Technical arts 101
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Lecture – 17

If you are understand perspective raise your hands, if you think you understand perspective raise your hands. So, may be devote sometime to revise a whatever we have covered in the last two three lectures and I will also talk about a new method that I got introduce to by Prof N.N Kishore, yesterday evening I will talk about that.

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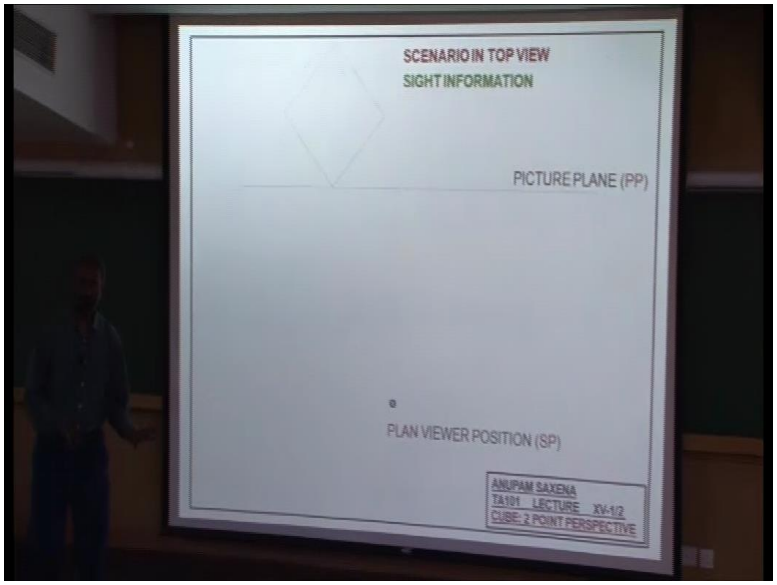

So, you know if you few guys came to me yesterday and sir I mean may be is do us lot, if we can have an extra session and I was like fine. So, after the class yesterday I went to the a lecture hall office spoke with mister Varma about the availability of the halls he said l sixteen eleven o clock I said great fine. So, then I start thinking man I mean I am not prepare for today what I am going to be doing. So, maybe I will just revise whatever we have covered and then I met Prof. Kishore in front of office, and then he explained a method which seemed very logical to me and then I am going to talk for that today. So, this seen let me animate the seen.

So, stay with me here let us see that phase of the cube in top view is this table, let us see the phase in top view over there is this stable this is the position of the viewer; that means,. So, if you looking from the top you would be looking at some bodies head and

imagine that I as a viewer I am standing here and you are looking at me as well as this table from the top and let us say that this table is at an angle and here this table is there you guys a looking at me as well as table from the top. So, you see my head which is that point the position of the viewer that is me giving the table in the top view all right.

Now, the picture plane how was the picture plane the picture plane is going to be a vertical plane that would be in between the object as well myself fine all right good. So, this is me the viewer object and the picture plane is in between the me and the object the picture plane is vertical in the top view that would appear as a line which is here fine all right.

Now, my eye would be looking at different aspects or different features of the object are the vertex on the left left top right bottom right top, and the vertices below and those would be represented by the rays going from this point, here after all these four vertices. So, for the top view we get the sight information you get the sight information from the top view ok.

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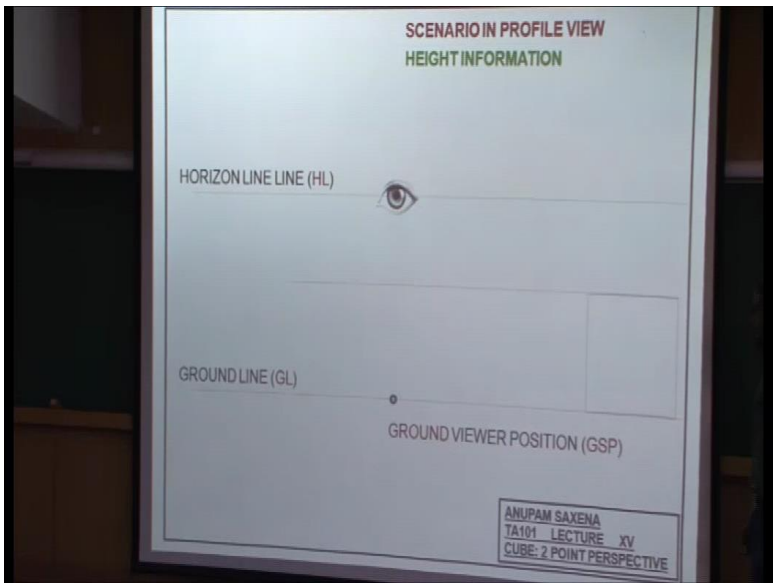

