Indian Institute of Technology Kanpur
National Programme on Technology Enhanced Learning (NPTEL)
Course Title
Engineering Graphics

Lecture – 14
Oblique projections-Part-II

by
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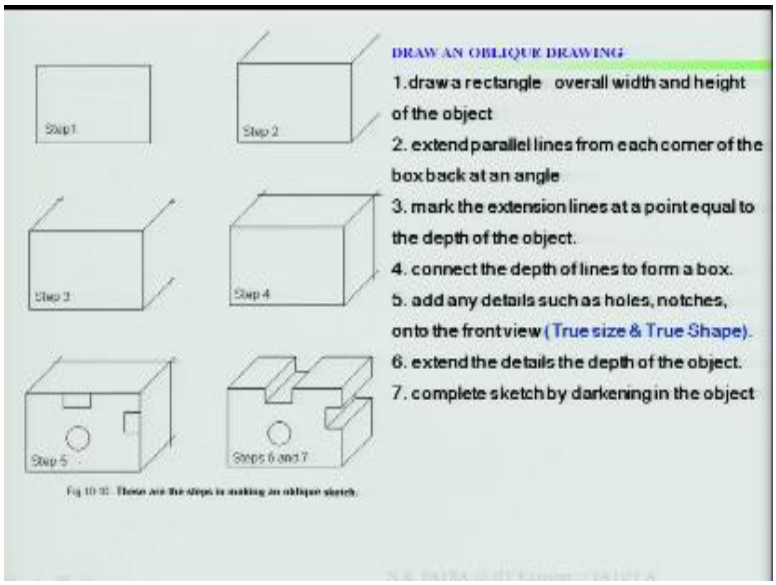

Last class we have finished basic introduction to oblique drawings. So we have covered one examples and steps. So just for a repeat step 1, draw a rectangular a rectangle overall width and height of the object step 1, because the front face is giving your true shape. Extend parallel lines from each corner of the back box at an angle, mark extension lines at a point equal to depth of the object.

Connect the depth of the lines to form the box step 4, all step, step 1, step 2, step 3, step 4, step 5 add any details such as holes, notches in the front view, then step 6 and 7 extend the details the depth of the object, then obviously once you finish it completes case by darkening in the object.

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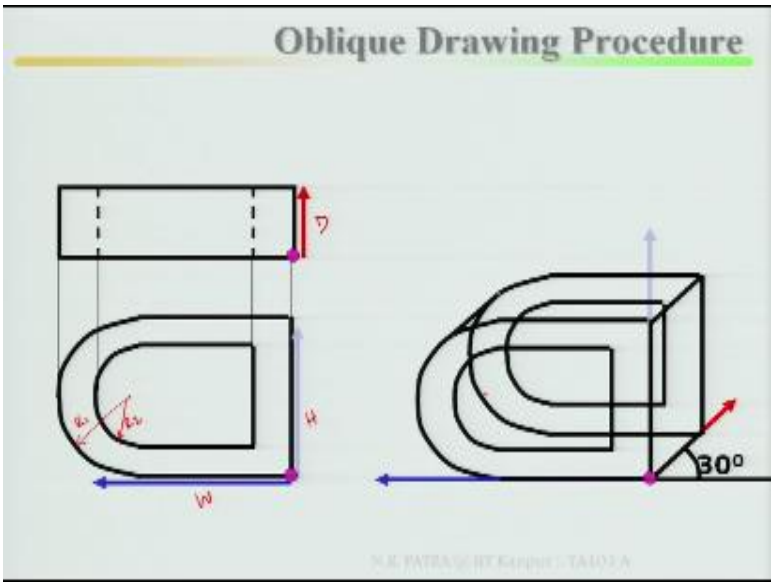

One this example I have finished, this two examples I have finished take your reference line, reference point then width mark your width, mark your depth, then mark your height. Then in depth directions make an angle with 30˚ this is your depth directions, this is your depth direction, this is width, this is your width, this is your height, this is your depth directions. Then as front view it is in true shape.

So whatever the dimensions distance from here to here distance from here to here, this is in true shape. So take the measurement and do the distance, this is your height, this is your width, finish it then mark your center line, then mark your center line and take the measurement of your R1 and take measurement of R2 then draw circle, semicircle R1 and R2 draw the semicircle, inner circle as well as outer circle.

Then once it is over in the depth direction extend it, depth directions this has been drawn at an angle 30˚ write up, so this is the depth, this measurement you can get it, you can take in depth directions. Similarly at top at the height depth direction you finish it up, then once you finish it up your dimensions depth, height and width in depth direction then finish your same procedure

as far as this front view, front part whatever you have drawn in the rear side or back side finish both the circles, both these semicircle outer as well as inner.

This is your outer, then go for inner one this is your inner one, then this completes front as well as rear sides. Then you have to join, then look at how the object looks like. I joined with the common tangent between these two.

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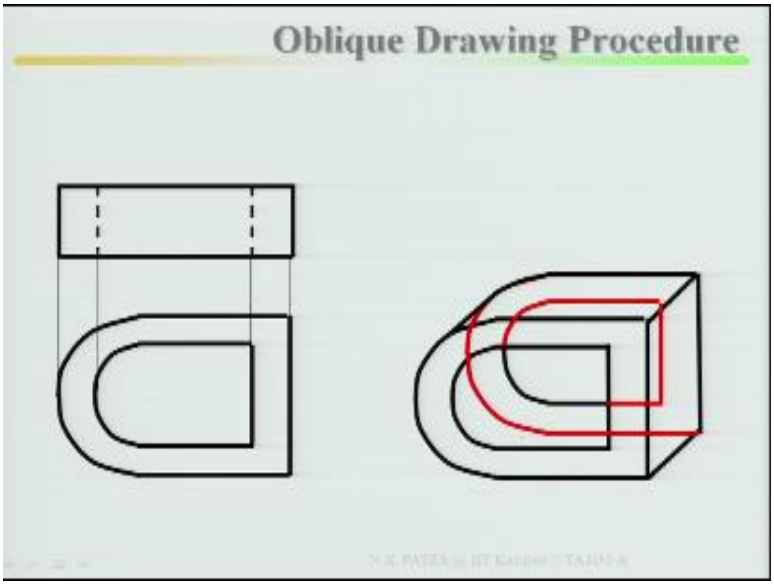

Then how the object looks like if you look at here, these are the parts I am not going to see that means this is not going to visualize. So this part, this part then you can erase it, erase it after you erase it then darken complete figure.

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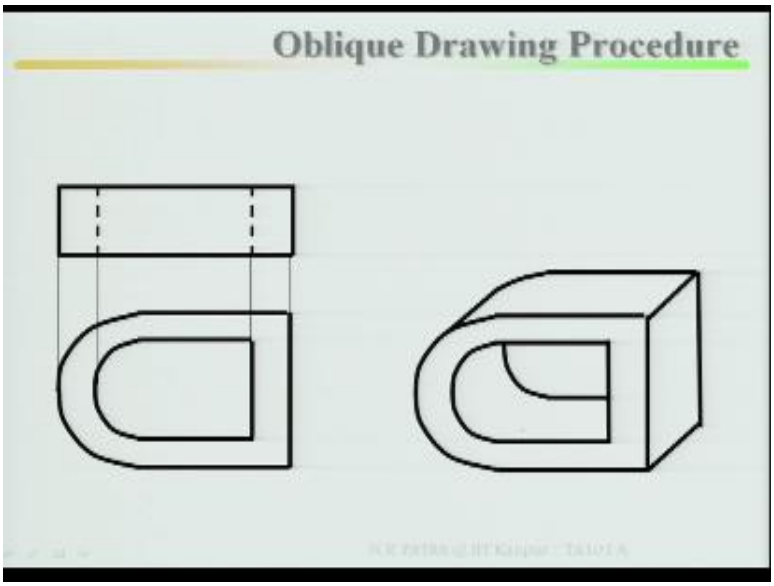

This is your oblique drawing.

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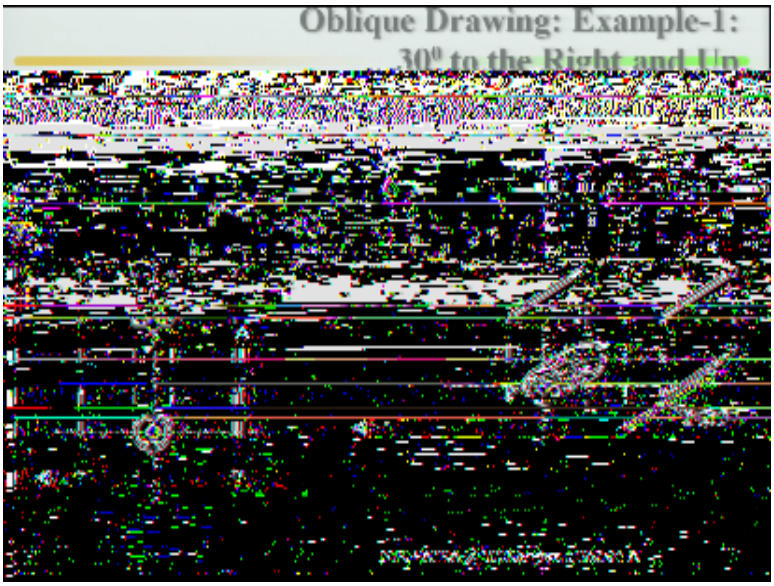

For this case similarly second example 1, 30˚ to the right and now I have also covered just for a repetitions, mark your reference point, then width, then height, then 30˚ to your depth directions, 30˚ to your depth direction, then locate with your reference point locate your center point or center line here and here. Here it is circle, then here you will locate it, how do you locate it, how far from here to here and what is the distance how far from here to here and what is the distance.

