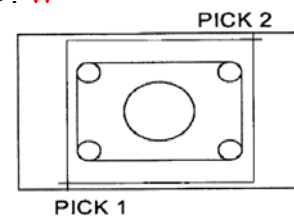
Specify center or window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window]<real time>: **E**

(The Extents option zooms all existing objects in the drawing to fill the screen.)

Command: **ZOOM**

Specify center or window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window]<real time>: **P**

(The Previous option returns the last zoomed state.)



AutoCAD User Tip No. 12-3

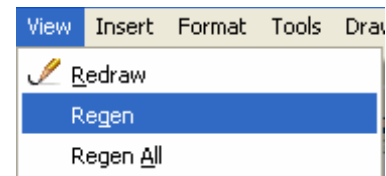
The ZOOM Previous command allows you to step back through the previous zoomed states. This allows you to quickly zoom in on an object, draw or edit and then return back to the previous zoomed state.

The REGEN Command

The REGEN command rebuilds all drawing objects from the .DWG file and displays them on the screen.

Command Line Syntax:

Command: **REGEN** or Command: **RE**



Panning

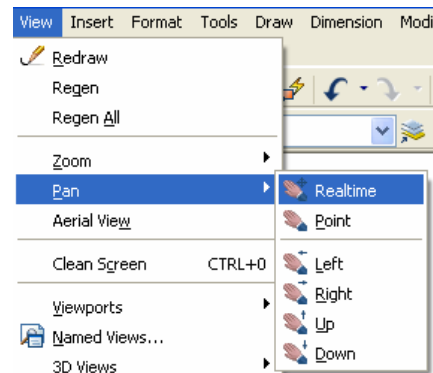
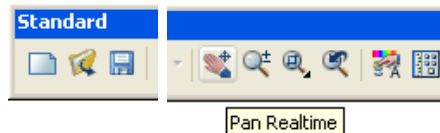
Panning is the process of moving the drawing around the computer screen without actually physical moving any of the objects on the drawing. The best way to do this is with the middle button of your mouse. If you have a wheel mouse, push the wheel down for the middle button. To pan around your drawing, move the graphic cursor to the location you are currently working on and push the middle button down and hold it. A cursor shaped like a hand will replace the graphic cursor. Move the hand and the drawing will pan with it. If you don't have a wheel mouse or a three button mouse, you can use the PAN command.

AutoCAD Command: PAN

The PAN command is used to move the drawing. Around the computer screen.

Command Line Syntax:

Command: **PAN** or Command: **P**



Regenerating the Drawing

AutoCAD stores all existing objects and their properties in a database format in the .DWG file. When you open a drawing, AutoCAD must open the .DWG file and rebuild the objects one at a time displaying them onto the computer screen.

There are times you are required to rebuild your drawing from the .DWG file. This is called *regeneration*. There are many reasons for regeneration and they will become clear to you as you work your way through the AutoCAD Modules. Some AutoCAD commands regenerate the drawing automatically, but not all of them. Therefore, it is

up to you to execute the REGEN command to force AutoCAD to display the result of the previous command.

AutoCAD Command: VIEWRES

The VIEWRES command sets the number of lines that AutoCAD builds or regenerates for all Circles and Arcs in the drawing.

Command Line Syntax:

Command: **VIEWRES**

Using the VIEWRES Command

The VIEWRES command sets the number of lines that AutoCAD builds or regenerates for all circles and arcs in the drawing. By setting a higher circle zoom percent, the circle and arcs in your drawing will display much smoother. AutoCAD cannot draw an actual circle on the screen. What it draws is a many-sides polygon. The more lines it uses in the polygon, the smoother the circles and arcs appear.

Command: **VIEWRES**

Do you want fast zoom?[Yes/No]<Y>:**Y**

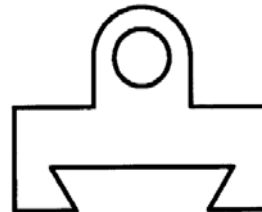
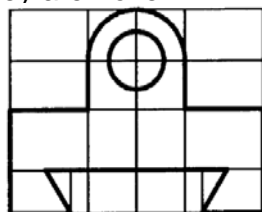
Enter circle zoom percent{1-20000}<100>:**2000**

Regenerating model.