Now, forget about the top view lets go to the front view. So, first you are looking at the profile view of the sight view of the object this is not the true sight view this is the sight view that is enough to give you the height information of the object fine this where the ground line is. So, this is where the object is stationed all right, horizon line. So, imagine that if I am standing on the ground this height corresponds to the distance between my feet and my eye level this is where my eye is going to be and. So, happens that in perspective views we do not need this information. So, we let go with this information all

be need from the front view is a ground line and the horizon line this is where my eye is and we can get the true height information from the profile view of the object now does not really matter where the ground line is if you push the ground line below the object gets push below by the same amount, and the horizon line gets push below by the same amount does not really matter where you position this what is important is how you are positioning your horizon line. So, this is again the line that differentiates between the sky and the ground your eye level. So, what matters is how you are positioning your horizon line with respect to the ground line that is what is important now the important thing for you to do is to combine.

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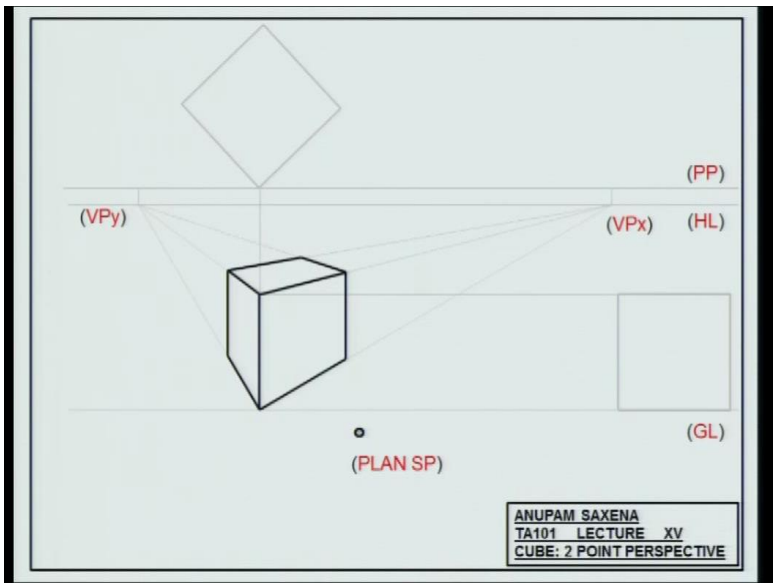

The top view and the front view like. So, the picture plane the top view of the object and the viewer position a point we call it the station point, these are parts of the top view with me and the ground line and the horizon line they are the part of the front view you are going to be getting the slight information by projecting the rays from this point to different vertices of the object an you getting the height information by projecting horizontal lines which are parallel to the horizon line from this object now I have already covered this example. So, I will quickly go through this. So, if you are looking at a point far away at infinity along parallel to this you will be getting this point as the vanishing point now imagine just in case in the isometric drawings that we have drawn ha what here the projection lines are too light is it less worry about that less worry about that you know why let us see how it goes.

So, if you are looking at may i. So, if you are looking at an object along this direction far away you'll get the image over here on the picture point project it down we get the

vanishing point. So, imagine the you are drawing something very similar to in isometric view. So, you can imagine that this thing is the direction along the x axis this thing is direction along the y axis and the height is coming out of this field. So, with that this would be the vanishing point for all the edges that have parallel to the y axis and likewise this would be the vanishing point for all the lines which are parallel to the x axis cannot see those construction lines, let us see how it goes.

So, you know that this edge is on the picture plane it will be in true length project it down get the true length of this edge right the corresponding x lines they vanish it may be here the corresponding x lines they vanish at v p x the corresponding y lines they vanish at v p y, we cannot see the construction lines can we give me a moment you have seen this example before. So, you know where the lines are gonna be do not worry about that it is going to be hard time to get this in fixed anyhow.

