Technical Arts 101
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Lecture - 4
Think and Analyze

Think and Analyze - TA101, lecture number 4. So, let us take a look at one of the examples in orthographic views, but before that some fun.

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Are you available on Fridays or Saturdays for your Auto CAD workshop? If you are, wonderful, we will arrange for the workshops on what the two days or at the both days. So, you are twelve batches, we will divide those batches into six and six. So, six can go on Fridays, and six can go on Saturdays, and then the next week we will have the Auto CAD lab, you know Fridays. Monday we have bunch of lectures, Tuesday bunch of lectures, Wednesday, Thursday bunch of lectures, come Friday and you ((Refer Time: 01:10)) right Friday. Anyways, do not worry about that does not matter.

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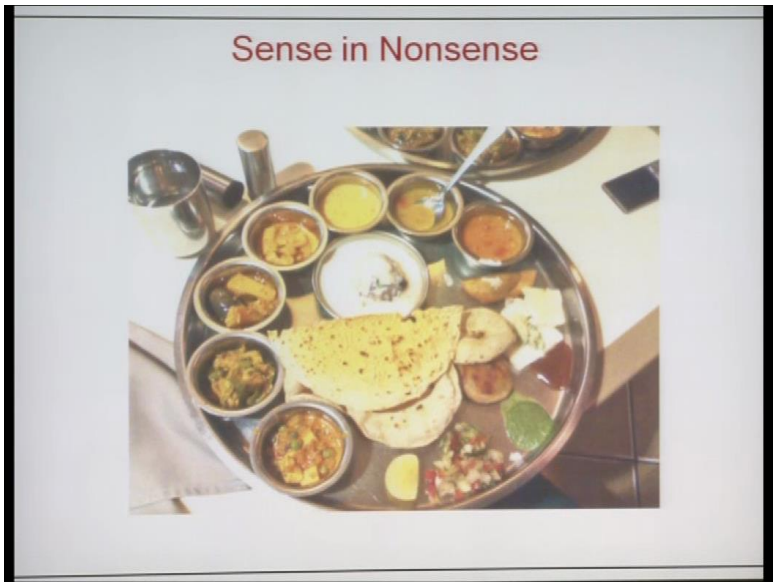

Sense in nonsense, some more fun, did you have a lunch yet its two o clock? So, the reason why I have post this picture up is to make a point, we tend to spoon feed you.

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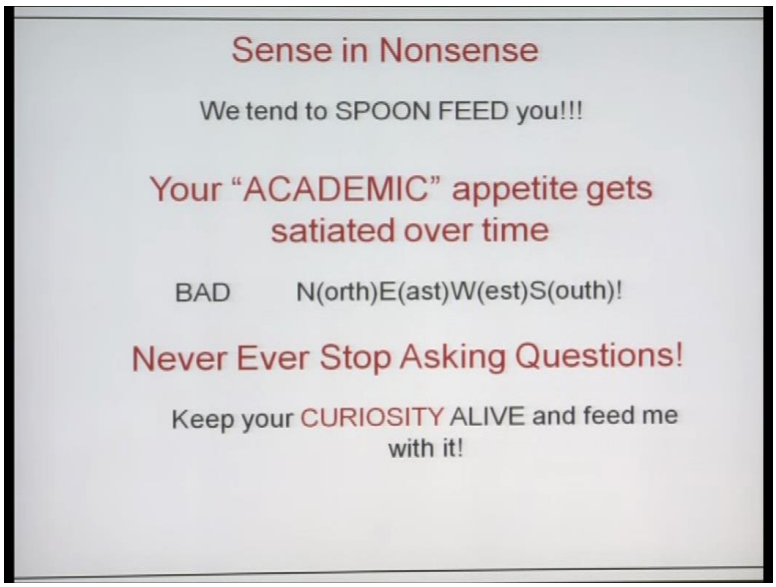

Yeah, your academic appetite gets satiated over time gets satisfied over time and that is a reason why that is not the reasons why you tend to lose interest in academics. In sometime, maybe one semester, two semester, three or four semesters, which is bad news - bad North, East, West, South, not good. The point that I am making is you should never

stop asking questions, no matter what academics or otherwise. Keep your curiosity alive and feed me with it. I am hungry for your curiosity.

