Engineering Graphics and Design
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Lecture 29
Examples

Hello friends, my name is Akash Deep and I am a TA in this course name, Engineering Graphics and Design. In this week Professor Naresh has discussed about pictorial drawings and construction of isometric drawing. In this session, we will solve a question regarding the drawing of isometric views.

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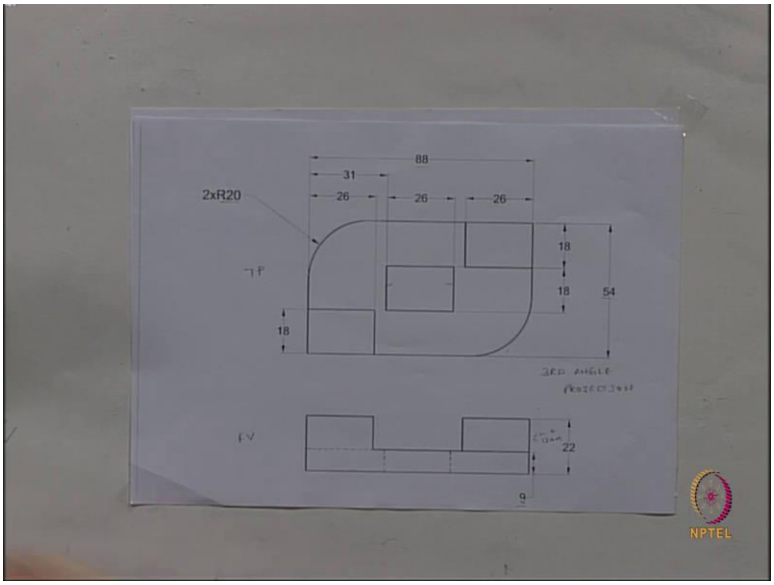

So, let us see the question. In this question, we need to draw the isometric view from these two orthographic views. This is the top view, this is the front view and we need to draw the isometric drawing since the top view is above, so it is a third angle projection. Now, before drawing the isometric drawing, we first need to visualize this solid we first get the mental picture of the solid from these two projections.

So, analysing the top view, we have a rectangle having two fillets, this rectangle has two small rectangles on it, having dimension of 18 mm and 26 mm in the mid of it, we have a rectangular cut of dimension 18 mm and 26 mm. In top view, we can see this rectangle as a rectangular slab

or cuboid having thickness of 9 mm, we have these dash lines, because of this rectangular cut this edges of rectangular cut will not be visible on seeing from front.

So, these dash lines are there for these edges. This dash line is there because of this edge. So, in this way, we have a rectangular slab on which we have two rectangular or cuboid pultrusions. The angular slab had dimension of 54 mm × 88 mm with a thickness of 9 mm, these two pultrusions have dimension of 18 mm × 26 mm × (22- 9) which is 13 mm and the rectangular cut in the mid have a dimension of 26 mm × 18 mm with a depth of 9 mm, we have two fillets at the two opposite ends that fillets have a radius of 20 mm.

So, in this way, we can have the idea of the solid which we have from these two projections. Now, in order to visualize it and get more confidence, I have the model of this drawing. This is the model of these predictions. As we can see, it is a rectangular slab or a cuboid having two fillets and two pultrusions cuboidal pultrusions, a rectangular cut in the mid, this dimension is 54 mm this dimension is 88 mm. Now, this is the top view as we can see in top view, we have this rectangle these two small rectangles and this rectangular cut.

Now, this is the front view, in front view, we can see the thickness of the slab the thickness of pultrusions and since this edge will not be visible in front view. So, we can have the dash lines. Additionally, this edge, this edge will also not be visible on seeing from front, so we have this dash line.

Now, in order to get the isometric drawing, I will first draw this rectangular slab without considering fillets, then followed by these two cuboidal pultrusions. Then I will draw this rectangular cut of dimension 26 mm into 18 mm. Then at the end, I will draw these two fillets. So, let us, start drawing the isometric drawing of this object. In order to get the isometric drawing we will orient this object in such a way that all the three faces of this object will be visible. So, this must be the orientation to get the isometric drawing, so that this surface, this surface as well as this surface will be visible. So, let us draw the isometric drawing now.