So, you see that vertical edge corresponding to this it would be lying at it would be lying in between these two rays vanishing towards v p y this edge would lie in between the two rays vanishing towards v p x and then draw two more vanishing lines complete the block this is this is something that you have seen before not a problem something that you understand hopefully right. So, keep this in mind this is where I am going to be introducing you to what I say Prof. Kishore's method, I am going to be making a few changes and I want you guys to be attentive over here, I am going to be making a few changes change number one I will not draw the prospective with pre specified vanishing points or pre found vanishing points I will not be using vanishing points at all instead what I will do is I will use the true profile view.

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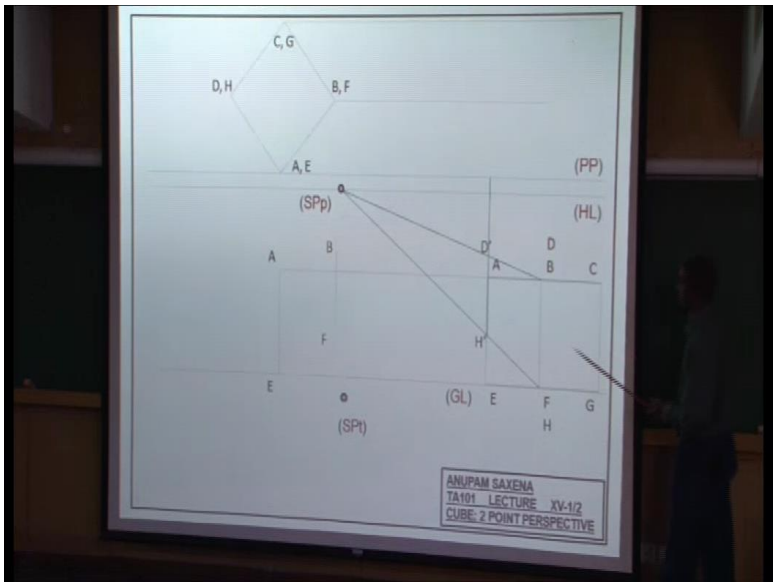

So the top view remains the same from there I use projections like we do in orthographic projections I name these vertices as a e. So, a is on the top e is at the bottom those as b f beyond the top f at the bottom c g not the center of the gravity, but c g c on top g on bottom and d h d on top and f on bottom once again number one I will not use vanishing points number two I will use the true profile view of the object and I will see if I can a prospective a nice prospective of course, that is the picture plane there.

Now, if you are looking at the picture plane and the object in the front view your picture plane will be passing through the edge a e alright if you are looking at the picture plane in the profile view how would your picture plane be look looking like. I will be a line, and I will be a line that passes through. So, I will be a vertical line that passes through a e that picture plane is not visible here, but let us try it is visible now.

Now, the second thing that you are gonna keep in mind look at this point here what is this point station point in English it is the position of the viewer with respect to the picture plane in the top view. So, you would know this distance from here towards the picture plane you all know this distance how would this distance show in the profile view in the profile view if we use the same distance from here to here rotate it come over here and block the position of the eye on the horizon would it be this point once again this the position of the viewer in the top view. So, this is where the viewers position with respect to the picture plane this is what the distance is from here to here.

The scenario if you wanna capture in the profile view how would you gonna do that I am here from the top you see my head, you see my station point the head position with respect to the picture plane, what you guys see now is the profile view this is my line of horizon this is where I am standing of course, and that is where the picture plane is what is this distance from here to the picture plane is that distance is same as this distance.

So, if you know this point if you know the position of the picture plane in the top view you know the distance use the same distance to locate the station point or the position of the eye of the viewer in the profile view. So, this is where the eye of the viewer will be in the profile view this distance is the same as this distance from here to here and of course, the eye is going to be lying on where the horizon line right, now comes interesting part and a very logical very reasonable part and follow me carefully position of the eye of the viewer in the profile view alright, let me use the short forms s p t station point in the top view SPP station point in the profile view.

Now, what I am doing is I m looking at vertices a and vertices e from here this is very dim I am sorry about that, but just imagine that I am looking from here at vertices a and vertices e man it is going to be difficult for me to explain let me see if I see those lines this helps. So, picture plane this is the picture plane here I am looking t vertices a and vertices e from the station point in the profile view it is. So, happens that a e lies on the picture plane I use horizontal projections directly and then I look at the vertices a e from the station point in the top view. So, it lies on the picture plane here I take those projections and what I have over here is a vertical edge a e.