Then draw your – once you locate your center line, center of this circle then draw the circle, similarly in the depth direction go towards the depth, you can take the measurement of the depth this is your depth. So in this direction take the measurement of the depth, then again locate your center of the circle then draw the circle, this is the feature inside feature then join by means of common tangent then finish your outer surface by taking the measurement in depth, as well as width, as well as in height directions. Then finish it up.

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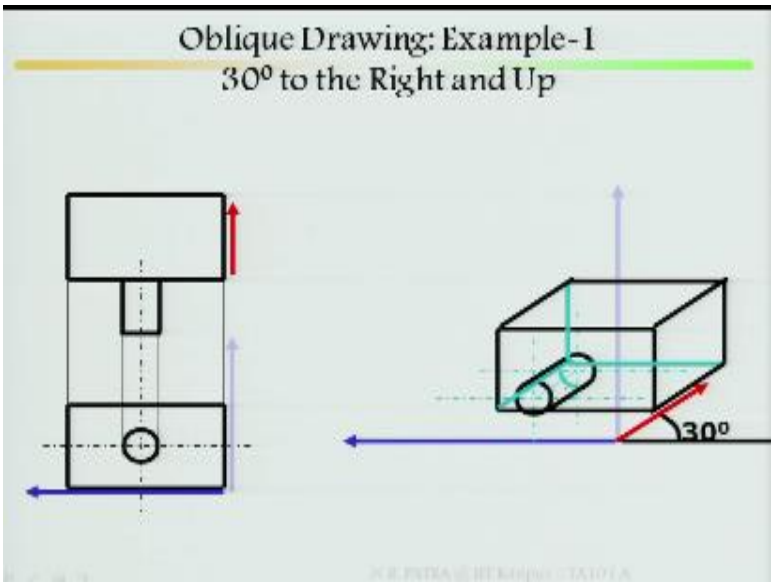

After finishing it off take a cut how it looks like, look at here how it looks like.

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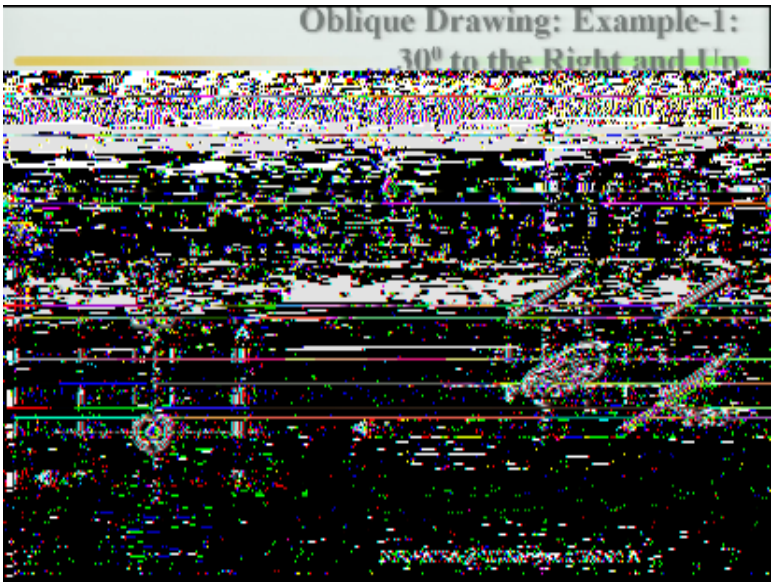

Before this stiff this is what you have drawn inside as well as outside features, because this is in the front face or this is your front view, so front face will be true shape.

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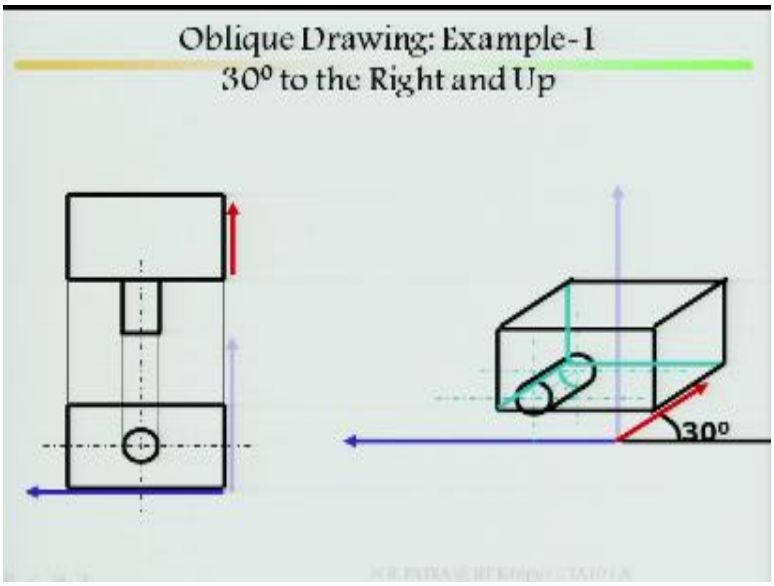

So that means then you have to erase certain part where you cannot see it, look at here this line, this line, this line and this circle it cannot be shown or I cannot visualize, because it is the inside feature so to finish your inside circle.

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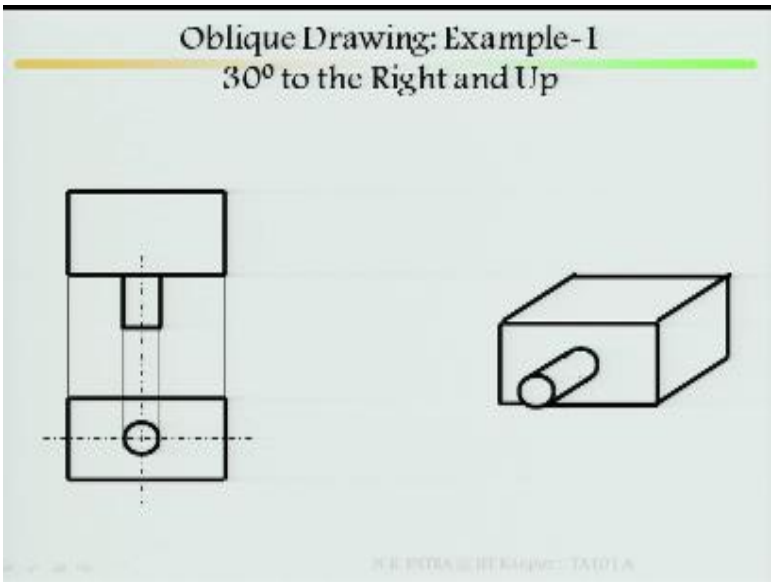

Then you remove it this comes your object, oblique drawing.

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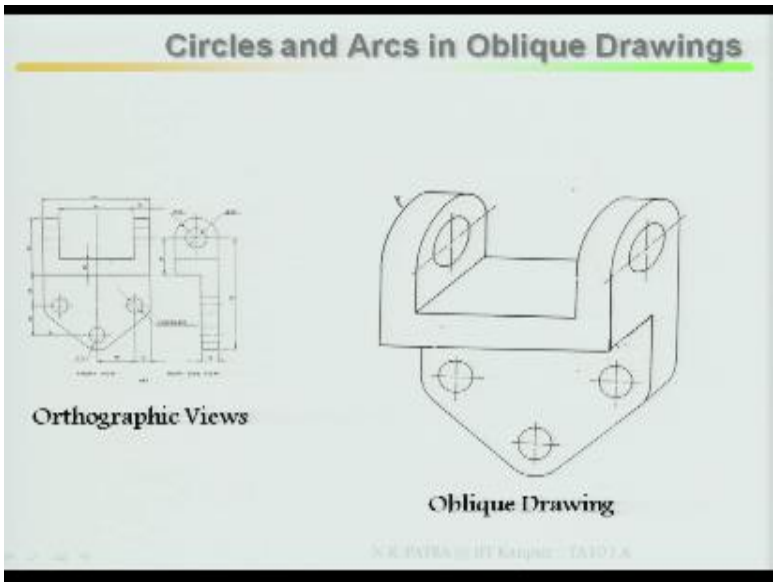

Circles and arcs in oblique drawings, orthographic views then oblique drawing, how it looks for visual eye sense. This is your orthographic view, front view as well as side view, then oblique drawing how it looks.

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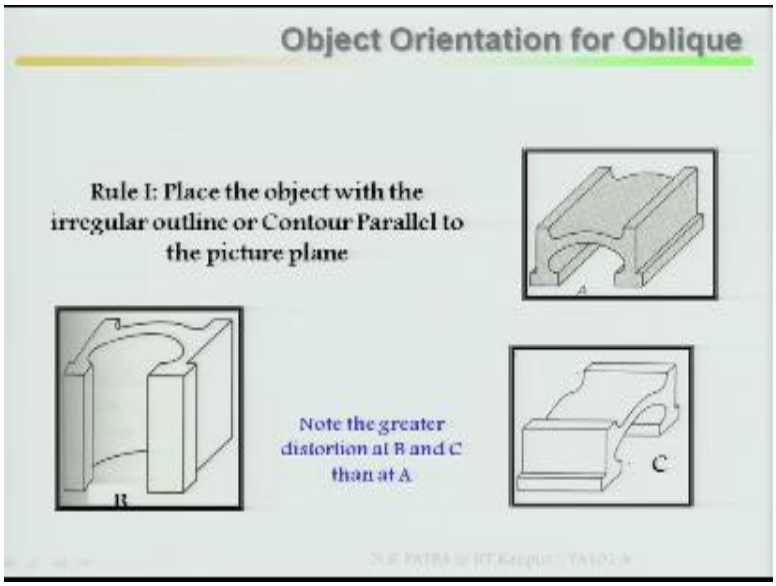

Object orientation for oblique B, C, A look at this same object how it has been oriented A, B and C. The greater distortion at B and C than A. first you identify what is your distortion in which direction there is a greater distortion in B if I make it in B, make it oriented so that this is C and this is A. If I compare A, B, C then the greater distortion at B and C than A. Place the object with the irregular outline or contour parallel to picture plane. Irregular outlines or contours should be parallel to picture plane.

