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Projection Recommendation of Various Object Visualization on a Different Projection Plane

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Abstract: ***In orthographic projection an object is represented by two are three views on the mutual perpendicular projection planes each projection view represents two dimensions of an object. Projection is defined as an Image or drawing of the object made on a plane. The lines form the object to the plane are called projectors. The two views thus required are to be obtained on two different planes which are mutually perpendicular (one HP and one VP) with the object remaining in the same position. The projection or the view obtained on the horizontal plane is called the top view or plan and the view obtained on the vertical plane is called elevation. The placement of the front and top views when the horizontal plane is unfolded will be different in these two systems.***

Keywords: orthographic projection, projection planes, top view, elevation, technical drawing

1.Introduction

3-D objects and structures are represented graphically on 2-D media. All projection theory is based on two variables. (1) Line of sight, (2) Plane of projection**. Principles of Projections:** the reader has been familiar Observer, Object and Projection of Plane in 3-dimensional object i.e. length, breath and height., always in F. V. of any 3D object we see the length and height of object and T.V. we see the length & breath and in S.V. we see the breath & height of object. There are types of projection in that basically.

(**A)Parallel projection**: Distance from the observer to the object is infinite, projection lines are parallel – object is positioned at infinity. Less realistic but easier to draw, (2) All lines of sight start at a single point.

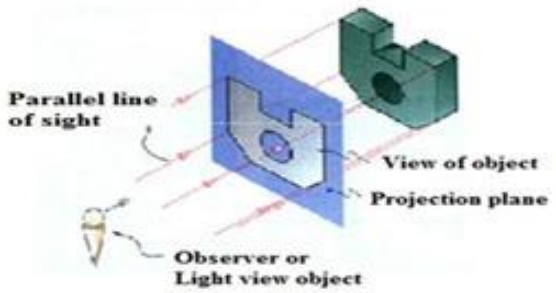
(B) Perspective projection (1) Distance from the observer to the object is finite and the object is viewed from a single point – projectors are not parallel. Perspective projections mimic what the human eyes see; however, they are difficult to draw. (2) All lines of sight are parallel. (3) It is difficult to create. (4) It does not reveal exact shape and size.

2.Literature Survey of Orthographic Projection

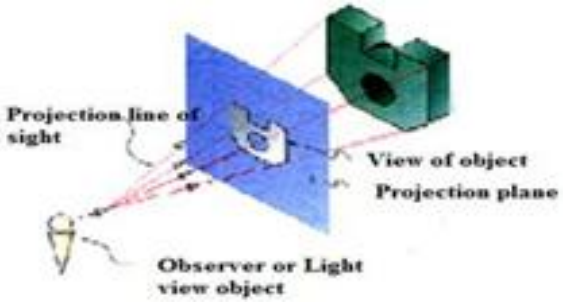
In any Engineering drawing book Orthographic projection is a means of representing three-dimensional objects in two dimensions. Orthographic projection is a form of parallel projection in which all the projection lines are orthogonal to the projection plane,[2] resulting in every plane of the scene appearing in affine transformation on the viewing surface. The obverse of an orthographic projection is an oblique projection, which is a parallel projection in which the projection lines are *not* orthogonal to the projection plane.

3.Process of Drawing of Orthographic Projection

In Engineering Drawing, we sole very easy way of orthographic projection. Generally, in this you get more confident when you make more practice with imagine the 3D object with different views. But simple & easy practice is always we see the plane making angle to the direction of the eye of the observer but the plane which making angle 0 °& 180 ° to the direction of eye of the observer it is seen as line although it is Plane.]