In prospective straight forward here comes the interesting part, if I look at d f from the station point in the profile view right now this ray is going to be cutting the picture plane at this point. So, this means that the image of point b will be here on the picture plane in the profile view likewise the image of point f will be here on the picture plane in the profile view b prime f prime I project these guys horizontally, and then I use the sight information from the top view what do I do I will tell you what. So, follow me and I will make certain revision of the slides. And then post it on the web for you guys. So, you just imagine that I am looking at b from here, if I look at b from here it will be crossing the picture plane here somewhere I take the horizontal projection down just in case that you have been doing in case of your two point projections, and then I look at f same thing. So, this ray would be cutting the picture plane here somewhere I project it down and this is what my b f is gonna be it is gonna be vertical again. So, this is the new thing this is the new thing this is the same thing that we have covered in previous lectures. So, d

prime h prime they will be lying at the same two points as b prime and h prime on these two rays take the horizontal projections same thing from the station point.

Here look at d h over there that would be cutting the picture plane somewhere over here project it down wards and then you will be seeing d h the same thing with c g you are looking at c from the station point SPP, this would be the image of c in the picture plane on the picture plane this would be the image of g on the picture plane in the profile view project them horizontally. Now look at c g from this position use the ray that ray is going to be intersecting the picture plane somewhere project that intersection downwards let that ray cut these two points or these two points and essentially you will be getting this edge c g you have all the eight vertices that you need in your prospective figure that is it.

Yeah you what the interesting part is you what the interesting part is you do not if I extend the edges along the x and y directions. I can see those projection lines. Now if extend these I will be getting the same vanishing points that I have been using.

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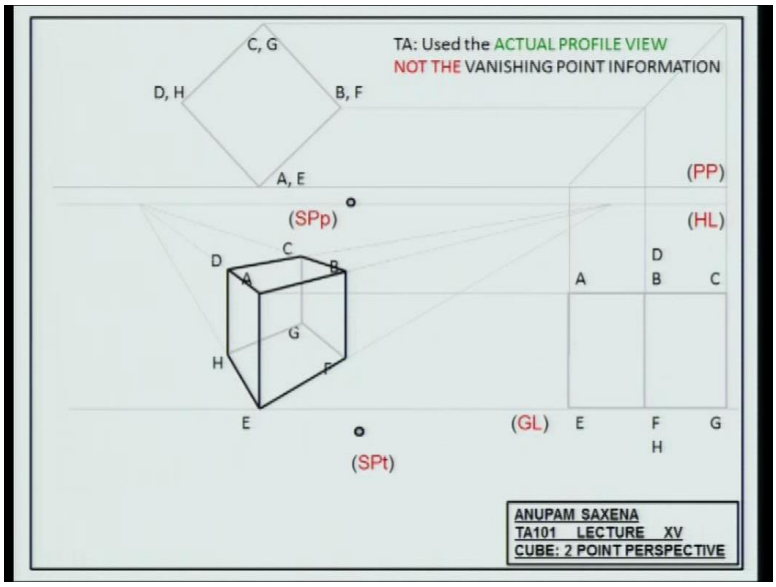

So, this is the prospective using the new method this is the prospective using the old method new method old method exactly at the same locations, now you had a lot of questions regard to how to choose the vanishing points over here etcetera, etcetera. This actually sounded a lot more reasonable and logical to me. So, I would recommend this method to be used for even single point prospective that hopefully I am going to be covering today with me are you with me.

Yes sir.

Good clear.

I am really sorry about the projection lines I thought they would be visible, but anyhow depends in the two methods in the new method that I had introduced to you today I did not use the vanishing point rather I choose to use the true profile view of the object in the previous method that we had covered we had used the vanishing point machine, but we had not used the true profile view of the object. So, that is the difference.