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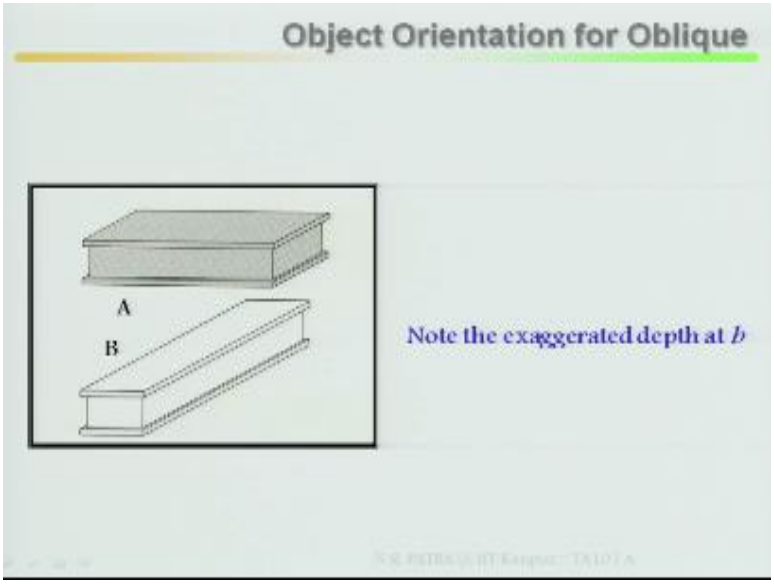

Number 2, note the exaggerated depth at b. This is your B this is your A, in case of A and B this is coming as a width, in case of B the depth direction is long, the depth direction is long.

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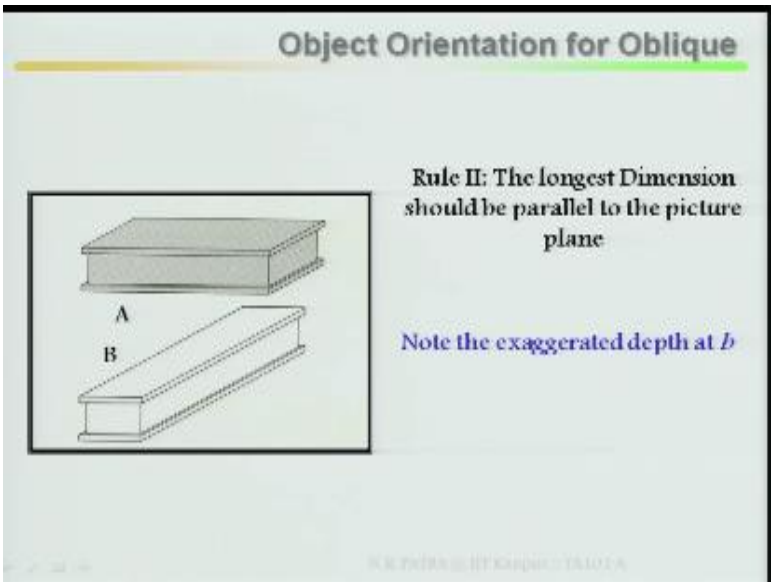

In that case rule 2, the longest dimension should be parallel to the picture plane. Longest dimension should be parallel to the picture plane. In this case this is your shortest dimension; this is your longest dimensions.

So you cannot put your shortest dimension parallel to the picture plane in B, it is not there. In case of paid this is your longest dimensions, so you are putting parallel to picture plane that means you will get the true shape. These are the two rules.

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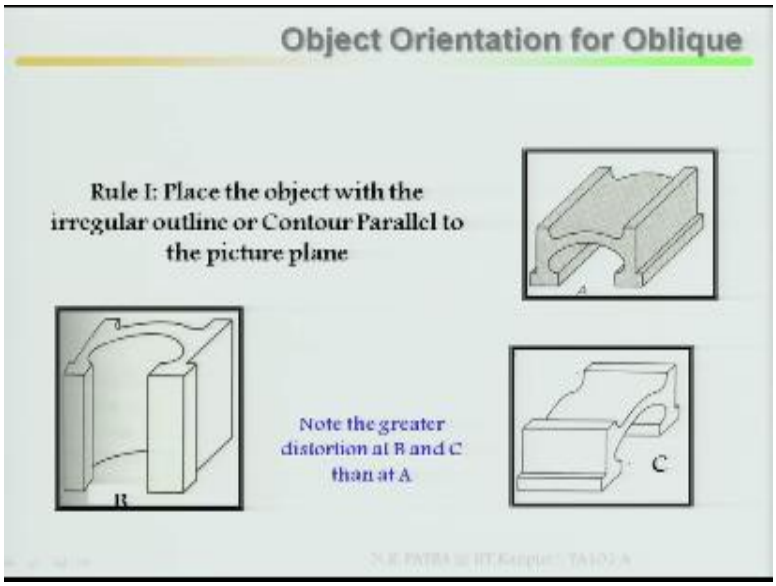

Once again rule 1, place the object with the irregular outline or contour parallel to your picture plane, parallel to your picture plane rule 1.

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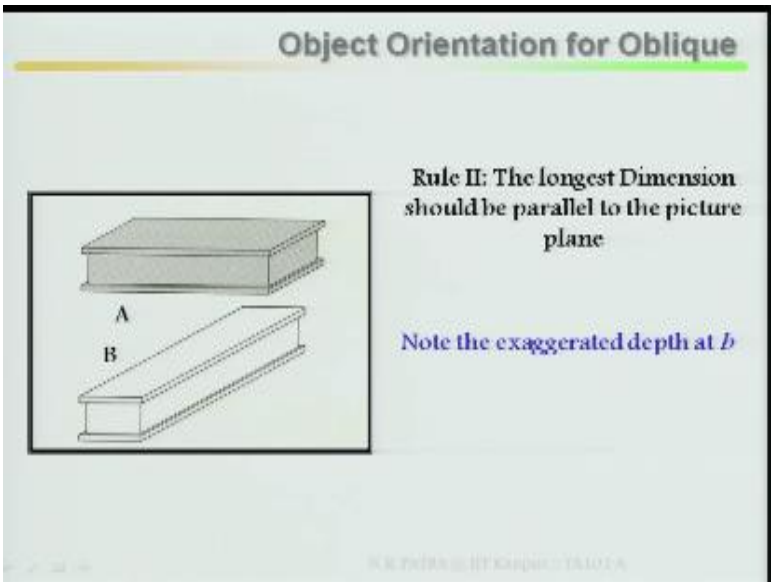

Rule 2, longest dimension should be parallel to the picture plane. So these are the two rules you have to follow in case of oblique drawing.

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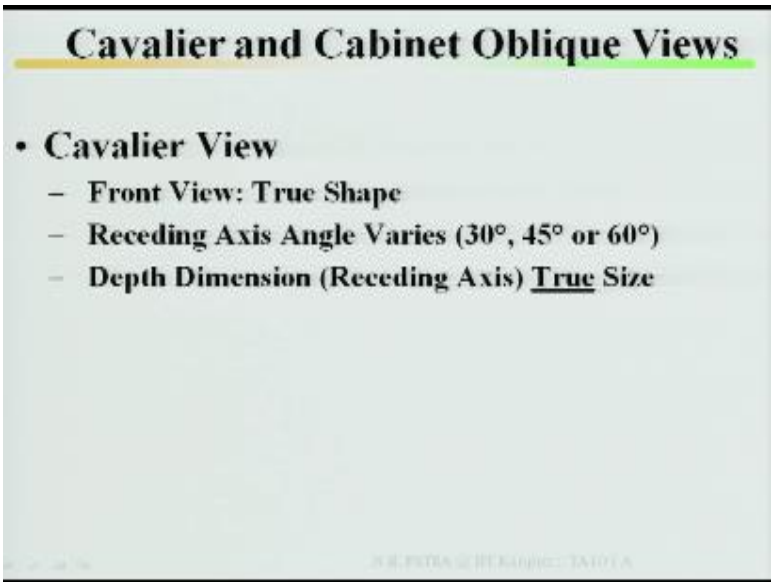

Then there are two views one is your cavalier another is your cabinet oblique views. In cavalier view front view mark the difference between cavalier and cabinet. In cavalier view front view true shape, receding axis angle varies is remember this, axis angle it varies is 30˚, 45˚ or 60˚, 30˚, 45˚ or 60˚. Depth dimension true size, depth dimension it is your true size.

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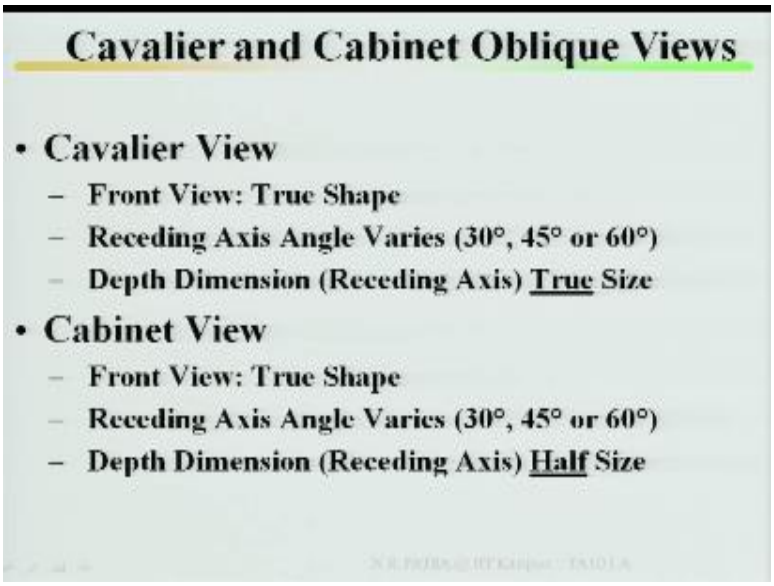

Come to your cabinet view, front view true shape, receding axis angle varies is 30˚, 45˚ or 60˚ depth dimension half size.