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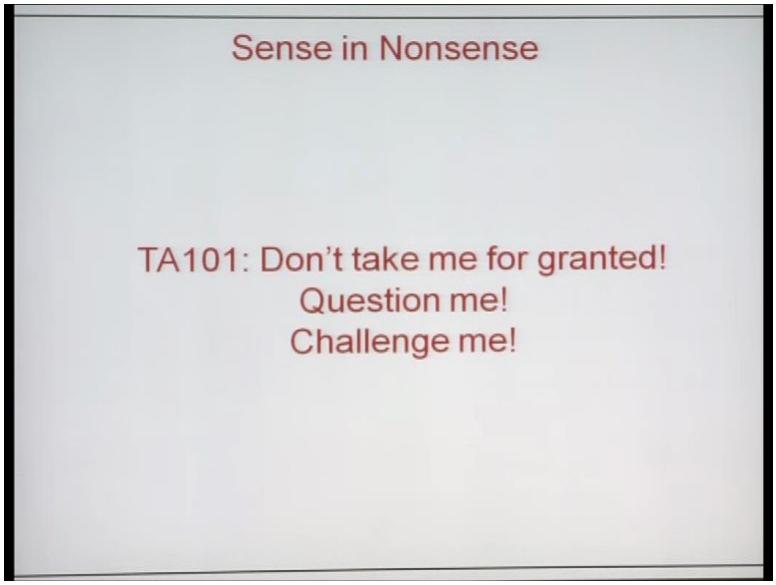

Do not take me for granted, question me, challenge me. I am mount to make a lot of mistake, I keep making lot of mistakes, you know so always question me, challenge me, I will be very happy to answer your questions then there if not then definitely in next lecture.

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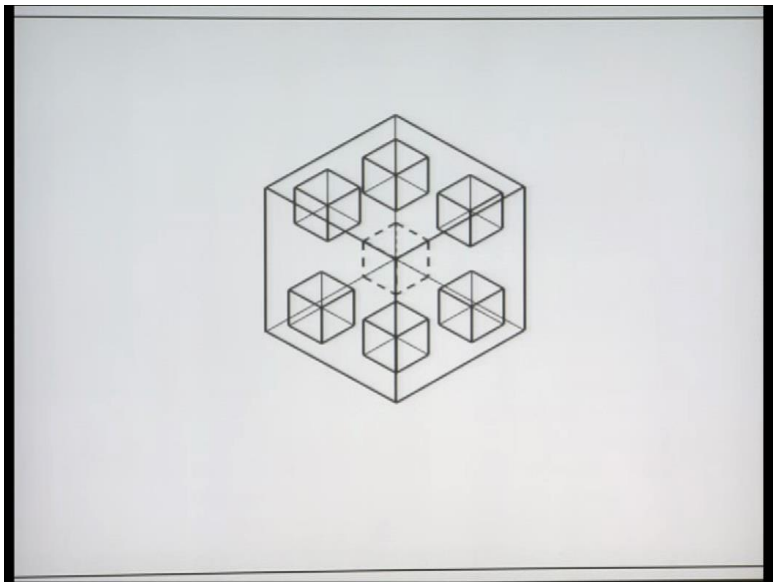

So this is putting three question that I had post in the previous lecture. So, given the three orthographic views, is it possible first to uniquely represent a solid or vice versa. Can a solid can any solid be uniquely represented by three orthographic views. So, this is a counter examples. So, let us say you have a block or a cube. You have a smaller cube on the backside, on the back face. You have again a smaller cube on the front face, cube on this side, cube on that side, cube on top cube on bottom. And then you have avoid in there, so this is pretty much like you know you have this cube placed dot at the center of this face, and all such cubes placed on the respective centers of the respective faces. Now for this solid is that possible for you to represent this uniquely using orthographic views, let us see.