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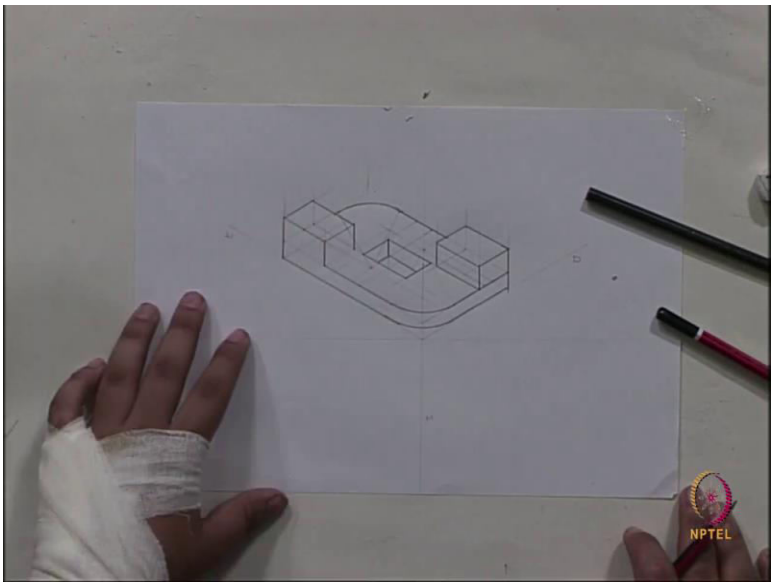

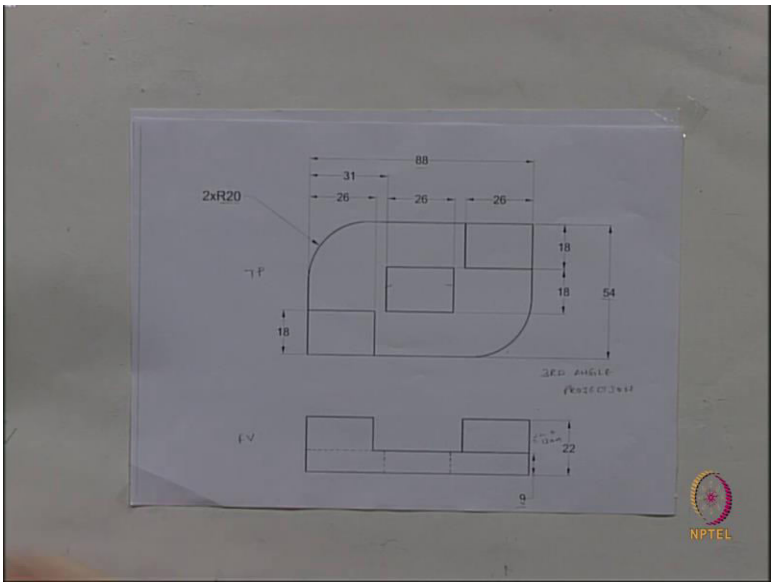

To draw an isometric drawing firstly, we need isometric axis. These are three isometric axis, which are oriented 120 degree from each other. So, this angle will 120 degree, this is 120 degree and this is 120 degree. So, I will orient this solid in this way. So, that this fillet come here, this edge will come here and this axis will capture the width, this axis will capture the depth and this axis will capture the height.

So, this will capture the width, this will capture the depth and this will capture the height. I am just drawing this to get the idea. Now, I will start drawing this rectangular slab without these

fillets. Initially we will start with construction lines and after that we will start drawing outline as per the parts visible to us.

To draw the rectangular base of this slab, I will first mark 88 and 54, this is the dimension of the base of the rectangular slab or cuboid. After marking these dimensions, I will use the parallel lines and connect these parallel lines to get the rectangular slab, these all are construction lines. So, these all should be light and thin. Now, in order to get the height of the cuboid or rectangular slab, I will just extend these points using these as reference. It is a good practice to use isometric axis as reference to draw parallel lines.

Since the height of this cuboid is 9 mm of this rectangle slab is 9 mm, I will mark 9 mm here. Then using parallel lines and connecting these parallel lines, I will get the rectangular slab. Again I am repeating these all our construction lines. So, these all should be thin and light. So in this way, I will get the base or rectangular slab of the object.

Now, I will draw these two cuboidal pultrusions here and here. These pultrusions have dimension of 18 mm × 26 mm and a height of 13 mm. Firstly, I will start with drawing the base of these pultrusions, so I will mark 26 mm and 18 mm. Now, using parallel lines, I will draw the base of this rectangular pultrusion. Now to get the height, I will extend these points to since the height is of 13 mm.