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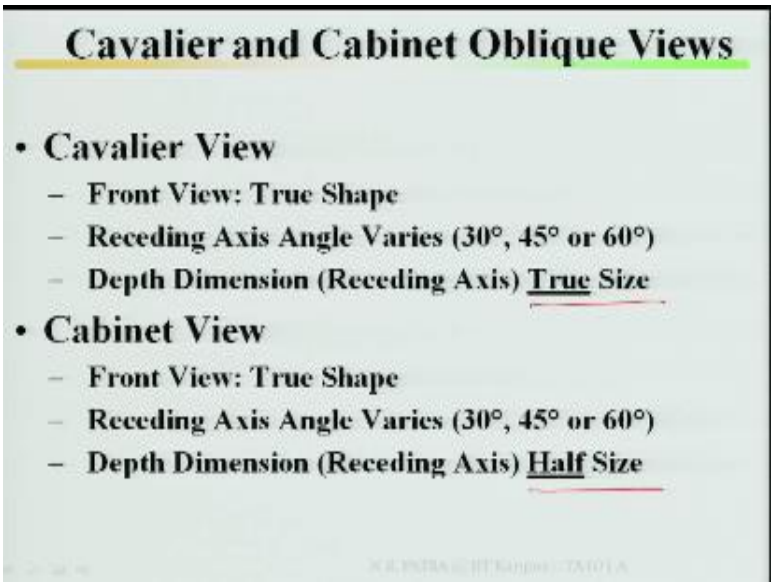

This is the difference between two view, one is cavalier view other is your cabinet view. In cabinet view in depth direction it has been reduced to half, but in cavalier view depth direction it is your true size or true shape, true link you can say that.

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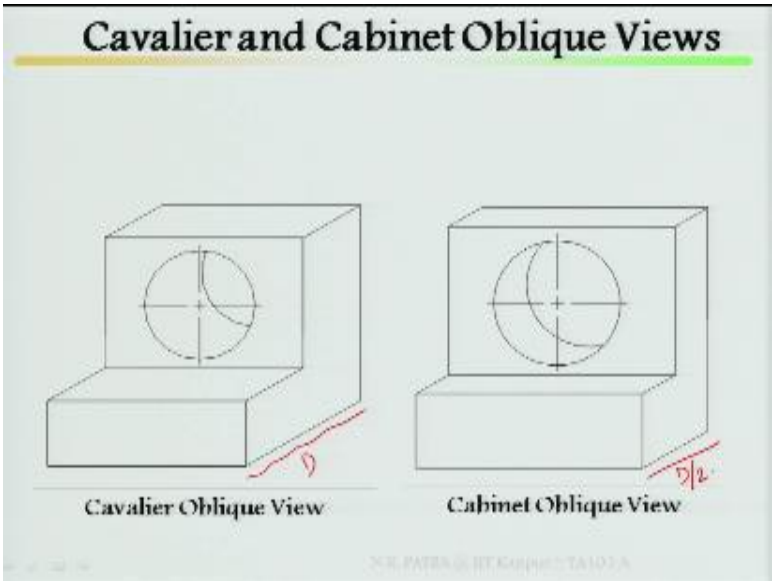

Look at how your cavalier oblique view and cabinet oblique view looks like same object in the depth directions in cavalier, this is your depth directions, this is your – whatever the actual real figure dimension did same dimension. But here actual dimension of the depth has been reduced to half, actual figure depth dimension has been reduced to half. How this two figure looks like, in depth direction it has been reduced or certain. In depth direction it is the true shape.

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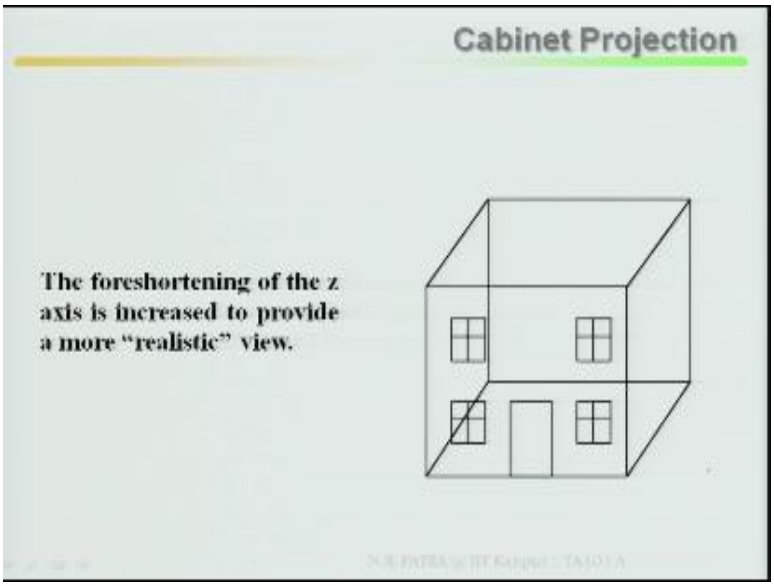

So look at the cabinet projection, the foreshortening of the z axis is increased to provide a more realistic view. In cabinet projections z axis you are reducing foreshortening why? Suppose in z direction there is a larger dimension is there, swing in depth directions in clear picture if your foreshorten that means you are bringing back side dimensions towards closer.

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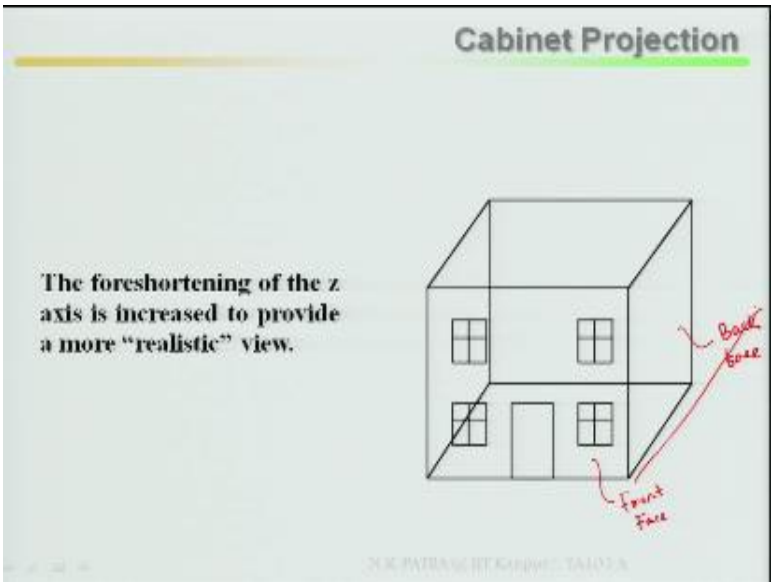

In depth direction suppose depth direction is large, suppose in this case this side is your – this is your front face, this is your rear or back face you can say back face, suppose in depth directions it is larger. In the back face there are certain features, so to show it and bring it closer so that you can visualize. So that is the object behind this cabinet projection.

The foreshortening of the z axis is increased to provide a more realistic view, more realistic view in z directions or in depth direction.

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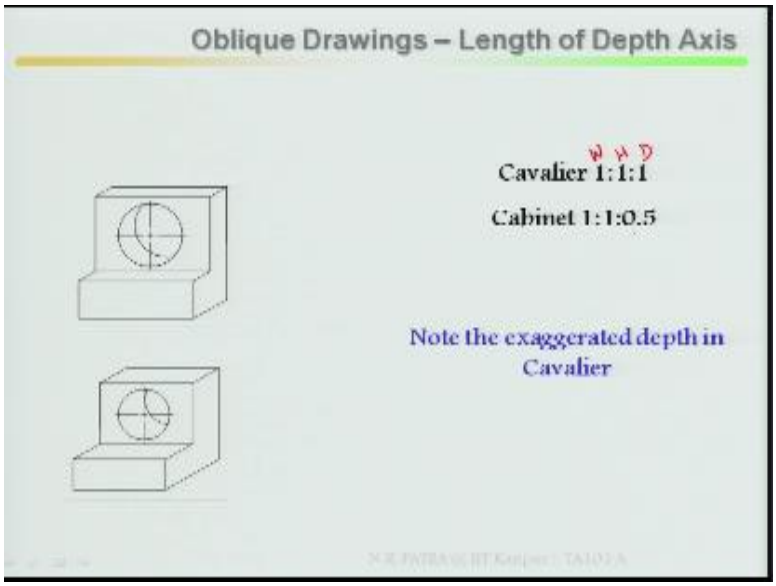

Oblique drawings length of z axis cavalier remember 1:1:1 that means it is completely true shape, true shape and I am not saying about true shape completely same length, same dimensions front face is your true shape. So 1:1:1 that means width, height and depth 1:1:1. Cabinet 1:1:0.5 remember this is your width, this is your height, this is your depth. So here cabinet 1:1:1 then 0.5, 0.5 this is in your depth directions.

