Engineering Drawing and Computer Graphics
Prof. Rajaram Lakkaraju
Department of Mechanical Engineering
Indian Institute of Technology, Kharagpur

Module – 03
Lecture – 27
Orthographic Projections I (Part-7)

Hello all. Welcome to our Engineering Drawing and Computer Graphics, NPTEL Online Certification Courses. We are in module number 3 and lecture number 27.

(Refer Slide Time: 00:29)

In the last class we have constructed a three-dimensional object; for example, taking this one taking this object we tried to construct front view and top view. And as a homework problem, we asked you to construct this side view. The solution to this problem is this one.

(Refer Slide Time: 00:53)

Here we have to observe the top view lines, the front view lines coincide here and the side view will be completely bounded throughout those lines. And this object will be projected here and this circle will be projected here. The centre of that circle goes there. In today's class, we will look at more details about this is front view top view and side view for different objects.

(Refer Slide Time: 01:42)

Let us look at orthogonal projections for this staircase. So, here we have a block, a rectangular block of 30 mm by 30 mm. The block perhaps fit in this box. So, if we are making something like that within that box this entire staircase construction is fixed.

When we are looking at this staircase connection, the first stair is at 10 mm distance, the second stair also at 10 mm and the rest is also at 10 mm. On this direction after 15 mm we have the step length of another 15 mm. And this is another 15 mm and this one also another 15 mm what we are going to have. Such kind of construction what we are going to make it. Let us look at it step by step. First of all, we have to identify the views. The maximum dimensions visibility happens in this direction. So, pick this one, pick this one for the front view direction and this will be top view direction and this one will side view direction. Now project these views onto different planes. It can be in the first quadrant of projection planes. So, the backside of the surfaces will be opaque.

So, if I am going to project this entire part onto that plane as the front view what we will be seeing is this magenta portion as steps. So, this magenta portion we will see it on that opaque plane as steps.

Because we cannot see these surfaces, the rest of the surface what we can see is this purple one along with this part. So, what we will see for that case? This step we will see.

So, this purple one and this purple one matches and this magenta and this magenta portion match the view. Let us look at the top view. The top view direction is that opaque plane is bottom. So, when we are projecting this one this L shaped one projected into L shape here. This part will be visible there, this step will be visible there as a rectangle and this step visible as another rectangle.

(Refer Slide Time: 05:26)

Similarly, for the side view if we are looking. This is the side view direction; we will be seeing this L shape predominantly and that L shape will be this. This surface we cannot visualize, this surface we cannot visualize; however, this surface and that surface predominantly visible. So, this entire rectangle portion that the entire rectangle portion will be visible. Similarly, this rectangle portion also visible there; that is wayside view supposed to look like. After that, what we will do is; because it is a first quadrant thing, this entire opaque plane comes here for top view. This front view comes at this level by unfolding it and this one we have to unfold it in that direction. So, our side view comes here we are looking from side view from left direction to right direction.

(Refer Slide Time: 06:48)
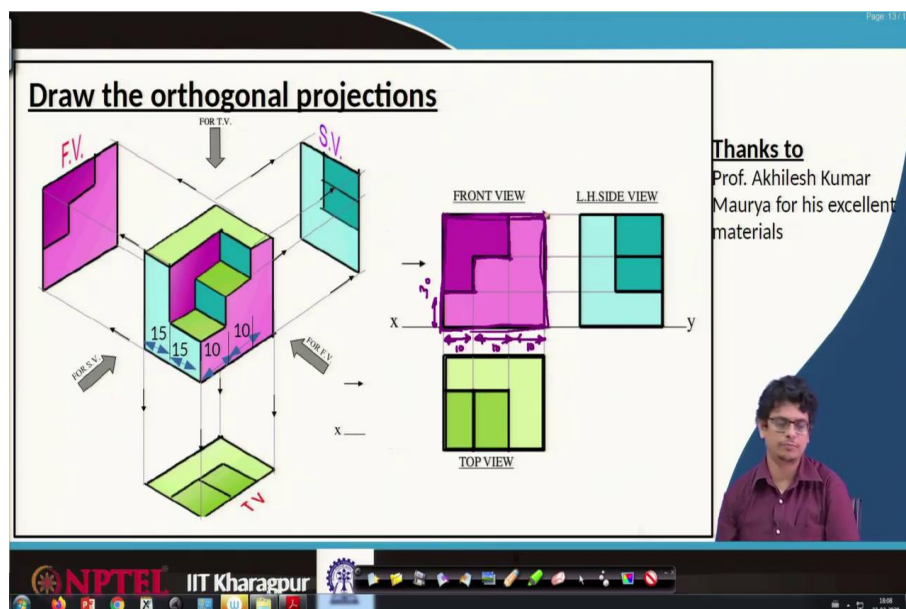
So, it is left side view. This is the way we have to construct these projections. So, after drawing that on the sheet; first one front view we will construct it. This supposed to be 10 mm, again this is 10 mm, this is 10 mm and this one will be 30 mm. So, a 30 by 30 square we will construct it. In that 15 mm, we will ah 10 mm we will go up construct a block, again go 10 mm up construct a block, another 10 mm we will go up and construct a block.