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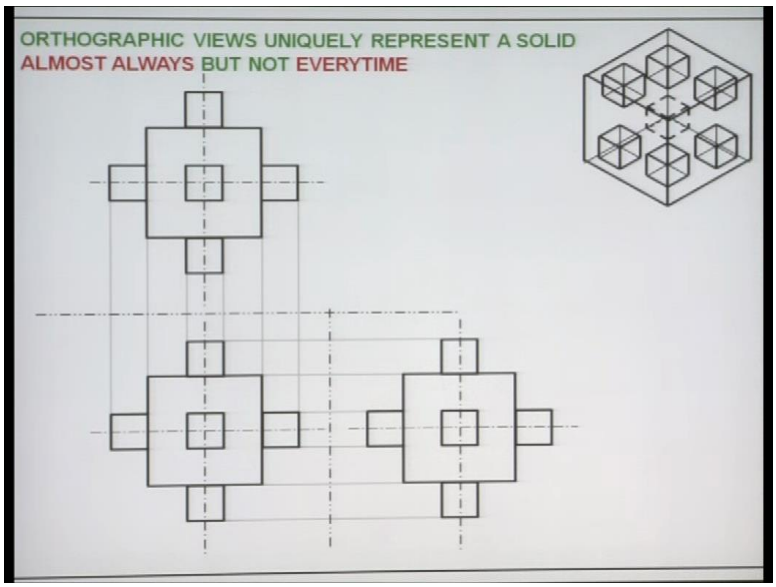

Hinge line separating the front view from the top view, and another vertical hinge line separating front view from the right side view. Now if you sketch the views out ((Refer Time: 04:20)) getting some like this front view top view and the right hand side view, exactly the same story, exactly the same result. Now watch out for the conventions are used. I used dash dot dot, dash dot dot to represent the hinge lines. So, this object as symmetric both along the vertical as well as along the horizontal. So, I am using dash dot dash dot this convention to represent the line of symmetry. Usually, it is also used to represent the central line. So, since these two are also symmetric about the horizontal and the vertical, I am going to be using those lines.

Of course, there are my projection lines they have to be there. So, the final lines are thick sorted lines whereas, the construction lines are gray lines, just for your reference. So, always a nice idea to have projection lines, because otherwise things become very difficult to comprehend. Orthographic views uniquely represent a solid almost always but not every time. For instance, in this case, there is not possible for you to represent the internal void here, so be careful about that, but almost always, these views they work.

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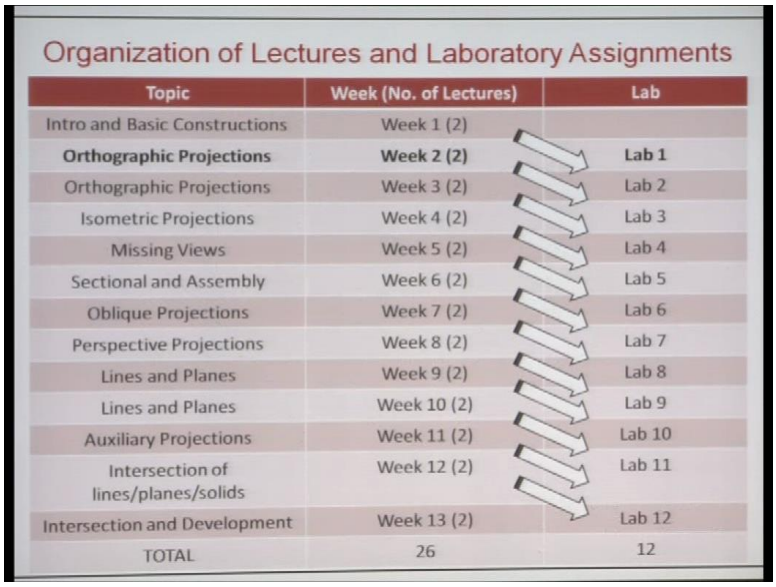

Orthographic projections is the fourth lecture, second week.