Command:

Reminder – Using Construction Objects

In Module 8, there was a geometry lesson on using the Construction layer. Review it, if necessary. From this point forward in the all lab exercises, you will be asked to create a layer named Construction, color 253. Draw all construction objects on this layer. When required, simply thaw the construction layer to see the construction objects. See the drawing below. The object on the left has all the construction objects displayed. The one on the right, they are frozen.

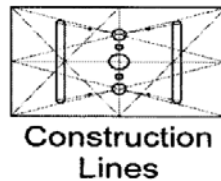
**AutoCAD User “Must Know” No. 7-4**

At times, you are required to generate your drawing from the .DWG file. Drawing regenerating is accomplished with REGEN command. If you are in doubt about current appearance of your drawing, regenerate it.

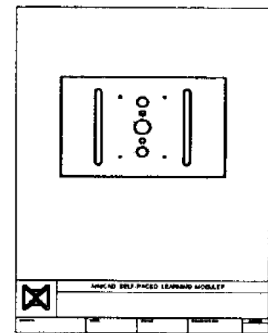
Lab Exercise 12-1			Time Allotted: 30 min.	
Drawing Specifications				
Name	Template	Units	Text Style	Font
AutoCAD 2D Lab 12-1	Module Template A4	Millimeters	N/A	N/A
Note: Color, Linetype and Lineweight are all 'ByLayer' unless otherwise instructed.				
Layering Scheme				
Objects on Layer	Name	Color	Linetype	Lineweight
Construction Objects	Construction	253	N/A	N/A
All Objects	Object 1	Red	N/A	N/A

Instruction:

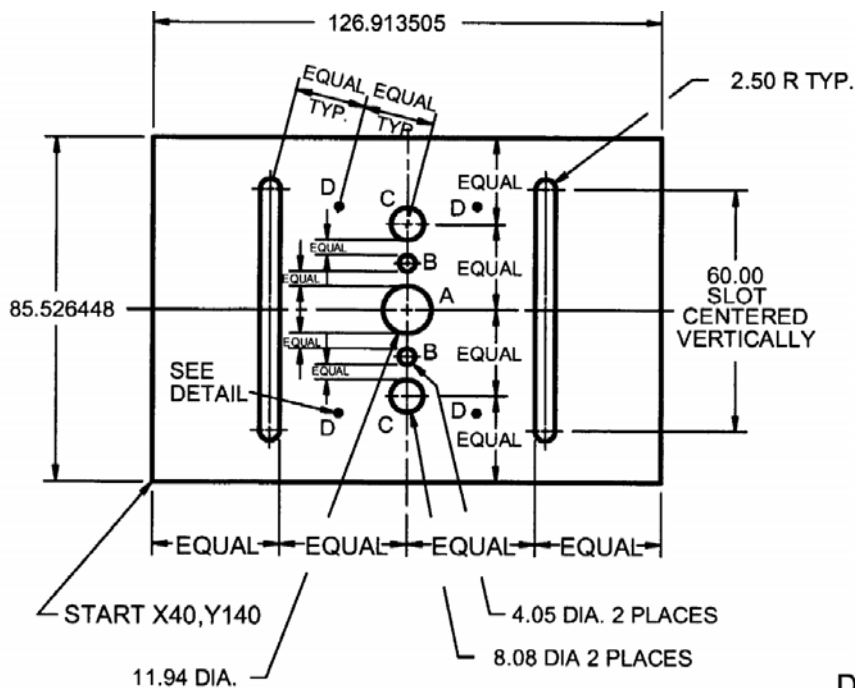
1. Setup the layers using the Layering Scheme above.
2. Draw all construction objects on layer Construction and freeze it when complete.
3. Draw the object shown below.
4. Set the Viewers to 5000.
5. Regenerate your drawing.
6. Check your drawing with the key.



Note: Do not use a calculator to complete this lab exercise or any other lab exercise in the AutoCAD Modules. By using geometry principles and techniques, objects snapping and construction objects, AutoCAD will do all the math for you.