Perspective Projection



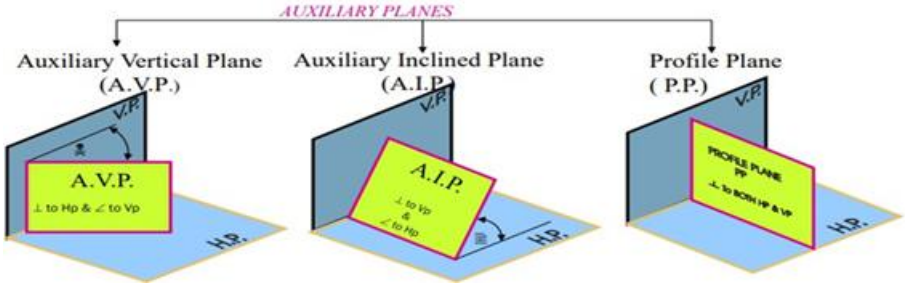
Parallel Projection

Drawing steps: (1) first we **find Area** & draw the **Area** in which we see the F.V & draw that area with Length & Height. [Always we see the Length & Height of any object in F.V.] (2) **Identify the plane** in which we see F.V. [i.e. plane which has some angle between 0° to 180° but not 0° & 180 ° to eye of observer angle plane is seen as line although it is plane than similarly draw T.V. & S.V.] So firstly, of any 3D object first we must draw

the F.V. of the object with L & H than we know that **always exactly below F.V. we get T.V**. So, after drawing F.V. we must draw X-Y line than by taking projection of F.V. we draw 2 vertical line below xy line than on one line take one point & draw parallel to xy line than with the breath of object we get another point on first vertical line & from that again we draw parallel line to xy line so we get area in which we draw the T.V. [**T.V. with Length & breath]** than draw again reference line x-y beside the F.V. & T.V. than draw area i.e. Draw horizontal line from extreme point of F.V. we get Height of object & than transfer breath by extreme point of T.V. in S.V. The projection theory is based on two variables: 1) Line of sight: Line of sight: is an imaginary ray of light between an observer's eye and an object, there are 2 types of LOS: Parallel projection Perspective projection 2) Plane of projection [image plane or picture plane]

General Information about Orthographic Projection:

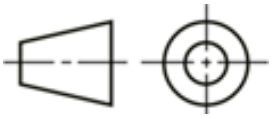
[A]



[B]

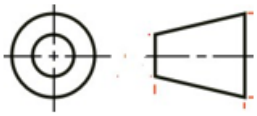
1ST angle projection Method

Projection plane placed other side of the object from viewer and viewer
Object is placed in 1st Quadrant.
Primarily used in Europe & Asia
Symbol is



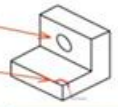
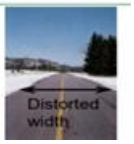
3rd angle projection Method

Projection plane placed between the object and viewer.
Object is placed in 3rd Quadrant
Primarily used in USA, Japan
Symbol

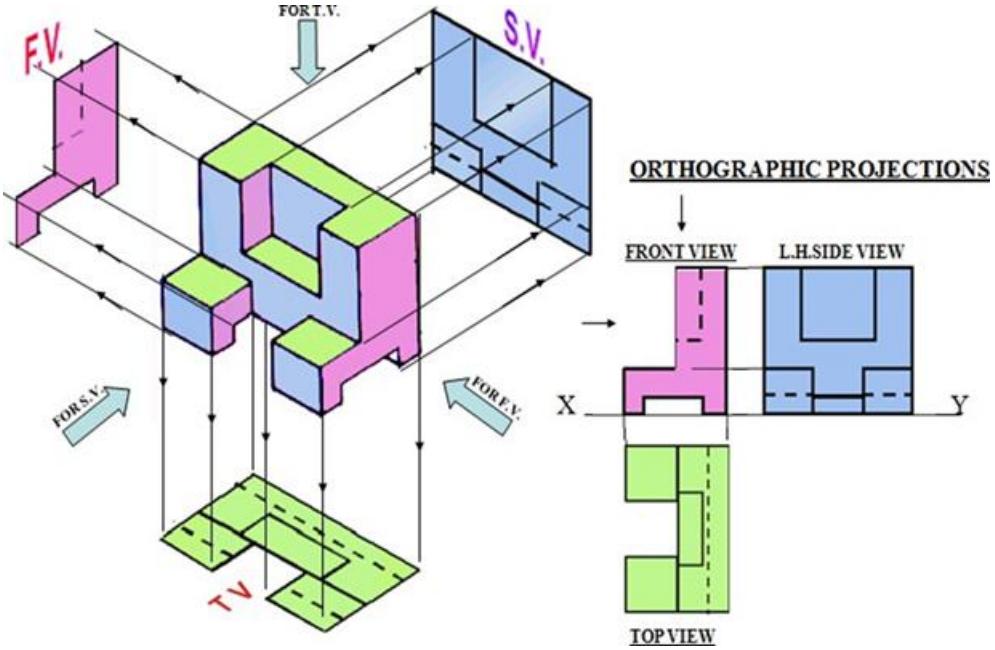


[C]