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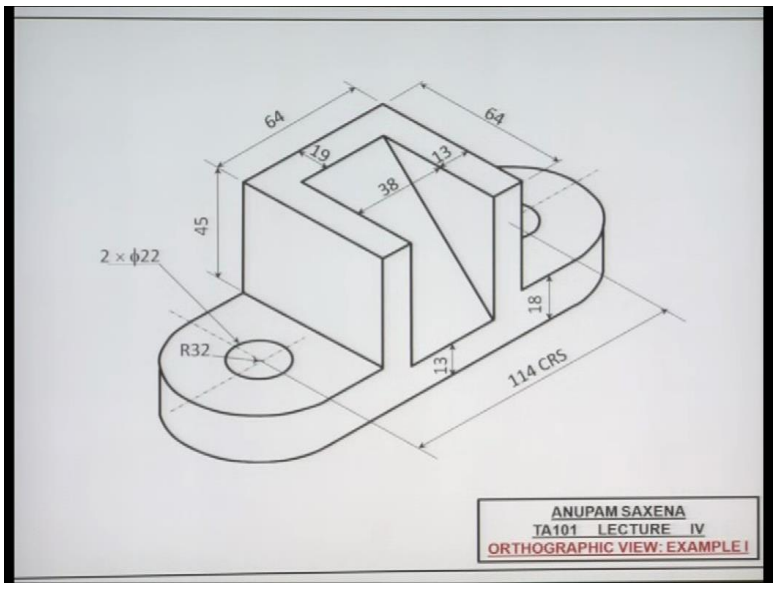

Let us take an example. So, we have to draw the orthographic views of the solid dimensions are which are given. Let us work it out one by one. So, this could be a little boring, but if you follow the construction you know step by step, things might be enlightening for you.

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The first step preparing your sheet; write your name, write your subject what you are working on. Give all the details in the box over here, and this the convention we used for the third angle orthographic view. So, if you have a cone, the cone from this side, it is going to look like two concentric circles, and of course, this what look like a trapezium, mention the sign over here and ((Refer Time: 07:03)) sign over there. Actually all though this is at the center, on this at the center of the sheet, it actually is on the bottom right corner of a sheet, right there. So, once you have prepared your sheet, you are ready.

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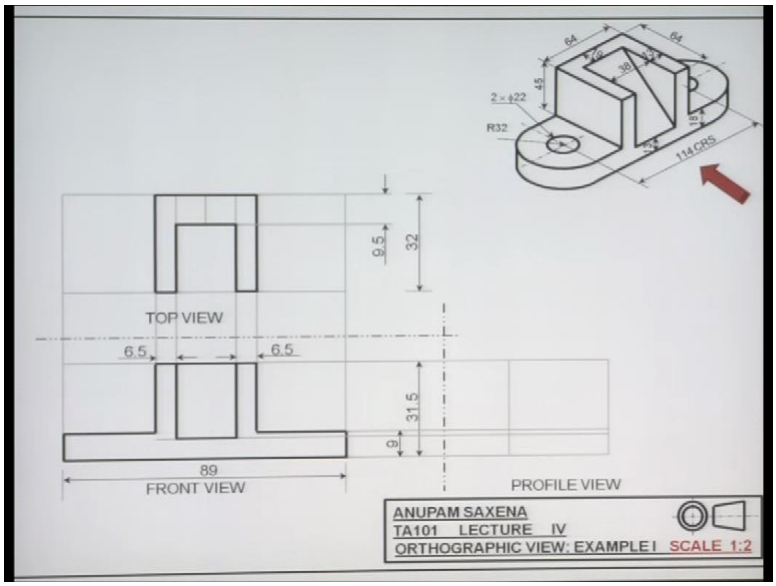

Once again mention the subject more importantly mention the scale. So, we using the scale one is to two. Now we are looking at the object along this direction. So, this would be the front view of the object that would be the top view and the right hand side view would be from that side. Draw the hinge line, but before that just estimate based on the dimensions as to how you bounding boxes for the front view, top view and the right hand side view. I have going to be placed once you make those preliminary measurements, start with the hinge lines first. So, this is the hinge lines that separates the front view from the top view make the bounding box. Now this is about 114 millimeters, this is about 32 here and this is about 32 over there, 114 plus 32 plus 32 - 114 plus 64, which would be something, some number 178, I believe that would be the length of this bounding box. And the height would be about this dimension 45 plus 18.