Completed Drawing

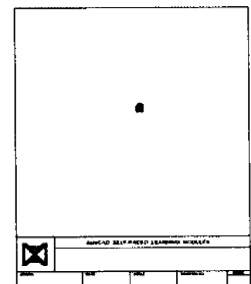


DETAIL OF
CIRCLE D

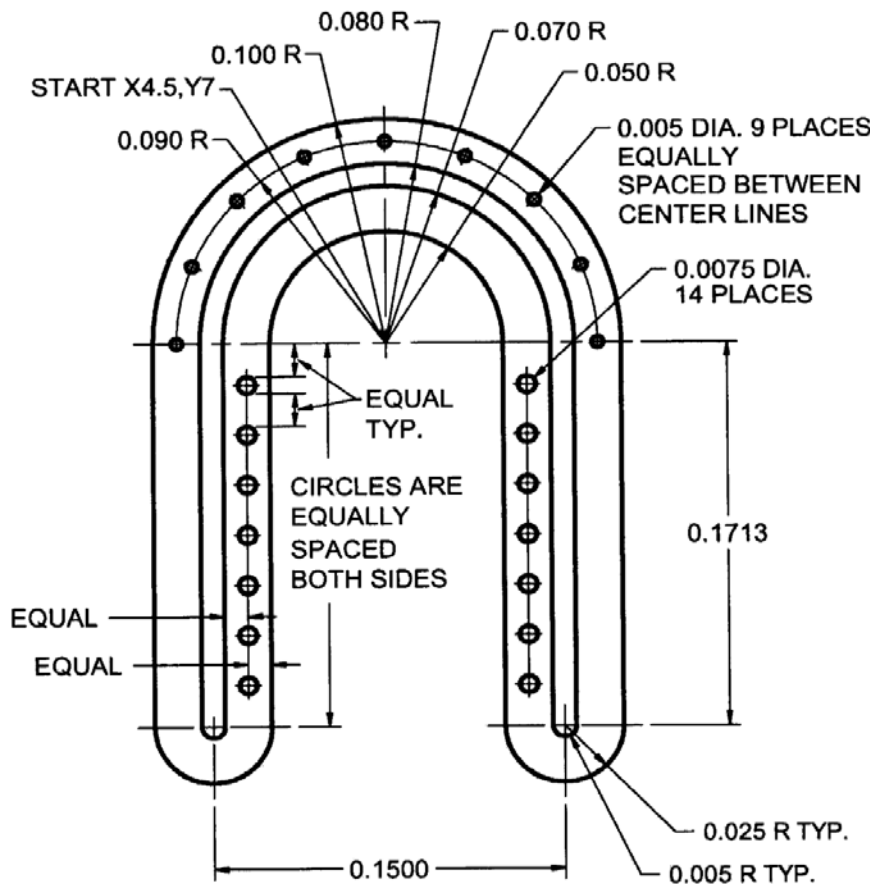
Lab Exercise 12-2				Time Allotted: 30 min.
Drawing Specifications				
Name	Template	Units	Text Style	Font
AutoCAD 2D Lab 12-2	Module Template A	Inches	N/A	N/A
Note: Color, Linetype and Lineweight are all 'ByLayer' unless otherwise instructed.				
Layering Scheme				
Objects on Layer	Name	Color	Linetype	Lineweight
Construction Objects	Construction	253	N/A	N/A
All Objects	Object 1	Red	N/A	N/A

Instruction:

1. Setup the layers using the Layering Scheme above.
2. Draw all construction objects on layer Construction and freeze It when complete.
3. Draw the object shown below.
4. Set the Viewers to 10000.
5. Regenerate your drawing.
6. Check your drawing with the key.



Completed Drawing



Note: Do not use a calculator to complete this lab exercise or any other lab exercises in the AutoCAD Modules. By using geometry principles and techniques, objects snapping and construction objects, AutoCAD will do all the math for you.

Hint: To insert the circles around the arc, draw a construction arc and insert a circle at the midpoint of the arc. Then erase the arc and insert another one. Repeat the same procedure to draw the next circle. The circles along the line are inserted using the same principles but this time with a construction line.