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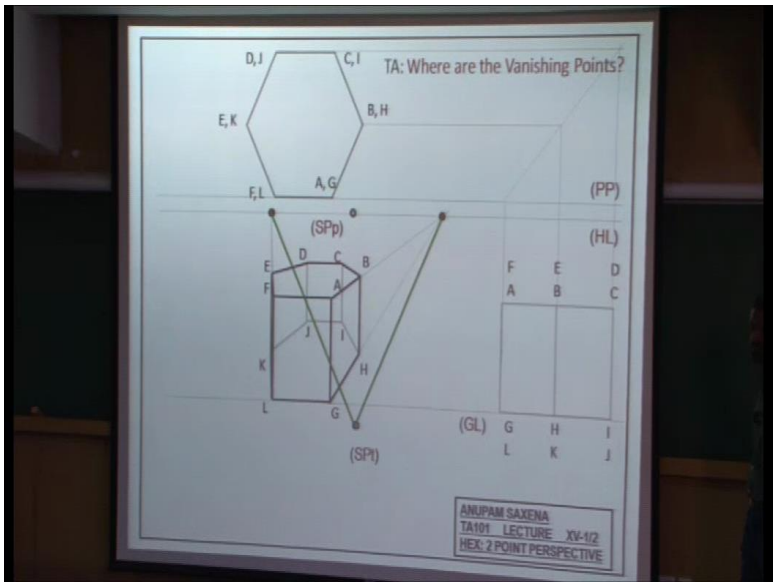

So, a hex signal block prismatic block using the new method again I how a feeling that projection lines will not be visible. Let us try. So, top view is a hexagon a g b h c i d j e k and f l edges going into the screen a b c d e f are vertices on the top face g h i j k l are vertices on the bottom face a g f l b h e k c i d j your station point in top view s p t is remains the same with respect to the picture plane here it is. So, frustrating for me I mean I can imagine. So, imagine that you have a picture plane over here let us see it is better alright. So, station point SPP you are looking at edge a g it is going to be. So, these two rays are going to be intersecting with the picture point with the picture plane here.

At these two points take the horizontal projections you would actually know that face a g f l l been true shade, because faces on the picture plane in the top view. So, get that face directly no problem a g l f right now. So, yesterday I made a miss by showing too many construction lines for I try to avoid showing additional construction lines. So, I start with new construction line. So, I am looking at edges b h and e k b h and e k, well will these two rays intersect I will get the images of e and b here and h and k here take the horizontal lines. Now I will look at the edge b h from the station point in the top view that would intersect the picture plane over here I make the projection downward

sensually it is a vertical line I believe just about close to vertical line. So, this is my edge b edge right I look at e k I get the intersection here.

Project the intersection down ward gets the intersection between these two rays and that vertical projection here and create an edge e k now I have look at edges see I and d j the images of which are going to be formed on these points and these points take the horizontal projection from the station point in the top view, I look at c, I get the intersection between this ray and the picture plane over here take that intersection downward allow this vertical projection to intersect with this and this horizontal ray and create the new edge c I likewise I look at d j from s p t same thing same thing same thing I have got six vertices at the top and six vertices at the bottom without using vanishing point.

I can join these vertices to get a hex signal prismatic without the use of vanishing points pretty pretty nice very logical very reasonable method. Do you wanna see where the vanishing points are… they have lye on the horizon line stay with me stay with me they have lye on the horizon line and. So, happens that that they do you get the right vanishing point here and the left vanishing point over here. Now if you draw a ray that passes through s p t and this vanishing point that would be parallel to what A b and if you draw a ray which is passing through s p t and this vanishing point that would be parallel to…

Ha.

What come again?

Which one?

Why?

Fine here we'd not use the vanishing point, but what we doing is we are saying how these guys are going to be vanishing what we are doing is just a reverse we drew this prospective with the true profile view the true top view stay with me true profile view true top view got this prospective, and then we are trying to figure where the vanishing points are how do you figure the vanishing points by looking at pair of parallel edges vanishing as a point. So, what I draw is a ray passing through this a ray passing through this these three guys are what concurrent they intersecting same point and likewise this horizon line and the ray which is along this edge and the ray which is along this edge they are also intersecting with the same point.

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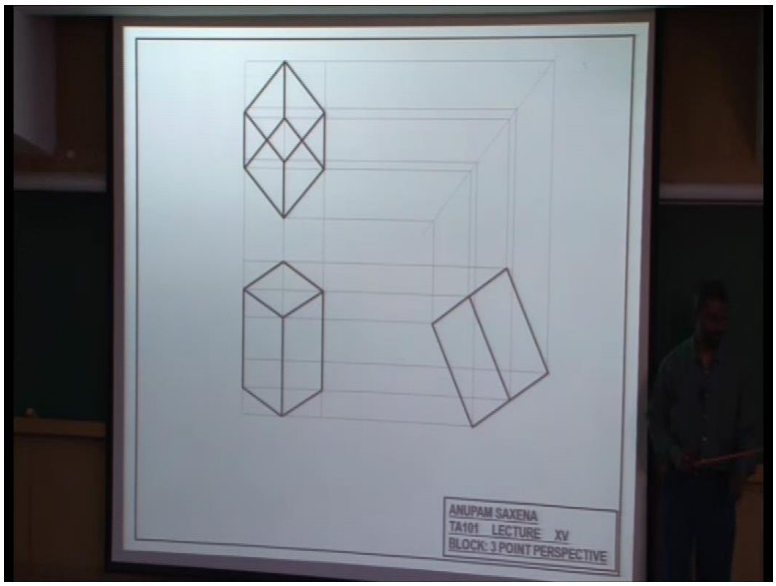