So, since I am using this scale one is to two, 178 over 2 would be 89. I am going to mention there and that is going to be 31.5, 45 plus 18 divide by 2. So, the scale one is to two would mean that one would actually represent two scale and this would represent that I am actually scaling this object down by half - one is to two all right. So, this is a front view, so that I am going to mention that over here; top view mention that over there about the hinge line; for the projection lines, the length remains the same. This dimension over here would be about 32 - 64 divided by 2. And I will finish this bounding box and I will draw the vertical hinge line, here I would be sketching my rather drawing not sketching, drawing my right hand side view, extend the projection lines, and I will

draw the bounding box over here. So, this length is the same as this length – 32. This is about 31.5; it is pretty much like a square. It is a profile view. So, the side view is also called the profile view. So, my profile view for instance.

I should have also extended the lines from here, from here and I am going to drawn the five five degree line over here. [FL]- be very careful. I am bound to make lot of mistakes. So let us start with the final version the drawing. I will see this edge from here to here, I will see this vertical edge, I will see the vertical edge over here, although this is like a semicircle. I will see the corner of that or the extreme of that. I will see this horizontal edge from both sides and then I am going to draw a projector from this point over here up to the top, and on this projector would lye this edge. Likewise, on this particular projector would lye this edge.

Well, I am actually going to be working on the right hand side view alongside all right. So, this the edge that I draw here, the second edge that I draw here, then I would draw this edge, so this is about 64, 38. So, 64 minus 38 is whatever dimension divided by two, so its dimensions is given, 13 - 13 divided by two from both sides. I would draw this projector from here to here; likewise, the other, vertical projector, this dimension is 18. So, I will mark it 9, note that I am working with one is to two scale that dimension is 13 over to 6.5, this one is again 6.5. This is thirteen from bottom from here, it is about 6.5, from there I will draw this vertical edge down and this vertical edge down.

I will also see this edge right there not quite. Would I be seen this edge, because this would actually correspond to this edge right there, am I done? Again not quite about these circular holes or cylindrical holes, I will have to depict that as well. If I look at this object from this side, are these holes visible no, but they have to be shown somehow. So, I am going to show that using hidden lines or dashed lines. Nevertheless, I will walk on them a little later let me project this guy here on to the right side view. I will start working with the top view. So, this is this edge that I have drawn there; this edge that I have drawn in my top view; this edge here very easy. I have draw the center portion, mark this as 19 divided by 2, which is 9.5, I guess.

Draw this edge and dimension. So, always a dimension while you are drawing different features of the objects in different views, this is 9.5 - 19 divided by 2. And then I will depict this edge and this edge and then I will complete this loop. So, this part is very

nicely visible in the top view what else. Well, if this, this edge and then this this edge right. So I already know what this dimension is, so from here I can measure what this extent is all right. So, these edges would also show up on the right side of the top view.

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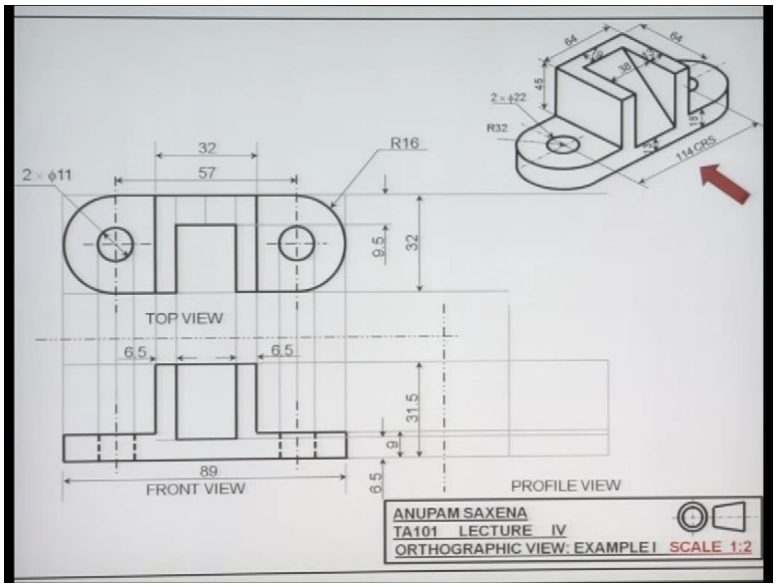