So, I will mark 13 mm using parallel lines I will draw the complete pultrusions. Now, moving on second pultrusion it has the same dimensions 18 mm × 26 mm and a height of 13 mm. So, I will first mark 18 mm, then 26 mm and again using parallel lines and connecting those parallel lines I will get the base of this pultrusion.

Now, to get the complete cuboid I will extend these points and mark 13 mm which is the thickness or the height of this cuboid. Now, again using parallel lines and connecting these parallel lines, I will get the second pultrusion. So, I have drawn the rectangular slab without this fillets, these two rectangular pultrusions.

Now, I will draw this rectangular cut to draw this rectangular cut. Firstly, I need to position this rectangular cut for that I need to position this point in the isometric drawing, this point is 31 mm

from this edge and 18 mm from this edge. So, firstly, I will place this point and using the dimension of this rectangular cut which is 26 mm and 18 mm. I will draw this rectangular cut.

So, let us start locating this point which is 31 mm from this edge. Now, that point is 18 mm from this edge. So, in this way I locate that point. In order to get the rectangular slot, I have the dimension of that rectangular slot, which are 26 mm and 18 mm. So, I will just extend these and mark 26 mm and 18 mm.

Now, using parallel lines I will draw this rectangular cut. Since the thickness of this slab is less, so I need to check whether the bottom edge of this rectangular cut will be visible here or not. To check this I will drop this point and mark 9 mm I need to check whether 9 mm will come here or not. Since 9 mm is the thickness of the slab. Since 9 mm is visible or since 9 mm ends here, so the bottom edge of this rectangular cut will also be visible. So, I will not stop here, but I will draw the bottom edges of this rectangular cut.

Now, I will convert some of the construction line into outlines as per the visibility, these all lines are visible. So, I convert these into outline.if I would start drawing the cuboidal base or the rectangular base using outline or dark line, then there would be some troubles like I need to since this part of the rectangular slab will not be visible.

So, I need to raise that part if I would start my drawing using outline. So, start draw using construction lines only and based on the visibility convert these construction lines into outlines. Now, for rectangular cut. Now, we have drawn this rectangular slab without these fillets, these two cuboidal pultrusions and this rectangular cut.

Now, at the end, I will start drawing these two fillets these two fillets have a radius of 20 mm or diameter of 40 mm. Here this two indicates that we have two fillets. Now, we need to think that for isometric view this edge and this edge this part top part and bottom part of this fillet will be visible. For front fillet top part and bottom part will be visible, but for real fillet only top part will be visible, this bottom part will not be visible.

So, I need to draw two arcs here and one arc here. To draw the arc, I will use the four centre method as discussed in the class. Since the diameter of this arc is 40 mm, so firstly, I need to draw the rhombus of edge length of 40 mm. To draw the rhombus, I will first mark 40 mm here

and 40 mm here then by drawing parallel lines and connecting these parallel lines, I will get the rhombus.

In four centre method we connect we first identify the short diagonal and draw lines using the endpoint of this short diagonal and the midpoint of these two opposite edges. I will connect this opposite end with the midpoint of this edge and the midpoint of this edge. For that I need to first locate the midpoint of these two edges since I need not to draw the full circle.

So, I will find out I will locate the mid centre midpoint of these two edges only. Now, I will join the endpoint of the diagonal to the midpoint of the opposite edges of the rhombus. These all are construction lines. These all should be thin and light. Now, taking this point as centre and this length as radius, I will draw the arc. To draw the bottom fillet, the bottom part of the fillet, either I can use the four centre method again or I will just extend the centre to 9 mm, I will mark 9 mm since the thickness of the slab is 9 mm and taking this point a centre, I will draw the arc of the same length as drawn previously.

Now, joining these I will get the front fillet. Similarly, we will use the four centre method for the rare fillet. Since top part of the rare fillet is visible, so we need to draw the, we need to draw only one arc. I will first draw the rhombus of 40 mm length. Since 40 mm is the diameter of the arc I will mark 40 mm here, then 40 mm here then using parallel lines and joining these parallel lines, I will get the rhombus. Since I am not interested in drawing the full circle, only the one fourth of the circle, I mark the midpoint of these two edges only. This is the midpoint of the first edge and this is the midpoint of the second edge.

Now, joining the endpoint of the shorter diagonal to the midpoint of the opposite edges. To draw the arc, I will take this point as centre and this length as radius and draw an arc now on joining these I will get the arc at the rear end. So, I am able to draw the isometric drawing of this solid. So, in this way we can draw the isometric drawings for other objects too. Thank you for listening.