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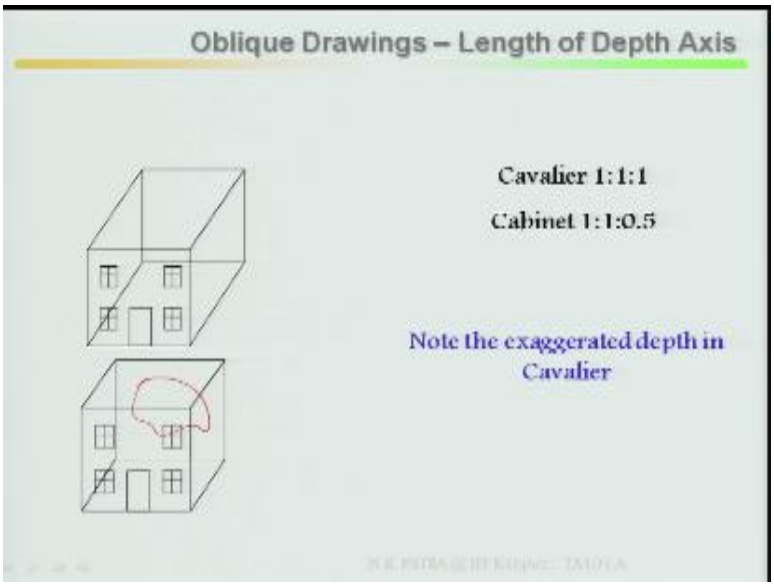

Look at the two drawings length of depth axis one drawing very simple picture a building, one drawing in the depth axis, it is a large dimensions. So if you bring back, if you bring back to the front the back side you can very easily visualize what is there in back side, so that is the reason this cabinet view are oblique drawing is there, but the objective of this oblique drawing particularly our cavalier as well as cabinet.

Reduce the size in depth direction, so that you can visualize clearly what is there is area of side of this object.

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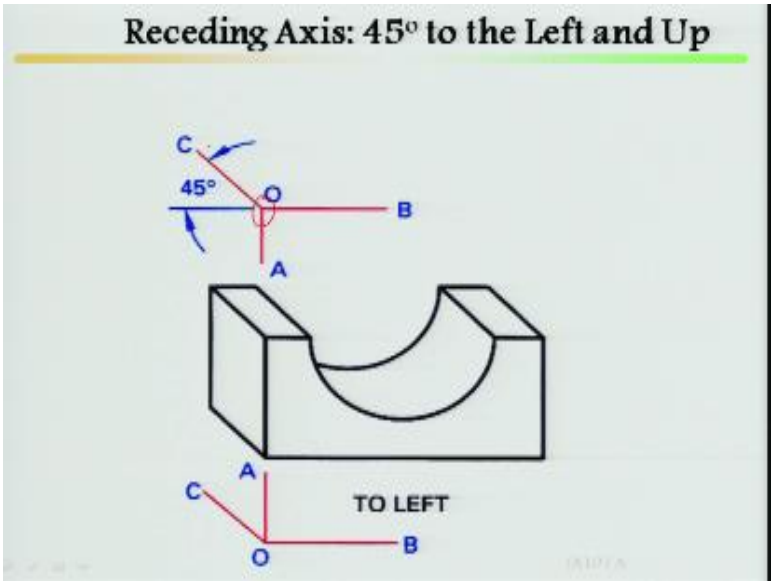

Receding axis 45˚to the left and up. I am sitting here if I sit 45˚ to the left and up in depth directions that means here 45˚ to the left, this is the left. So here 45˚ to the left and up, up means with the normal axis it is up.

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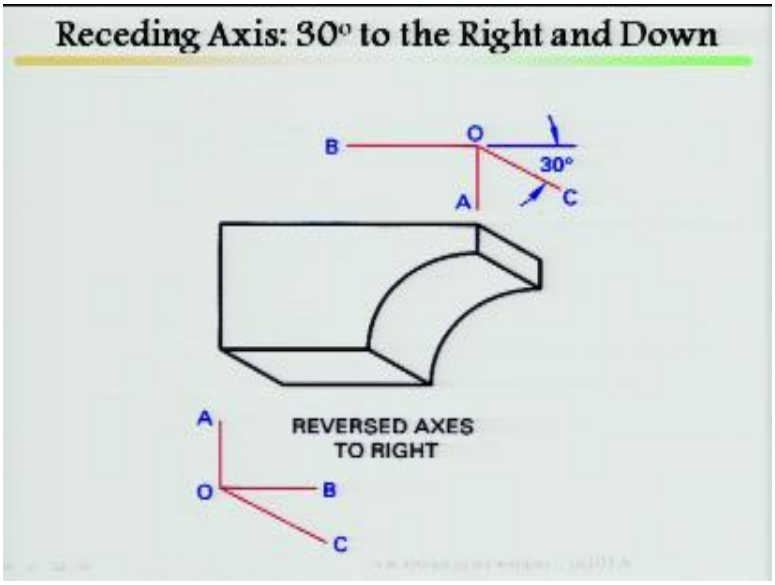

30˚ to the right and down, remember this notice hence in the exam this will be given the notice 30˚ to the right and down, 30˚ to the right from here 30˚ to the right, here in this direction right and down, down means with the normal axis it is down to your normal axis. This way it will be given, kind of the question will be asked. Draw a cabinet or cavalier view, where you are in a depth direction 30˚ to the right and down. That means it will be down and 30˚ towards your left.

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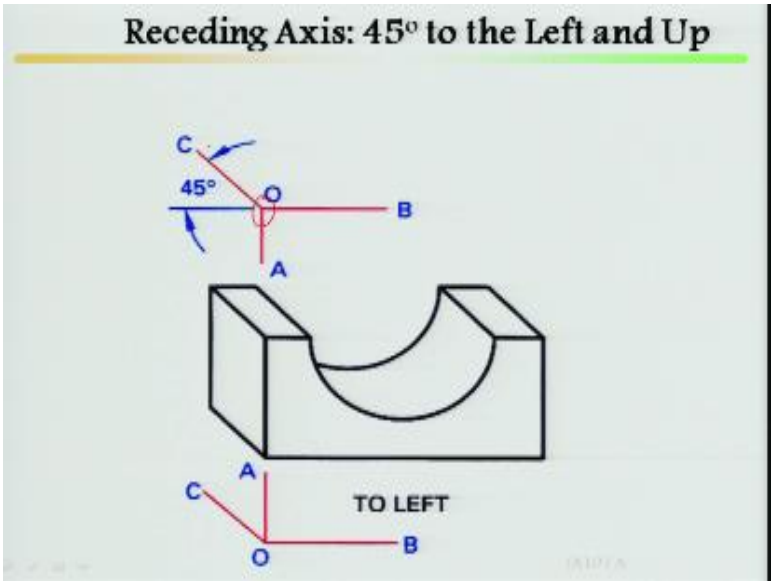

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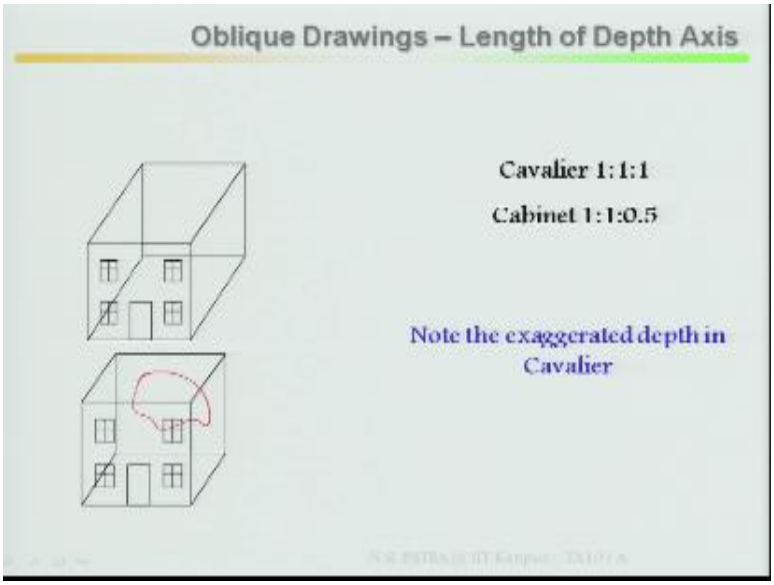

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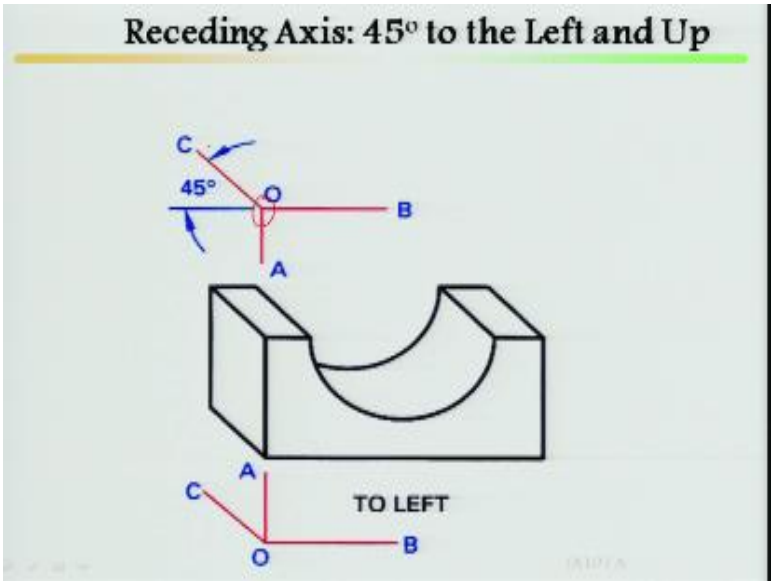

If you look at here 45˚ to the left and up.