And then I would mark the center, I would mark the central line. And then I will draw this semi circle on the left as well as on the right. Well ideally before I get that I should have marked the vertical central line as circle well as the horizontal central line on both sides to you know depict the center of the semi circle as well as this circle. Nevertheless maybe I ((Refer Time: 15:37)) that patient enough. So, I do that now and with these centers, I draw a circle of diameter phi 22 on both sides.

So this dimensions is 114 divided by 2 – 57, that dimension is 64 divided by 2, which is 32. Now this is of radius 32. So, I am going to be using a leader and the way i depict this leader is as if I have an arrow, this line pointing towards the center of this semi circle at 45 degrees, 30 degrees or 60 degrees if you have many such circular features here. So, this one is a 45 degrees. And then I will draw horizontal and then I will depict this is R 16 - scale one is to two. And that one again at 45 degrees on the other side of diameter 11, scale one is to two. So, since the two circles, so it is like two times five that represents the diameter times 11.

Am I done with the top view, not quite or perhaps? I do not know, you tell me. Now I should have dimension this before, but I am dimensioning it now. So, this is about 13

divided by 2 which is 6.5. So, I just said before there would be two circulars features here also getting represented in the front view. So, I choose to first depict those circles in the top view and then project the corresponding future on to the front view. So, I project the central lines first on both sides, and then I project the end points of the diameter of the circle on both sides again. So, since the circle is hidden, it is going to be showing using hidden lines on both sides. So, this is how nicely these projectors they work. You would not have to measure things every time. So, the projectors they do that for you indirectly or implicitly. So, things become lot more efficient, so always a nice idea to keep drawing projectors alongside, when you are working with a main drawing.

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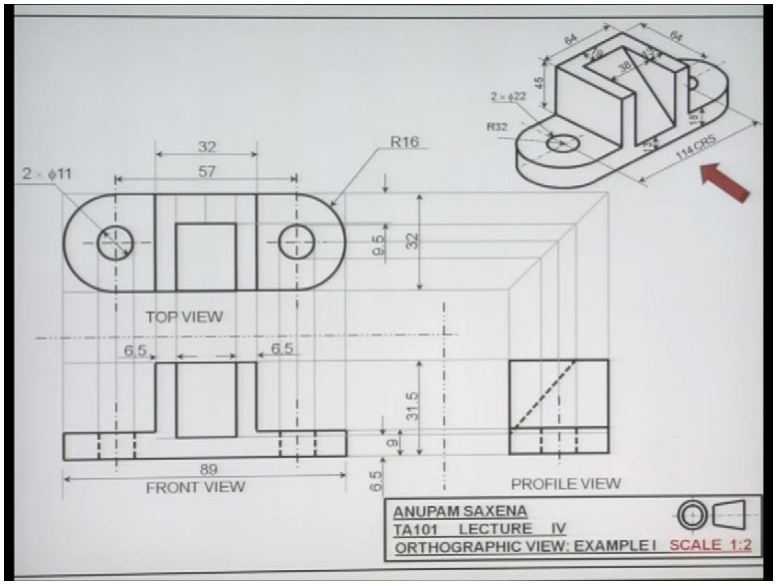

Now to the right side view of the profile view, and now extending these projector lines 45-degree line over here. So, from this side I am going to be seeing this edge it is pretty much this edge. I will be seeing the edge corresponding to this surface, the verticals; you know the extent extreme right and left. And I am going to be now seeing this edge right there, and this edge right there and then I am going to be seeing this edge right there. Now like I did for the circles over here, I do the same thing for the profile view. First I will project the central line, draw the central line the profile view and then project the extremes of the circle on to the right side, and then again in the right side view of the profile view the circle or the circular features going to be hidden, I am going to be showing those features using hidden lines.