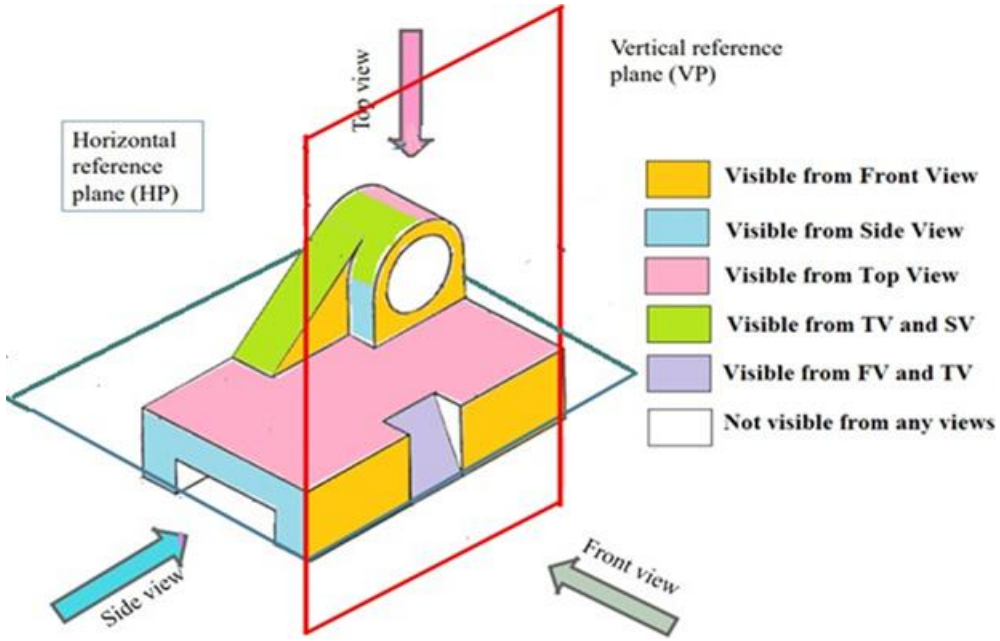
View comparison

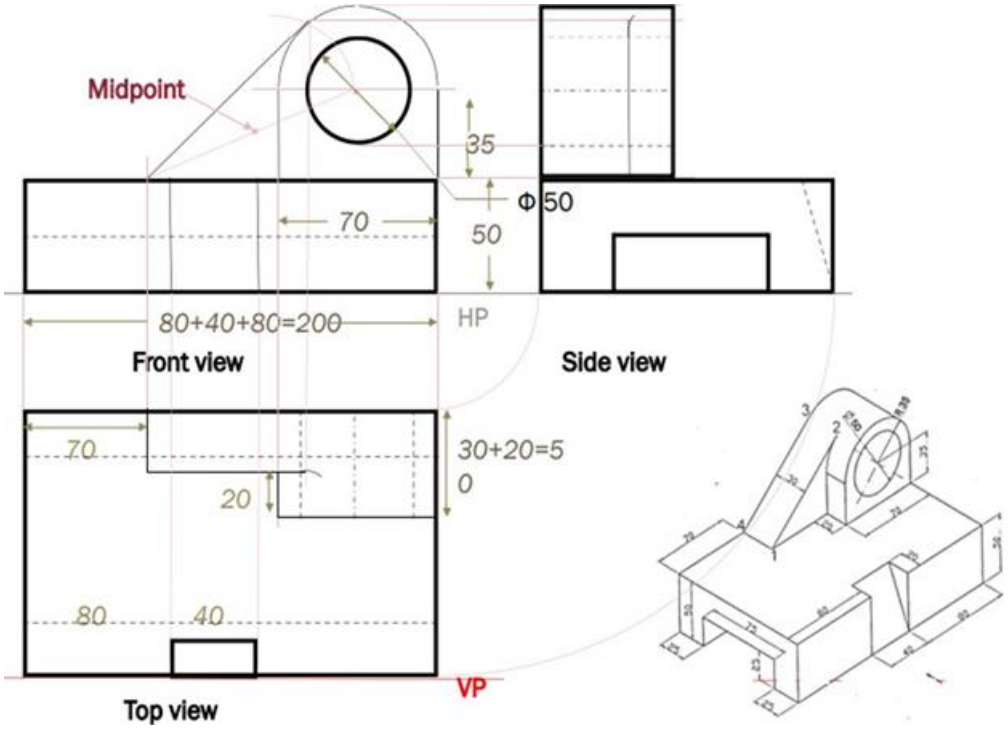
Type		
Multi-view drawing 	● Accurately presents object's details, i.e. size and shape.	● Require training to visualization.
Pictorial drawing 	● Easy to visualize.	● Shape and angle distortion  Circular hole becomes ellipse. Right angle becomes obtuse angle.
Perspective drawing 	● Object looks more like what our eyes perceive.	● Difficult to create ● Size and shape distortion  Distorted width

