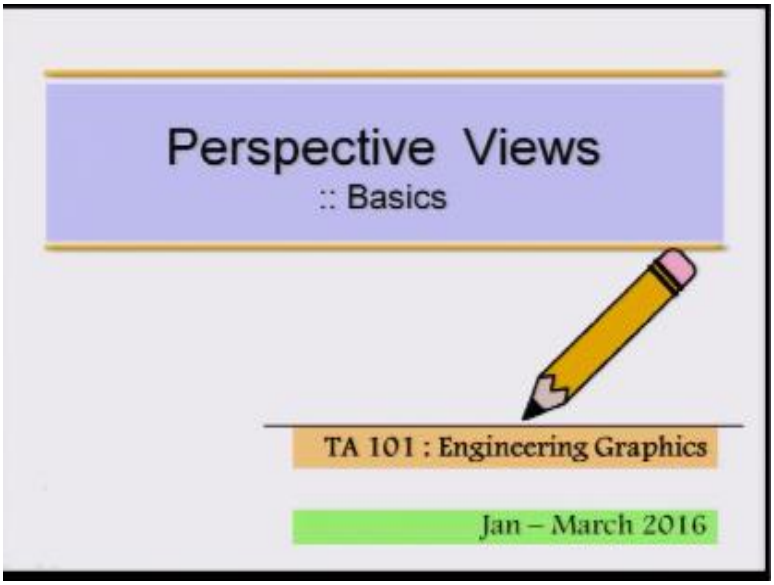
Indian Institute of Technology Kanpur
National Programme on Technology Enhanced Learning (NPTEL)
Course Title
Engineering Graphics

Lecture – 19
Perspective Views

by
Prof. Nihar Ranjan Patre
Department of Civil engineering, IIT Kanpur

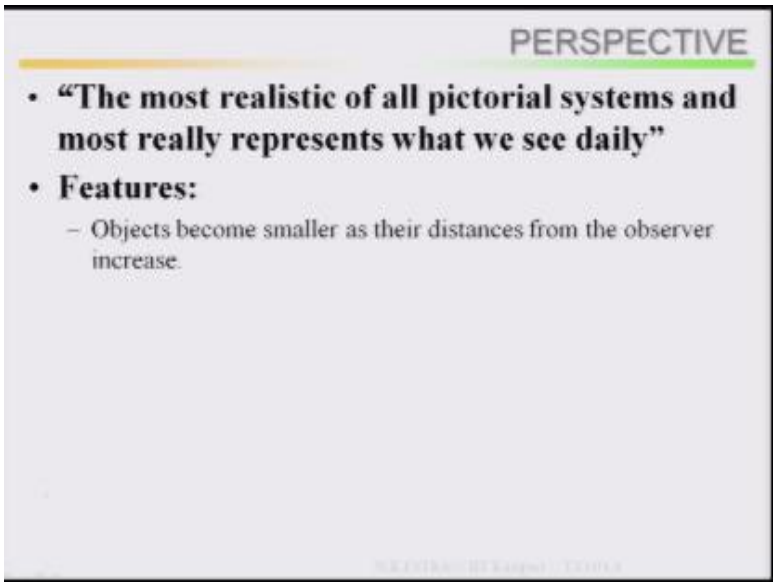
Now let us start new chapter that is your perspective view.

(Refer Slide Time: 00:21)