Now, would these two lines cover only this circle or both circles, question? They will be covering both circles what else, now this slope is something, which would be explicitly visible only in the profile view not in the front view nor in the top view. So, you know the extreme point for this feature here, this location you know which is at this site and then you would also in the extreme point for slope like that right here. So, this slope is going to be represented by a line a slant line in the profile view, so starting from here ending up to here, here we go. Anything else that I may be missing, well, let us see. As I said are we missing this line or not? This line essentially corresponds to this line in top view. Are we missing anything else, perhaps not?

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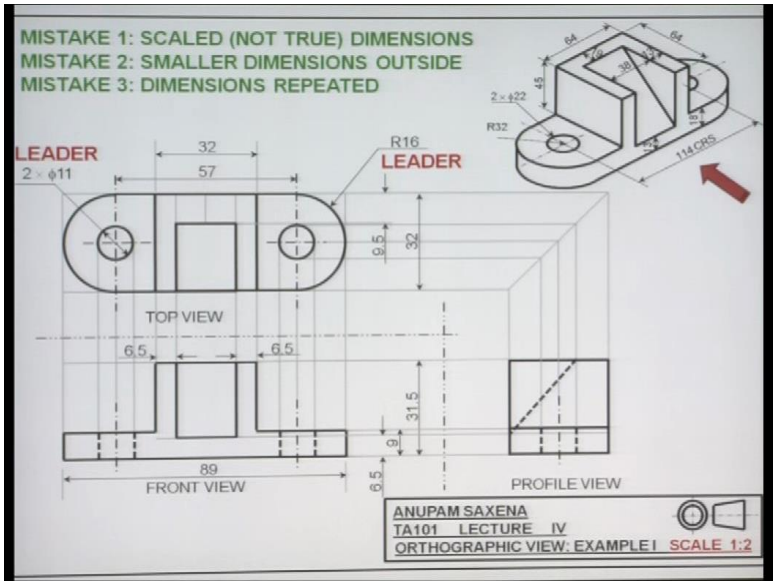

You know, but this example I deliberately made three mistakes. I will talk about that something that it is quite common amongst you, so would do that. Mistake one - I have depicted scaled dimensions, but not two dimensions. Now what is going to happened? A convention I should be depicting two dimensions. The reason is because I am mentioning the scale over here one is to two. So, of course, any person who else interpreting these drawings he or she would know that the drawings themselves a scale by half, but he or she would actually see the two dimensions if I depict them - number one. Number two - look at these decimal points 9.5, 6.5, 6.5, 6.5, 31.5; it is not a good idea to show numbers by means of decimals in your drawing, always a good idea to show your drawings by means of whole numbers. Mistake one that I made you should not make those mistake or that mistake. Even if your scaling your drawing, it should be depicting two dimensions.

Mistake number two - look at that we had dimensioned the drawing. The larger dimensions, they happen to appear to be closer to the object, whereas the smaller dimensions, they happen to appear to be away from the object; again not a good idea should be [FL]. Smaller dimensions, they should be represented closer to the object; and larger dimensions, they should be represented away from the object.

Mistake number three - dimensions have been repeated. So, try to depict the information as concisely as possible, do not repeat a dimensions. Now if I do not make these mistake, by the way I have already told you about the leader. So, this would be an arrow which is at 45 degrees while just emanating from the center at 45 degrees horizontal and then there would be a horizontal line and above that horizontal line we are going to be mentioning the dimension, it is called a leader. Likewise, we have a leader here as well earlier mentioned that before.