[D]



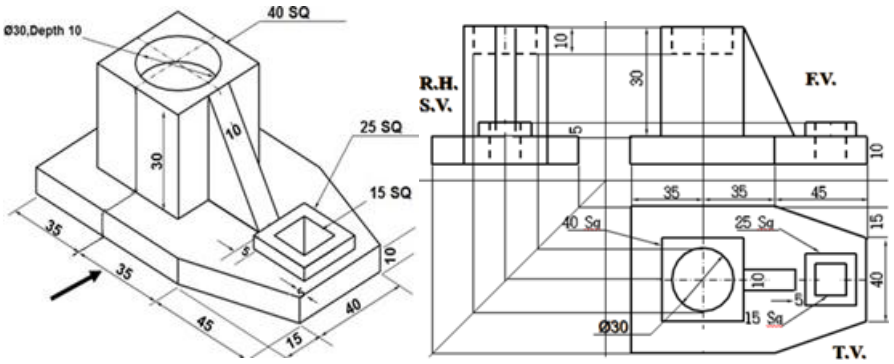
[E]



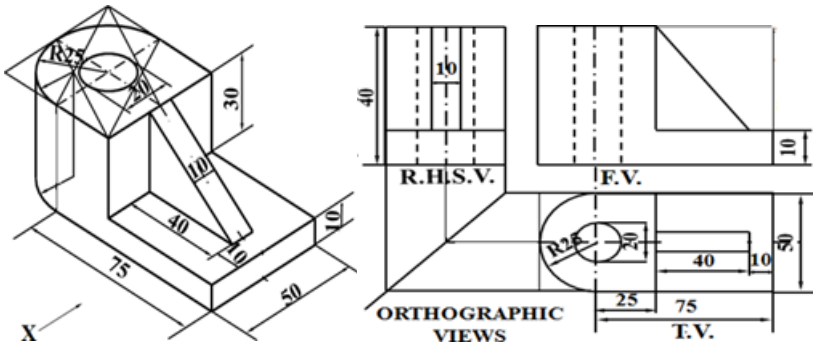


Let us start with taking any simple problem.

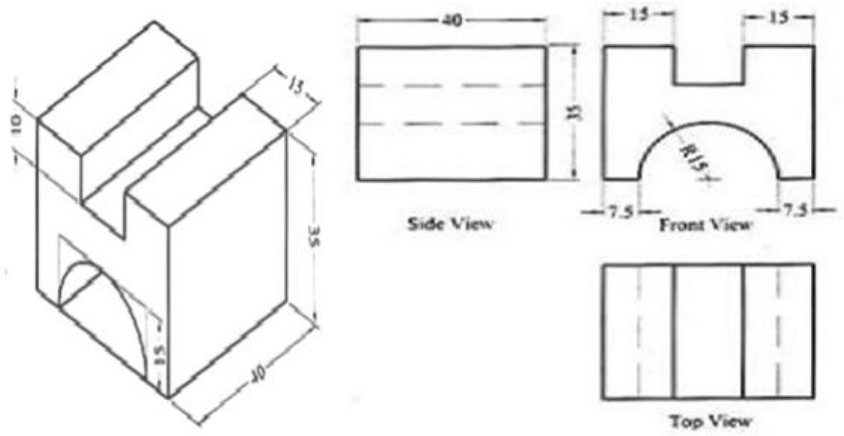
[1]