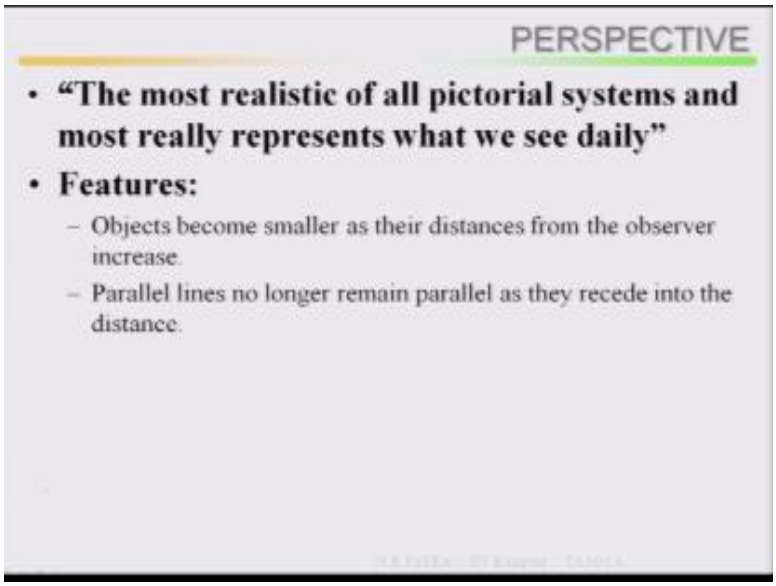
And its basics.

(Refer Slide Time: 00:24)



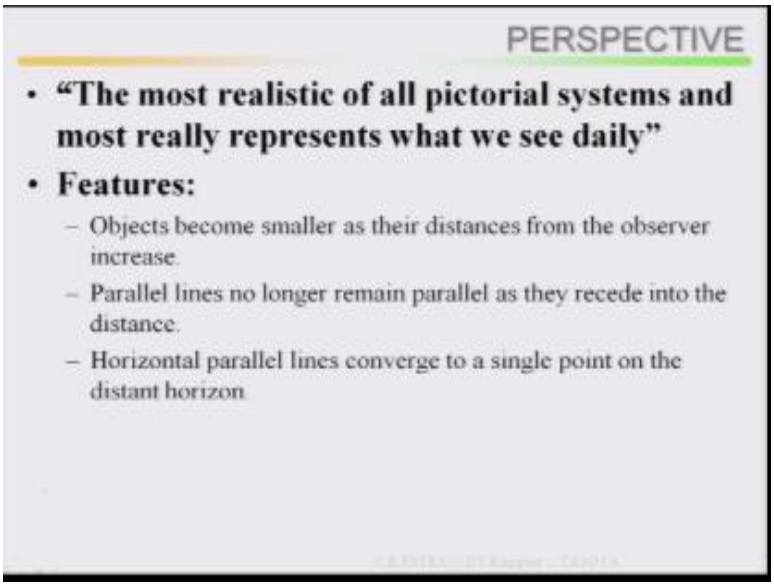
What is the perspective view basics, this most realistic of all pictorial system and by daily to daily basis life features, if you look at this features objects become smaller as their distance from their observer increases. Where it appears down shape, small, you are looking and standing and looking at the object and it becomes smaller and smaller as the distance proceed.

(Refer Slide Time: 01:01)



Parallel lines no longer remain parallel as they recede into the distance.

(Refer Slide Time: 01:07)