Now using the same method I am gonna try to construct a three point prospective you can try constructing a single point prospective using this method simple examples, I am going to be using the example of a cube to construct a three point prospective using same method.

So, what you see third angle orthographic projection the front vie the top view and the profile view. So, the top view in the top view the cube is rotated by certain amount let us say 45 degrees now how would I get a three point prospective rule number n in prospective all lines have to be running away from the picture plane none of the lines should be parallel to the picture plane only then I can get a three point prospective otherwise not right. So, what do I need to do for that I need to make another rotation. So, it is. So, happens that you would be getting a two point prospective on this because you have you still have an edge or rather you still have four edges one two three and four parallel to the picture plane which is here. So, I need to make one more rotation what would I do is I would rotate the cube in the profile view and get the respective views in the top and the front view.

Like this use projections go back rotate this cube in the profile view by a certain amount when I rotate this what happen to this gets rotated about this axis and this also get's modified accordingly you have done orthographic views.

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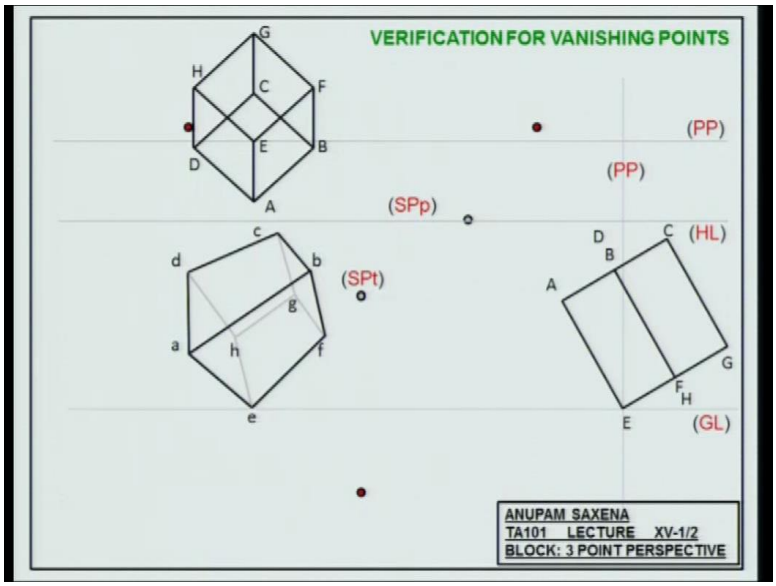

So, it should not be very difficult for you, now I am going to be using this picture and this picture to draw a three point prospective the top view and the true profile view, these vertices one two three and four they corresponds two these four vertices. Over here right well are these vertices in the top view these guys or those guys careful, careful, careful you know I was making this animation at eight o'clock in the morning.

The set of vertices below or the set of vertices above look at the projections these four vertices are getting projected over here these four vertices are getting projected and coming back here look at the projections. So, these four vertices they'll appear at the bottom or at the top in top view at the bottom. So, that is one thing that you need to keep in mind, which is where I struggle for half an hour almost 45 minutes this morning. So, a b c d is the bottom face e f g h is the top face in the top view a b c d is this face here e f g h is this face here in the profile view clear look at the position of the picture plane in the top view it is passing through the vertices e.

In this time this example the picture plane is passing through the vertices e correspondingly in the profile view the picture plane is going to be a vertical line that passes through this vertices c, I choose a station point in the top view s p t this can be any point and the same rule whatever this distance is I am going to be using the same distance from this picture plane in the profile view and have my eye all the station point in the profile view on the horizon line fine here SPP and then the drill remains exactly the same exactly the same no changes look at these vertices from the station point in the

profile view draw horizontal projections look at corresponding vertices in the top view from the station point s p t draw corresponding vertical projections find the intersections find the vertices and that is it.