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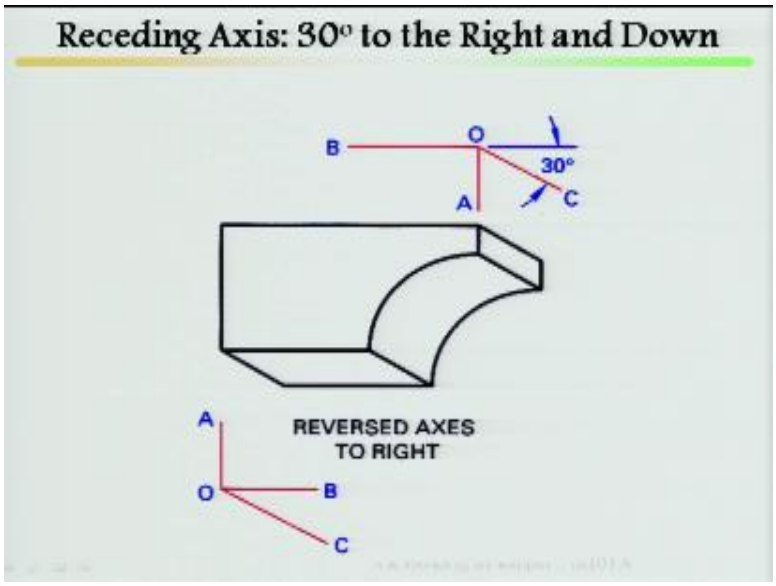

Here is your 30˚ to the right and down.

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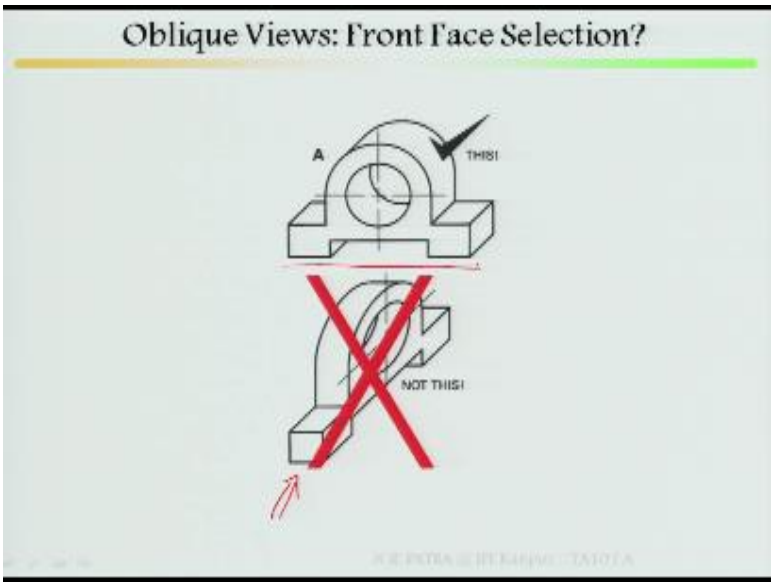

Oblique view is front face selections, look at your front face selections, I cannot select in this way, this is my front face. Why? Because curved features, curved features are more curved features so if there is curves I can see taking into the front face. So this is the best way rule 2, this is your rule 1 contours of irregular, irregularity or irregular face or maybe curved phases. Rule 2, longest dimensions, longest dimensions this is your longest dimensions you put parallel to your picture plane.

It should not be in your depth directions. So in this rule 1 and rule 2 considering this two this is not a true front face.

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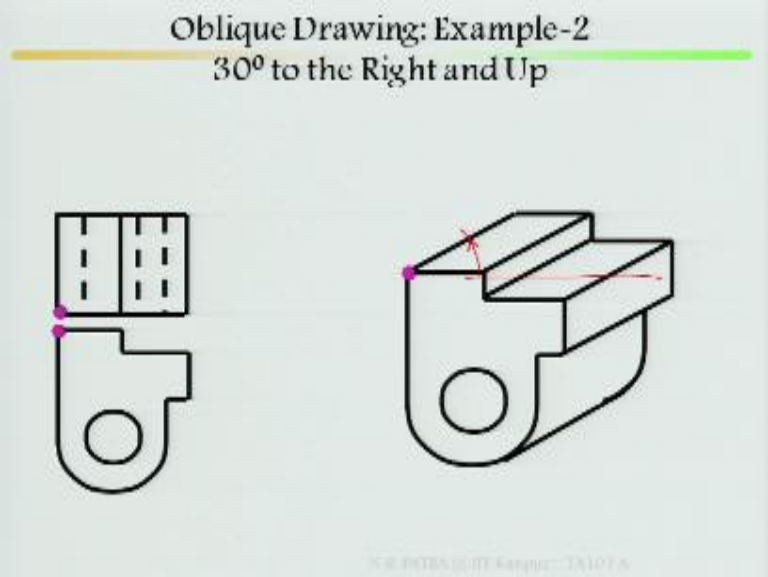

Oblique drawing example 2, 30˚to the right and up. Just I am going slightly faster 30˚ to the right and up see, this is what is your front view, this is what is your top view front view in oblique drawing this is your true shape. So then in case of front view this is your true shape. Now in the depth direction it is 30˚ to the right and up, 30˚ to the right and up. 30˚ to the right from here, if this is my reference point from here to the right, right hand side and up. Then you can finish it up in your depth directions, how this objects looks like oblique drawing.

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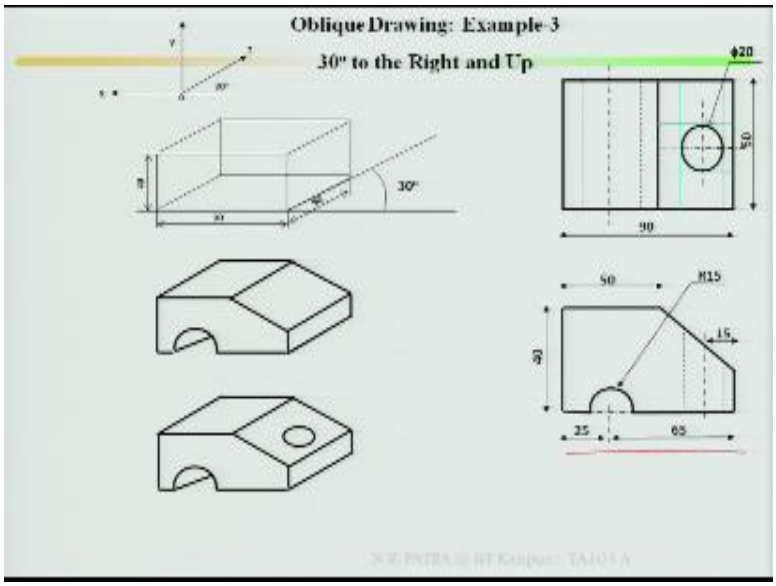

Example 3, 30˚ to the right and up, front view as well as top view is given all the dimensions has been given. If you look at here this is your width, this is your height and this direction is your depth, because basically this is your top view, this is your front view. Then if you start it 30˚ to the right and up, if I am taking X and Y this is my reference point 30˚ to the right from here to right hand side and up depth directions.

This is what how it looks, 90, 65+20, first identify your dimensions this is your 90 right, this is your width, height is your 40, height is 40, depth is given 50. Start doing this, front face or front view as it is there in oblique view it is your true shape. So whatever the dimensions are there, it is in true shape. Then go to the depth directions, go to the depth directions then finish your slanted face up to this you finish it up take it out.

Now what remains, there is a – look at here there is a circle, divide it then mark the coordinate, because here it is given, here it is given 15, from here to here it is given 15, then here to here it is given 65. So here to here it is given 50 so you can find it out what are the coordinates or center line you can find it out. Once you draw mark this circle removes it how it looks. Certain animation part I have missed.

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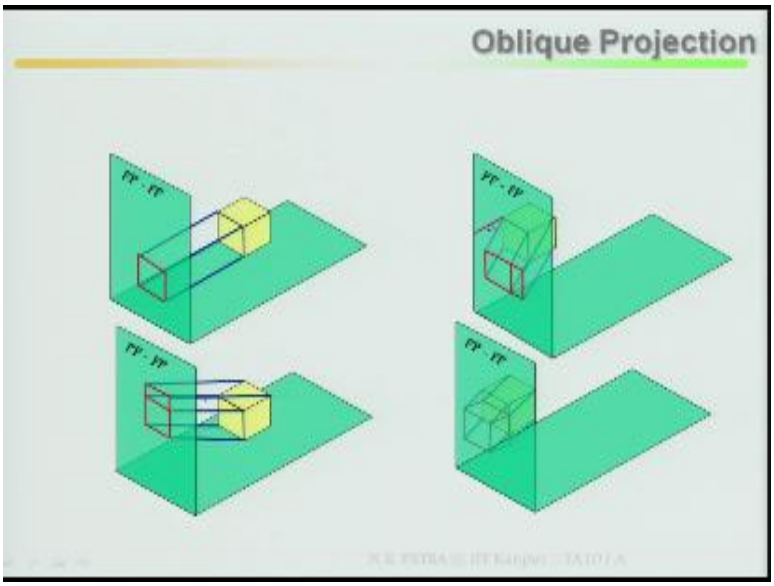

You can look at here, again basic fundamentals of your oblique projections. I am just animate it taking this object picture plane as well as front plane. This is your object, this is your picture plane, parallel to each other projected lines are perpendicular to your picture plane how it looks this is your orthographic projections. Now look at the object, now it has been rotated means it has been made it down 30˚.

How the object looks, then again third case x it has been making up this is your – with your axis up this is your axis down. Look at this object how it looks making up and down. Now here orthographic object is here, projectors are here parallel and perpendicular to your picture plane. In this case it will make 30˚ some angle of 30 or 45˚ or 60˚ down, here it is up then you can look at how the objects looks like simple animations I have shown.