(Refer Slide Time: 07:39)

Once that is done; project these lines down, leave a gap. What we have seen is something like 4 mm to 20 mm gap usually we leave it based on the picture. Again construct one more square 30 mm by 30 mm, in that these lines will be projected down, these lines will be projected down and what we are going to see is this kind of blocks. This is the way we construct the top view. Once that is done, project lines in this direction to construct because this is the line what we are going to project it. Again leave minimum 4 to 20 mm kind of gap, make a square of 30 mm by 30 mm project these lines construct this one. So, it looks like after the projection we will have this picture.

(Refer Slide Time: 08:54)

So, as homework for this section let us visualize this object this kind of pin. So, we have a base here. There is a base plate a rectangular plate on which this kind of pin is soldered or attached this one. So, you can think of it like two objects; one is this plate bottom one.

So, this is dash one goes via that a plate on top of that we have this kind of pyramid kind of structure which is something like a pin we have it. So, such kind of pin is there; the first and second part. Once we attach this second part on top of that it looks like that. If that is the case can we construct views of the object?

(Refer Slide Time: 10:55)
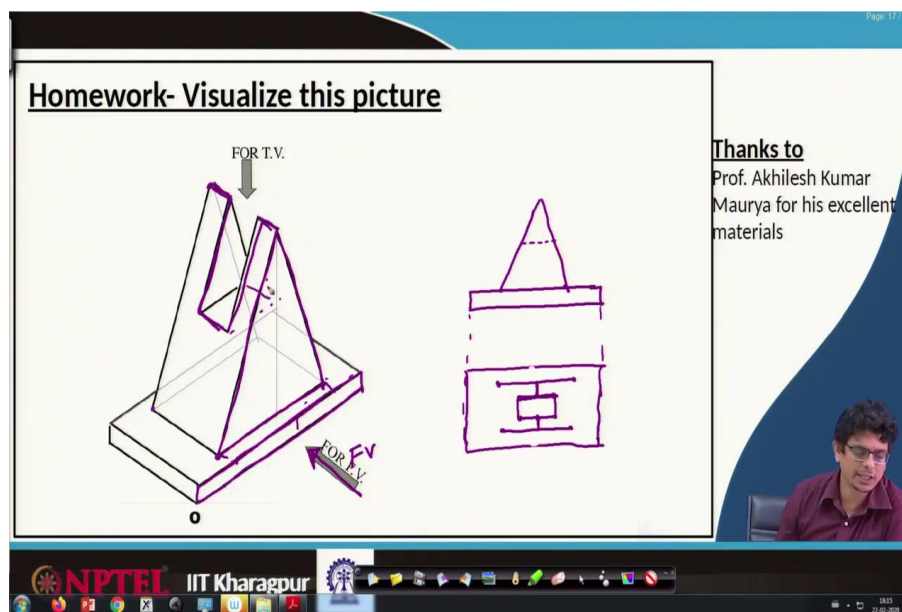
First of all, to do that, we have to decide which direction gives us maximum dimensions and minimal hidden lines; that we will pick it as front view in this direction, this is the front view direction. When we are visualizing that we will be in a position to see this entire plate here this line maps onto that line and this entire portion we will see and these lines map onto that. These lines are also maps onto that and so on. So, if we are drawing frontal view is supposed to look like this one. There is a triangular portion here and there something, like supposed to come and bottom there is something like hidden kind of thing, is going at a certain height there is a slot. So, we are supposed to have such kind of thing. If we are looking from top view this entire thing goes parallel to this. We are going to see this rectangle. So, perhaps this entire rectangle, we will see if there is something like a line at middle. So, somewhere here we have to see a line and that line joins at these points; that means, here somewhere we are supposed to join that. So, let us remove this portion. So, at this point, at this point; two lines supposed to meet in the triangular format. Similarly, on the backside, we have that triangular portions supposed to meet there and

that has a thickness which comes there. So, they're supposed to be again some thickness here and some thickness there a line supposed to go in that direction which meets at that location. Because this length to this is larger this to this shorter length. So, supposed to meet on that. And there should be a line this one supposed to be visible. So, this the way supposed to be visible. And because it is a continuous line here to there it connects the entire triangle, it connects there. And these two supposed to get joined because this line on that side on that side also we will see.

(Refer Slide Time: 13:48)

So, when we are constructing that some of the views like front view match this is the way what we got. What we have drawn is; this portion we have drawn, this one also we have drawn and this portion we have drawn, but this line supposed to match this line. So, it should be a closed object we are supposed to see.

Thank you very much. In the next class, we will look at different few more problems and how to construct their views.