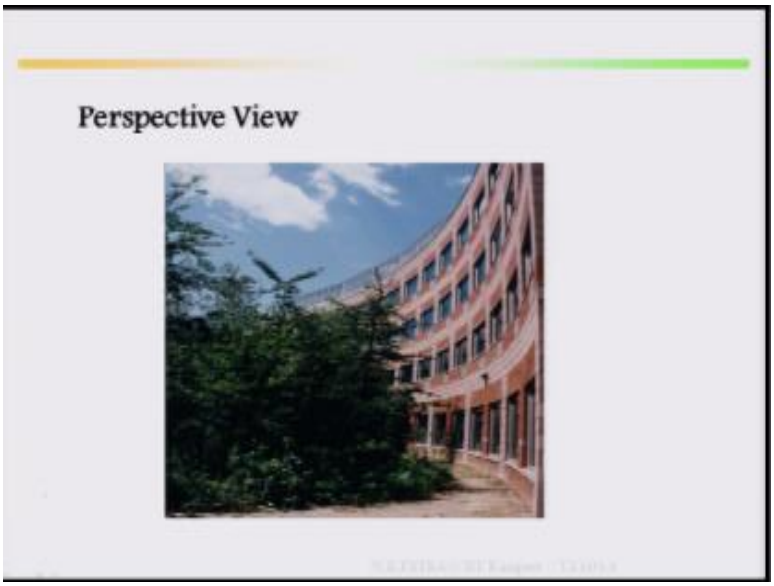


Horizontal parallel lines converge to a single point; remember here horizontal parallel lines converge to a single point on the distant horizon. Horizontal parallel lines converge to a single point as compared to orthographic projections if you come to the perspective views where your horizontal parallel lines, it will converge at a single point.

(Refer Slide Time: 01:39)

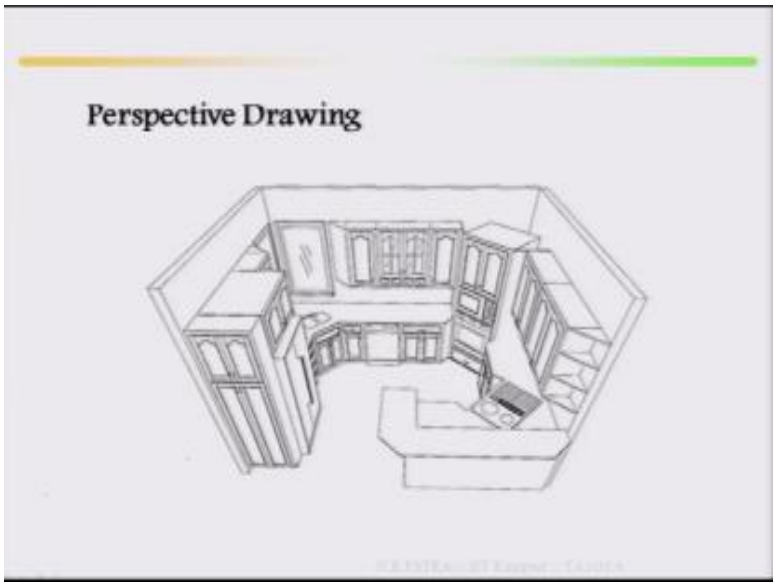
Look at the example, I am looking here, I am standing here and looking at there. And it is converging at certain point at an infinitive distance also.

(Refer Slide Time: 01:54)



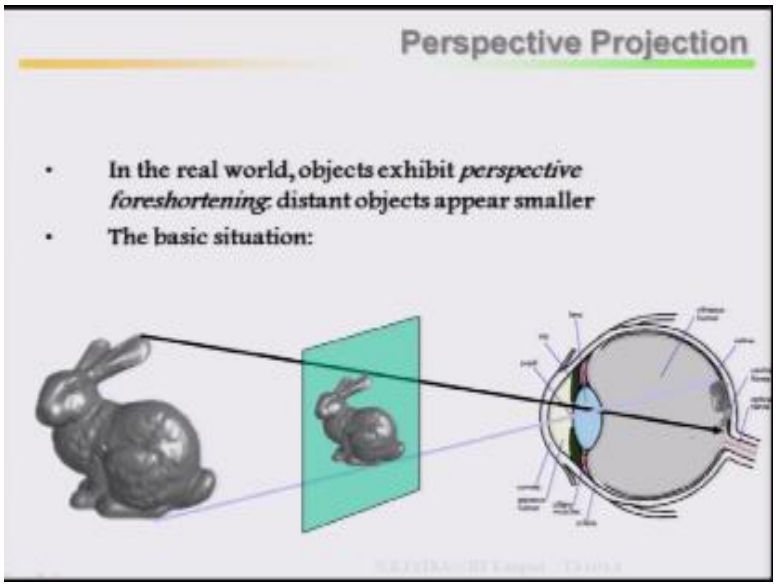
Look at here, second example.