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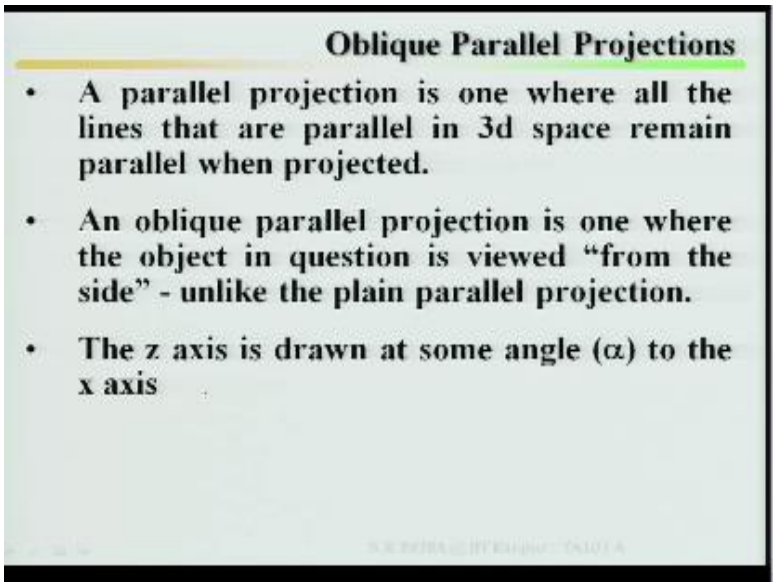

A parallel projection is one where all the lines that are parallel in 3D shape remain parallel when projected. A parallel projection oblique parallel projections – a parallel projection is 1, where all the lines that are parallel in 3D space remain parallel when projected. An oblique parallel projection is one where the object in question is viewed from the side. A parallel projection is one where all the lines that are parallel in 3D space remain parallel when projected, remain parallel when projected.

An oblique parallel projection is one where the object in question is viewed from the side unlike the plain parallel projection. The z axis is drawn at some angle, z axis is drawn at some angle α to your X axis. As I said moving up, moving down, towards left or towards right.

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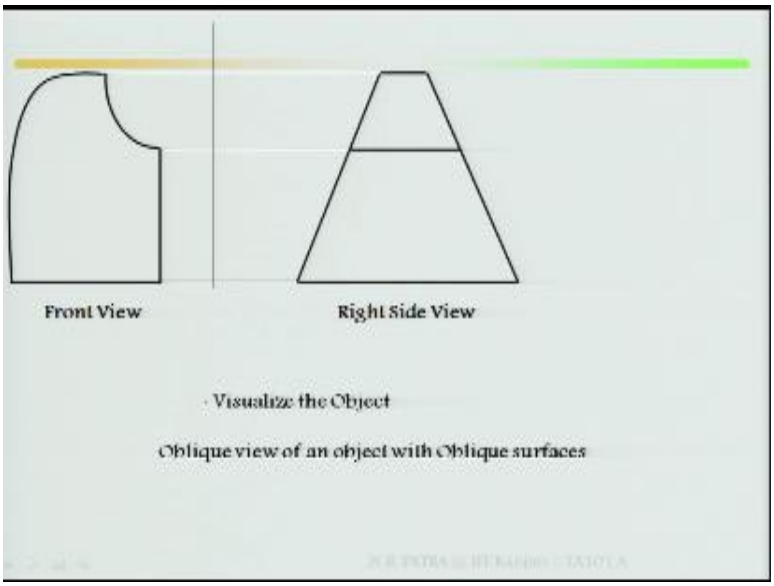

This is your oblique parallel projections, this is your front view slightly complicated case one example, right side view, visualize the object, oblique view upon object with oblique surface, this is a typical case oblique view upon object with oblique surface.

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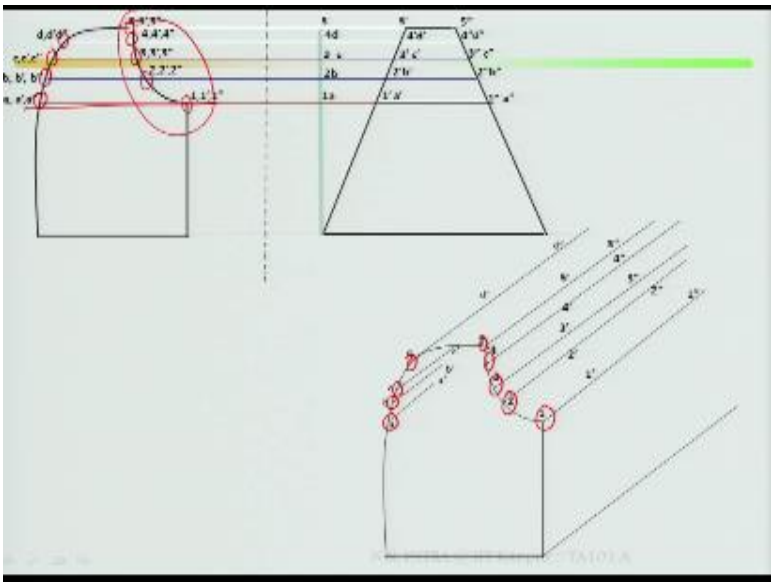

Take respective points in your oblique surface, take sections a, a′, a″, 1, 1′, 1″ finish it up your similarly B and 2 similarly C and 3, similarly D and 4 mark the points. Then draw this oblique projection, oblique view, because if this is your front view, that means this part is in your true shape. So you can very easily draw it taking respective points here, you can measure the coordinates, because this is your oblique surface right.

So take coordinates here, then take measurement then mark this points, then you can draw this, once it is over then go to your depth directions finish your depth directions, how you are going to finish it up. This is my depth directions, in depth directions mark 11A, 22B, mark 33C, 44 whatever the drawn, I have drawn it you mark it both the sides, because if this is AA, this is your AA this side will be 11, because this curved face oblique surface it is continuous.

So once you mark it look at this mark are you getting all, this is the typical case of oblique view of oblique surface, that means front face you mark it this is your front view. This is in true shape then as you have taken different sections in oblique surface 11, AA, 22, BB, 3, 3′, 3″, C, C″, 4, D similarly you mark your A, A′ here in case of side view we can mark it how far it is there. Then 1, 2, 3, 4 here A, B, C, D you can mark it, then join accordingly.

Because already in the front face if you look at here in the front face already in the front face I have marked 1, 2, 3, 4, 5 similarly A, B, C, D. 1 this is your 1, this is your 2, this is your 3, this is your 4, this is your 5. So similarly this is your 1, 2, 3, 4, 5 so this points locate it very easily taking your width as well as height. 1, 2, 3, 4, 5 then from here you can find it out, because from here to here this is your oblique surface.

Here you can mark where is your A is there, A, B, C then D, here it is A, B, C and D. How to get A, B, C and D from here you can mark your points how far it is there, then front view our front face you can finish it A, B, C, D 1, 2, 3, 4, 5 from here to here you can join it, you can join it by arc or you can join it simply.

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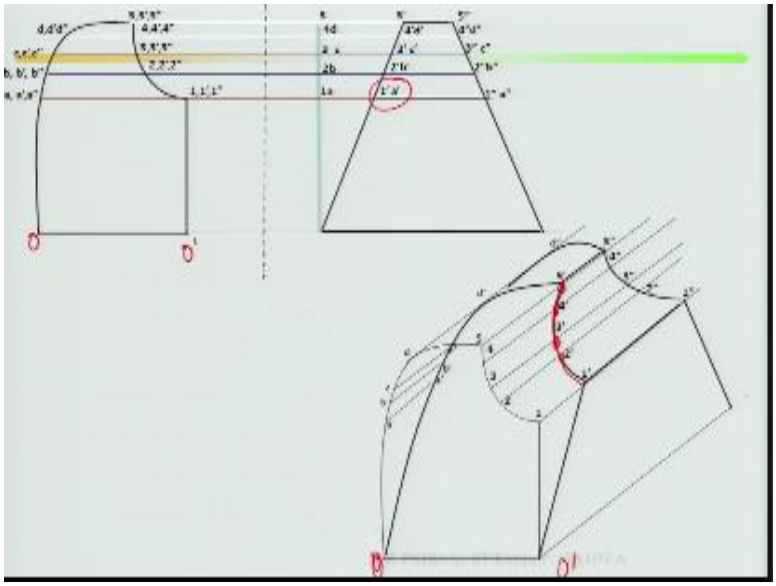

Then once you finish it off, once you finish it up your front face then in the depth direction in the depth directions take 1, 1′, 1″ look at here 1, 1′ and 1″, 2, 2′, 2″ how to get the 2′. If you look at here this is your case of your side view. With respect to reference I can get it 1′ A, 1′ A′ how far from the A, 1 your 1′ and A′ how far from your 1A, 1′A′, how far from 1A, 1″ A″. 1A that means with respect to 1 what is your 1′ with respect to 1 what is your 1″.

1, 1′, 1, 1″ you plot all these things 1, 1′, 1″, 2, 2′, 2″, 3, 3′, 3″, 4, 4′, 4″, 5, 5′, 5″ similarly you finish it off A′, B′, C′, D′ and D″ then join, then look at how I am joining it. First how you have joined, you have joined if this is your zero, this is zero not O, say it is O first front face O, A, B, C, D then 5 right. Then you have to go in the same sequence O, A′, B′, C′, D′ and 5′ then after 5 it is 5, 4, 3, 2, 1.

