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## **ASSIGNMENT # 02**

### **TWO-DIMENSIONAL VIEWS OF A 3-D DRAWING**

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**Program:** BE-Aerospace, Fall 2023

**Course code:** AE-103 (Engineering drawing and Graphics)

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**Date:** May 10th, 2024

# **Report of drawings**

## **Introduction**

In the domain of engineering, drawings are a means of communicating engineering knowledge between individuals related to the domain. The following assignment helps us to delve into the safe practices of using digital software instead of conducting manual drawing at this stage in life. It ensures the usage of all the basic tools and functions of AutoCAD in the formation of two-dimensional views of any real-life three-dimensional item. This, in turn, leads to the betterment of visualization and imagination and provides us with the very basic knowledge of the above-mentioned software.

## **Objectives**

The main objectives of the assignment are to

- Familiarize oneself with the use of a digital tool i.e. AutoCAD.
- Provide oneself with the usage of basic functions in the software like pan, fillet, etc.
- Helps oneself to develop better visualization skills.
- Getting a knowledge of dimensioning standards and tools.

## **Task**

The task was to draw three 2-D views (front, top, either left or right) of three 3-D drawings as given keeping in view the spacing and position of each view, taking the usage of basic functions of AutoCAD learned in previous lab practices.

## **Steps followed**

The following are the steps that were defined for each set of views in drawings.

(Note: Try to pay specific attention to the clarity of dimensioning and size)

## **Drawing 1**

1. For the 1st drawing, three views had to be drawn (front, top, and left). Keeping in mind the position of each view, vertical and horizontal spacing is conducted after drawing the border lines.
2. For the front view, only the use of horizontal and vertical lines came into action.

3. For the top view, which is drawn below the front view, again simple basic functions of horizontal and vertical lines and circles (either diameter or radius) are used. There is use of another basic function which is trim for the cutting of extra parts in the drawing of semi-circle.
4. In the left side view, simply horizontal and vertical lines are used.
5. The figure is completed after drawing the hidden edges in each view by hidden lines (colored).
6. The last step is to mark dimensioning in each view while keeping in mind the clarity of each dimension (as in size and spacing) and avoiding the overlapping and repetition of each dimension in multiple views.

## **Drawing 2**

1. For the 2<sup>nd</sup> drawing, draw the border lines first with the required measurements and do the proper vertical and horizontal spacing for multiple views.
2. For the front view, the mirror function can be used as the view is symmetrical on either side. Any of the half sides is done using basic horizontal, and vertical lines and circles and is simply mirrored to form the other half of the view.
3. One more function is used and that is the fillet function to give the pointed corners a round shape of a particular radius on the top two corners of the first view.
4. Moving on to the top view drawn below the front view, again the mirror and offset functions are used to get the view of the required side.
5. The left side view is simply drawn by horizontal and vertical lines with no use of any other extensive function.
6. Lastly, hidden lines are drawn to show the hidden edges and dimensioning is done carefully to avoid overlapping and maintaining clarity.

## **Drawing 3**

1. For the 3<sup>rd</sup> drawing, there is a change in the location of the views as the drawing requires the right-side view to be drawn instead of the left-side view.
2. After drawing the border lines and performing vertical and horizontal spacing according to the required dimensioning, move towards drawing the views.
3. For the front view, the function of mirroring can be used to draw symmetrical lines and circles on either side. The fillet function is also used to round the top edges of the view.
4. For the top view to be drawn just below the front view, simply fillet and mirror functions are used to get the required view.
5. Similarly, for the right-side view, vertical and horizontal lines are used after properly understanding the lines to be included.

6. Lastly, hidden edges are drawn by the hidden colored lines, and proper dimensioning is done.
7. Although this was a bit extensive figure, there is just a need for better visualization to imagine and draw any kind of view of a three-dimensional object.

## **Basic Functions of AutoCAD**

- **Pan**

Pan is a function that is used to move the screen (drawing area) without affecting the zoom level. It can be selected by writing 'PAN' anywhere on the screen. IT smoothly guides us to see each part of the drawing.

- **Mirror**

An important function in many drawings is the mirror function. As the name indicates the reflection of something, the mirror function is the same thing. It is used in the drawing of symmetrical views. Half of the side is drawn and the remaining half is mirrored by selecting the mirror function. For the mirror function to act, first one must select the objects to be mirrored and then the axis. It helps in the creation of symmetrical features easily and quickly.

- **Fillet**

A function used for smoothing out the sharp corners is the fillet function. A fillet can be drawn with the radius of any value. For the fillet function to work, one must first select the lines that are needed to be rounded and then the value of radius is entered to get the smooth, rounded corner of the desired value of radius.

- **Offset**

Offset provides for the drawing of parallel lines with a particular value of distance between them. The desired line is selected first and then the offset distance is selected to perform the function. By the offset function, one can easily draw parallel lines with a specific distance between them.

- **Trim**

As the name indicates, trim means 'to cut'. The trim function is usually used to cut out the unnecessary parts in any drawing. It is used for shortening lengthy lines and cleaning up the unwanted parts of any kind of drawing. The trim function is selected by either selecting its option on the control bar or by typing 'TRIM' anywhere in the drawing area.

- **Line type**

Line type is not a function, rather it is a property to change the characteristics of any line like color, size, etc. In different drawings, there is a demand for the usage of different lines so that the other person can easily understand the three-dimensional object. Also, one can use different colors to differentiate different lines like hidden lines, center lines, and construction lines.

- **Centre Mark/Centerline**

The centre mark is usually for any circle with any value of radius/diameter while the center line can be drawn through a circle as well as for finding the centre points of either simple horizontal or vertical lines.

- **Dimensioning**

Dimensioning is a very important feature of any kind of drawing. One cannot convey the full text and content if the dimensioning is not conveyed and checked by using the measure function in AutoCAD.

(Kindly pay attention to the size of the dimensions).

## **Conclusion**

The assignment provides for making 2-dimensional views of a 3-D object using software tools like AutoCAD. Focusing on the basic functions like mirror, pan, offset, etc, we were able to effectively translate the visual data into clear and concise dimensions. This not only provides a means to get familiarized with AutoCAD but also improves our understanding and promotes better visualization and imaginary techniques.