(Refer Slide Time: 01:59)



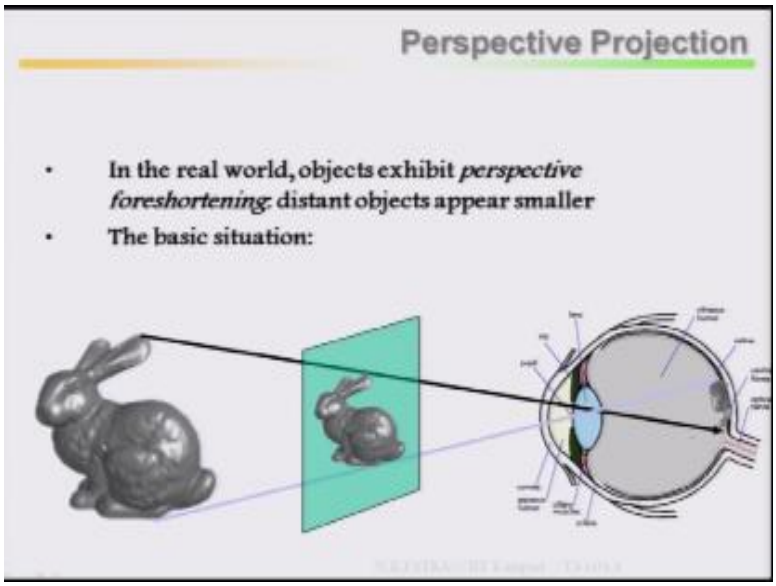
Then how it looks your perspective drawings.

(Refer Slide Time: 02:04)



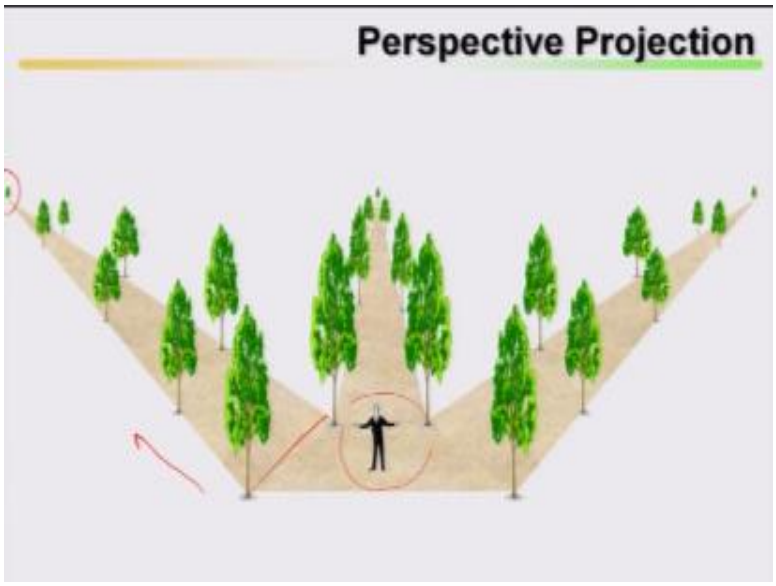
In real world, objects exhibit perspective foreshortening, distant objects appear smaller, particularly the distance object appear smaller. The basic situation look at the example of one object, this is your eye. In your eye lens, camin, cornea they are – then if you look at here, if you look at the object here, what happen to your eye, it looks smaller one. Now same smaller one, here in the eye your perspective particularly at long distance views, if you look at there from here a long distance object you are visualizing it looks smaller. In an imagination from your eye it looks very smaller.

(Refer Slide Time: 03:12)



If I take a picture plane in between object and the eye, if I take a picture plane, so it is in between the actual object and what I visualize in between it is a medium size.