Here it is 5′, 4′, 3′, 2′, 1′ just join the coordinates how you are joining it once you mark this point, once you mark this point from here to here I join then mark it by smooth hand from here to here I have joined, here to here I have joined, because this is a curved face, curved face this is one of the curved face. Then similarly next step, 1 suppose this is O this is O′ this is O this is O′ then 1′ and O′, because here earlier 1O′ was there you join it.

The next step finish it up again it will start from here then go to D″, 5″, 4″, 3″, 2″, 1″ then in depth directions you go.

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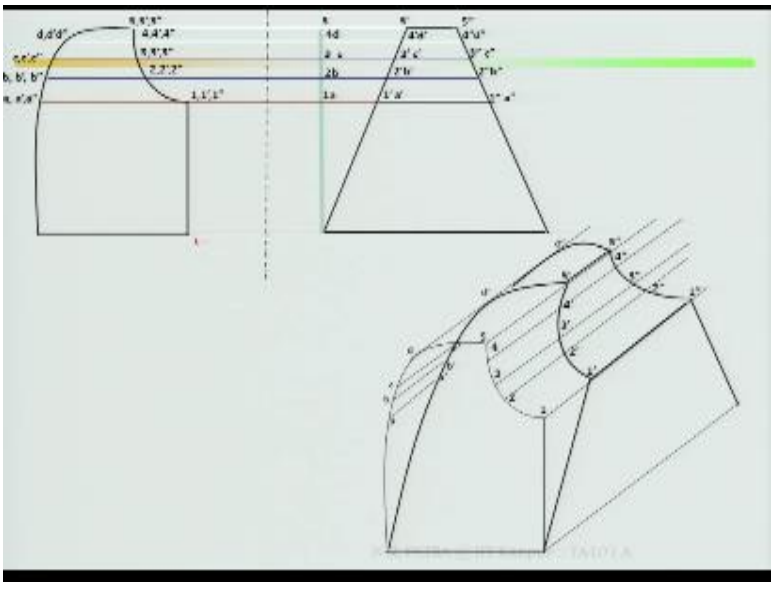

Once you finish it up you are finished curved surface inside, inside feature of your curved surface, because prime objective of this oblique projection is, if there is a curved feature that has to be shown clearly in case of oblique projections. So then this is what how your front size this is your front then this is your rear side then which part I can see it, exactly which part I can see it.

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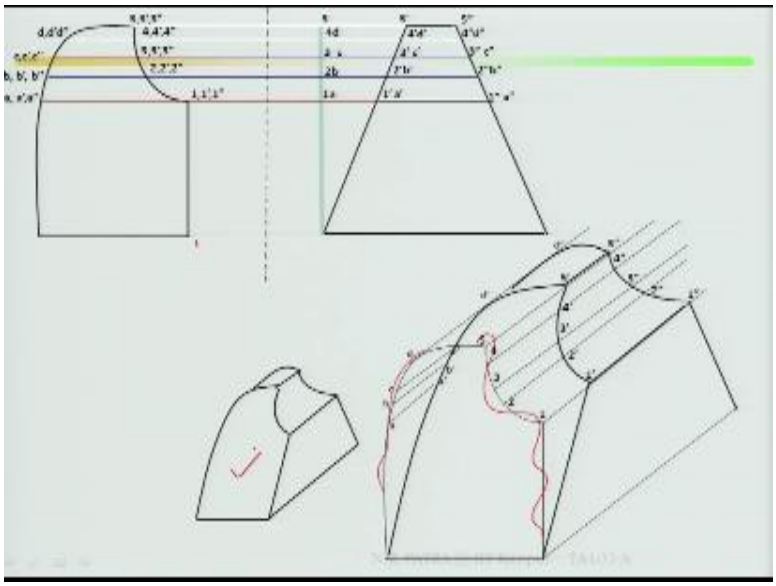

If you look at here, how it looks I have removed put it here, extend it, extend it come back. Now this is my actual object in oblique projections. I request all of you practice it at your home taking this example. Once this example is clear to you, everything of your oblique projection would be clear.

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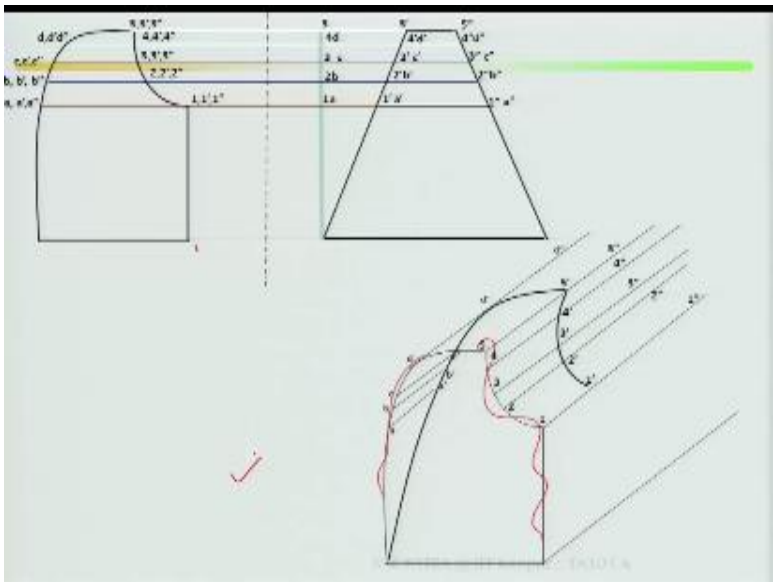

This is slightly difficult problem I have solved for your reference.

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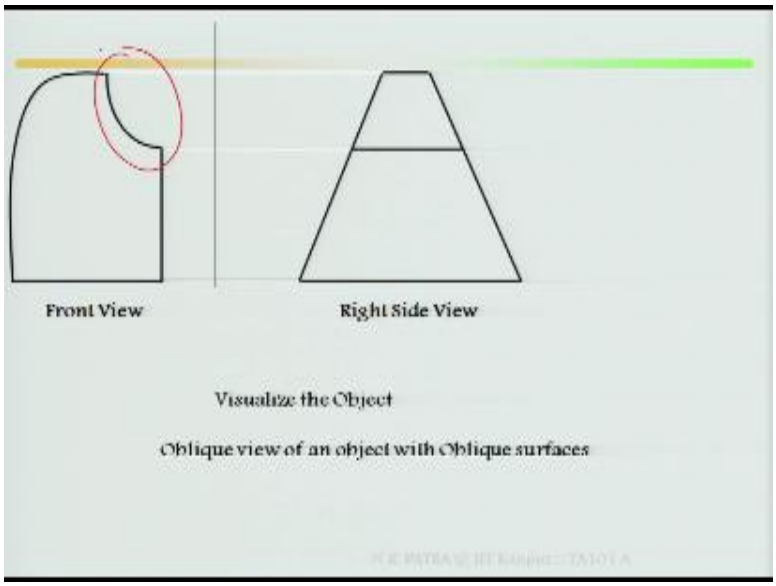

Look at this object visualize, front view and right side view, front view and right side view visualize this object. This is your oblique surface, this is your oblique surface then it is a simple case of oblique view upon object with oblique surface, front view is given the right side view is given.

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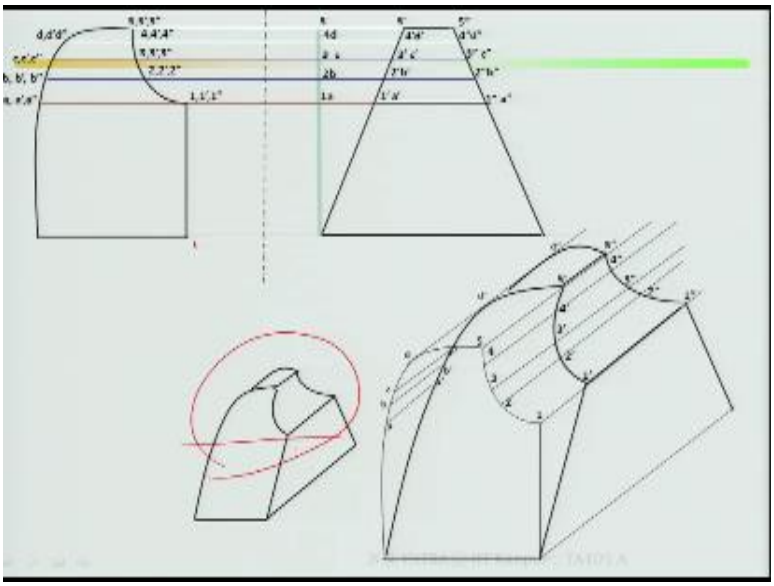

Then once again I am explaining take a reference point reference line then mark your oblique surface different sections, mark the points. Then once your front face or front view has been given in oblique projections front view is your true shapes. So finish your front face or front view, because this is your true shape. Then go to your depth directions then mark the same way, the way the points are been – or sectioning has been marked and points has been located.

Mark the same way 1, 1′, 1″, 2, 2′, 2″, 3, 3′, 3″, 4, 4′, 4″, 5, 5′, 5″ finish it off taking into consideration the way it goes. It will starts from here how it goes curved surface 0 or O A, B, C, D after D it is coming 5, 5, 4, 3, 2, 1 this is your sequence. So if you start it same way, I am starting here O here it is going A, B, C, D, 5, 4, 3, 2, 1 O A′, B′, C′, D′, 5′. Then similarly you go back from 5′ to 4′, 3′, 2′, 1′ then join it back.

Similarly rear face also you finish it up now this is what your object front as well as rear side which part actually it looks like. This object looks like, it will look at how the object looks like. It is a curved surface remember this part of this object is a curved surface, complete curved surface. That is why your oblique projection is required or oblique view is required. So how it looks, it looks like this.

So more examples probably if time permits I will cover your oblique projections or oblique views. Next class I will start sectioning, thank you.

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