Let us get started looking at a e I am looking at a and I am extending this ray because the image or face being formed over here on this picture plane take that horizontal I will look at a e now I need to extend this ray because the image what actually form on the picture plane over here draw the verticals find the intersections and get the vertices the same thing for all edges all vertices spares look at the f extend this SPP ray to intersect with the picture plane draw horizontal from here draw horizontal from here f gets from here the image of that look at the corresponding vertices in the top view get intersections between the ray and between the rays in the picture plane got the verticals let them intersect with the corresponding horizontals get the vertices again same thing this is for d h.

And this is for the center of gravity four edges of a block of a cube I do not know what prospective it is I join these vertices and get a prospective veered looking thing.

Yeah.

Fine, fine, fine I still need to convince you that these are three point prospective option one would your block look like that.

Or would your block look like this it would look like this yeah.

Or this…

Have you heard or something called necker's cube illusion.

Have you heard or something called necker's cube illusion yes or no.

No sir.

No.

No sir.

Yes.

No sir.

Alright for those who have not alright look at this vertices e and look at this vertices c and tell me which one is in front of the other.

Ha. Yeah. So, if you are looking at this object if you are looking at this object at one time it will appear to you that vertices e is in front at the other time I will appear to you that vertices c is in front careful careful so…

That is that is what the necker's cube illusion is.

Yeah that is that is what the illusion is anyhow…

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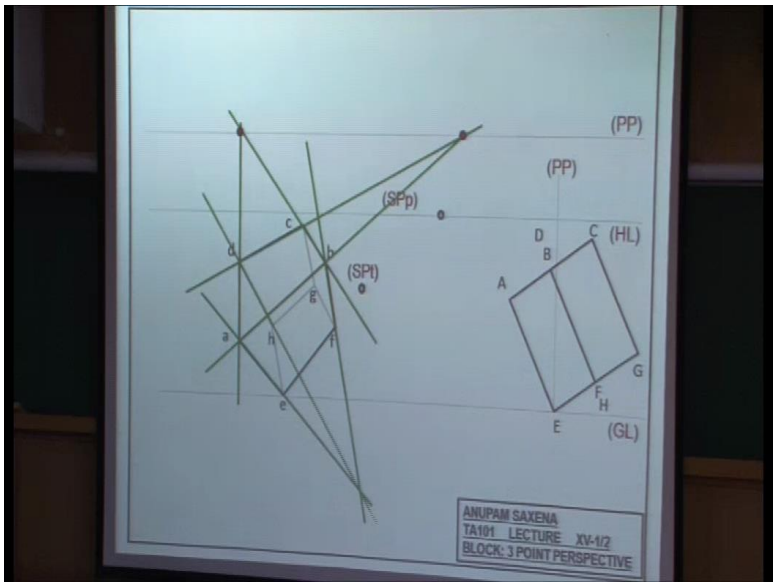

So, if this is the true prospective of this cube let us try to figure where the vanishing points are…

Draw lines parallel this is my first vanishing point.

Sorry got it wrong yeah yeah this is not the correct.

What?

I got this wrong alright I got this wrong let us see where I made a mistake.

I have three vanishing points alright, but two of them they happen to lye on the picture plane not the horiz horizon line which is strange.

So, alright can you help me figure where I have made a mistake you help me figure where I have made this mistake where I have made a mistake the entire thing alright fine think about it yeah.

Picture plane would be more towards the left side.

Look about my picture plane I decide my picture plane to pass through e I have decided my picture plane to pass through e well this distance I thought was the same as this distance.

No idea where did I go wrong.

The orientation.

The other alternative.

No no this nothing do with necker's cube illusion.

Where did I go wrong yeah, are the distance is between s p t and the corresponding picture plane alright.

Are these distance equal yeah looks like they are where did I go wrong you know the only problem with this is that I am getting the vanishing points on the picture plane and not the horizon line yeah.

So, this is why I will do?

Sir.

Yeah.

A b e and n were at the same face in the top view.

A b c d are in the same plane or on the same plane.

A b c d.

A b e f.

A b a b e f alright, so a b e f. So, got a b e f yeah I got that plane.

I will tell you what I will tell you what I will pose these slides on the web you can take a look, and if you have found my mistake share with me in the next class.