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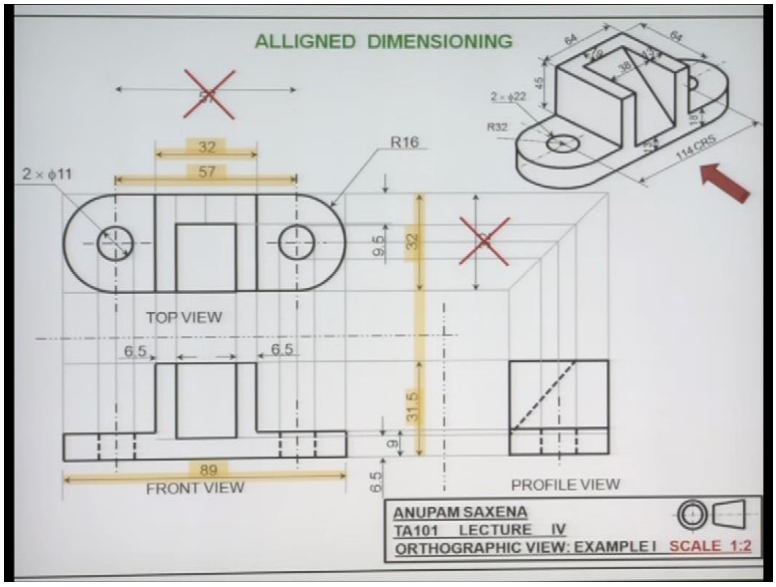

So, this scheme of dimensioning is called the aligned dimensioning. Look at the horizontal dimensions, we have an arrow with arrow heads on the right and on the left. And the dimensions happen to appear to be above the dimensioning arrow. For the vertical ones, imagine that you have rotated this thing 90 degrees clockwise, some like this. So, not only with the arrow get rotated also the number will get rotated. So, the arrow - the vertical arrow would like that arrow heads in both sides, and the number is going to be aligned with the arrow. So, if you imagine that this is rotated by 90 degrees

anticlockwise, the number will be appearing on the left of the dimensioning arrow aligned dimension that is an example. As I am mentioned the number above the arrow for the horizontal dimensions; and for a vertical dimensions, the number to the left of the arrow, but aligned with the dimensioning arrow.

So, you would not want to write 32 as this on the right side or even 32 as you know being aligned to the horizontal line that would not be current. So, if I correct those mistakes, if I bring in smaller dimension inside the larger dimensions outside, but before that in case of horizontal dimensioning dimension or the number below the arrow is incorrect. In case of vertical dimensioning, dimension on the right hand side of the arrow is again in correct mentioned that just emphasize.

So, if I go back for instance and if I try to correct these mistakes of my mistakes one, mistake two, and mistake three, and if I depict all two dimensions, number one, number two. If I depict smaller dimensions closed the object large dimensions away from the object, and if I make sure that the dimensions do not get repeated. Can you go forward my drawing would pretty much look like that. Smaller dimensions closer to the object, larger dimension away from the object, all these dimensions are in true scale. The ((Refer Time: 27:33)) mention this scale over here, gives the interpreter feeling that these drawings are actually scale by half all right. Of course, I have let go of repeated dimensions. For it is first example in orthographic views this is ((Refer Time: 28:00)) problems.

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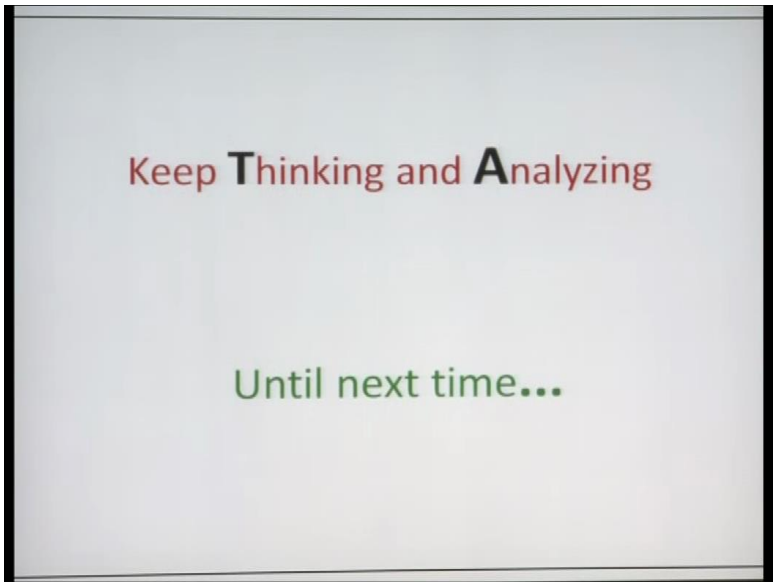

I will end this lecture here keep thinking and analyzing until meet next time.