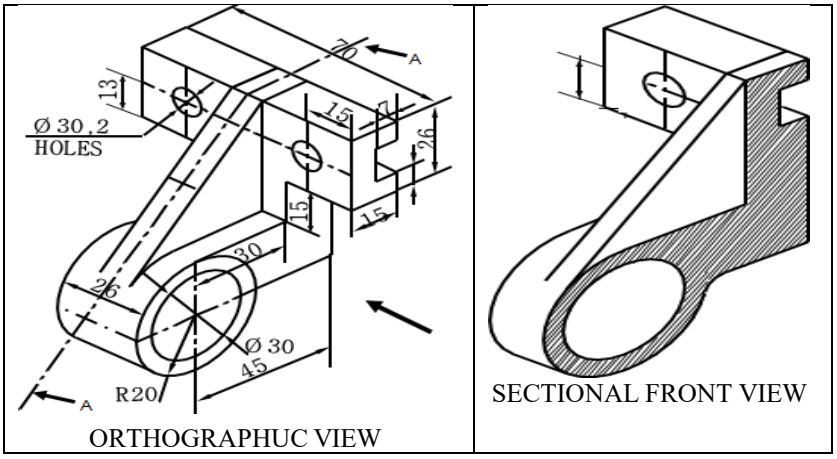
[2]



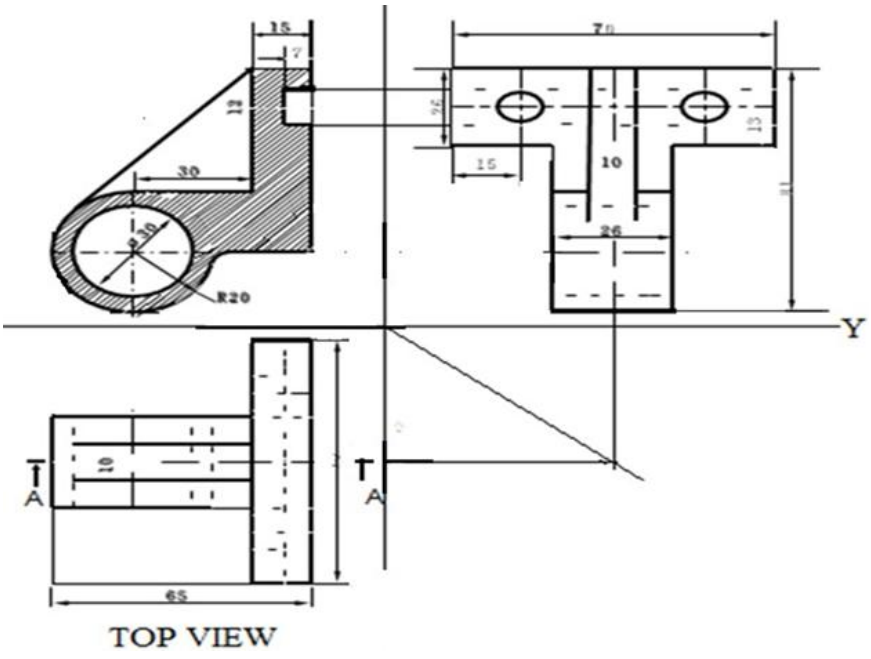
[3]



Sectional views: In this object is cut by cutting plane & removing half part of object outside & then view remaining object. i.e.(1) if you draw sectional F.V than always cutting plane is view as a line in T.V& S.V. than based on direction of cutting plane we see the remaining object.(2) Based on direction of cutting plane we see the remaining object show sectional line at 45° in which cutting plane touch the material of object during cutting of object except web which has very less thickness it is cut by cutting plane but you are not shown the section line in web it used only for supporting two member.



Always after cutting the any object half part of the object removed & than remaining object visualize & make a necessary projection of the object.



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