(Refer Slide Time: 03:28)

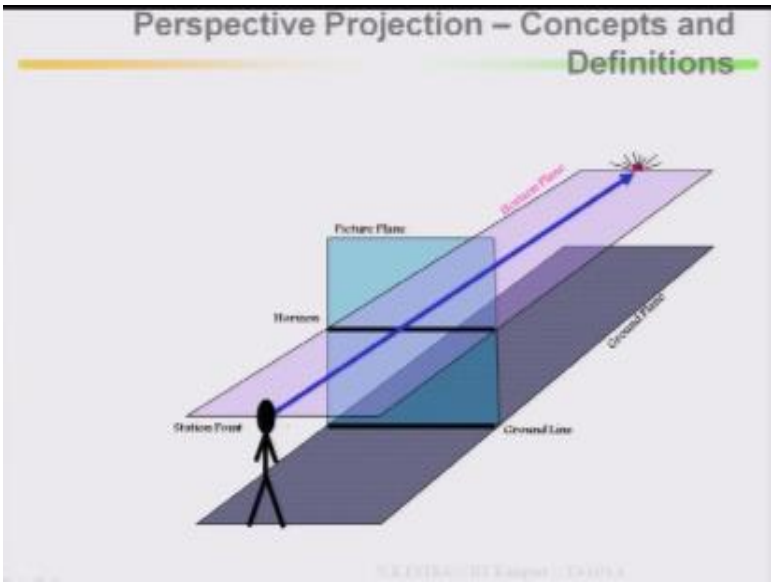


Now let us start this basic. Look at the animations carefully. There is a tree, in these directions there is a garden and the tree is continuous throughout. I am a observer here sorry object is this, this is your observer, from here suppose you are or myself we are looking at from here to how the trees looks like. It goes from here to infinity, but if I look at here first two trees how it looks, it is in real shape.

Then as it proceed further in infinity directions, that means somewhere else it is converging. It is no more parallel, if you look at here, this and this are in parallel a garden it is going, parallel it is going. At a infinity distance or maybe certain larger distance what will happen, this tree, this tree, this tree, this tree, this tree, this tree it becomes smaller, smaller, smaller and all of a sudden it converge at one point.

Similarly other side left hand side as well as right hand side this is the basic physics of this perspective views, particularly at a longer distance the object will be seen as a smaller one and it will be reduced. In the back side same, particularly this is the 3D view left, right and back even in front you can see.

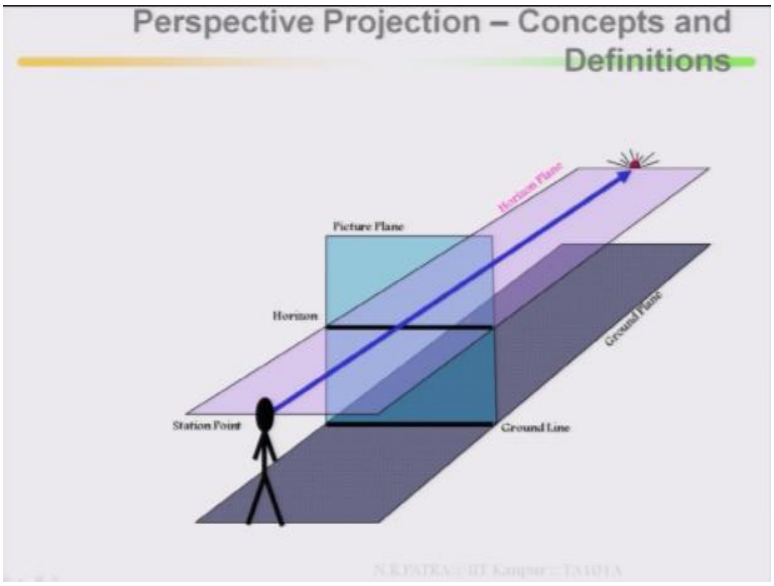
(Refer Slide Time: 05:23)



Now concept and definitions, these are all to understand what do you mean by your perspective view. Now let us – this is a ground plane, ground means where I am standing. If I am standing here this I can define as a ground plane, here this is your station point, station point means where you are standing and looking at the object that has been called station point. This is your ground line, then this is your picture plane, this is your picture plane.

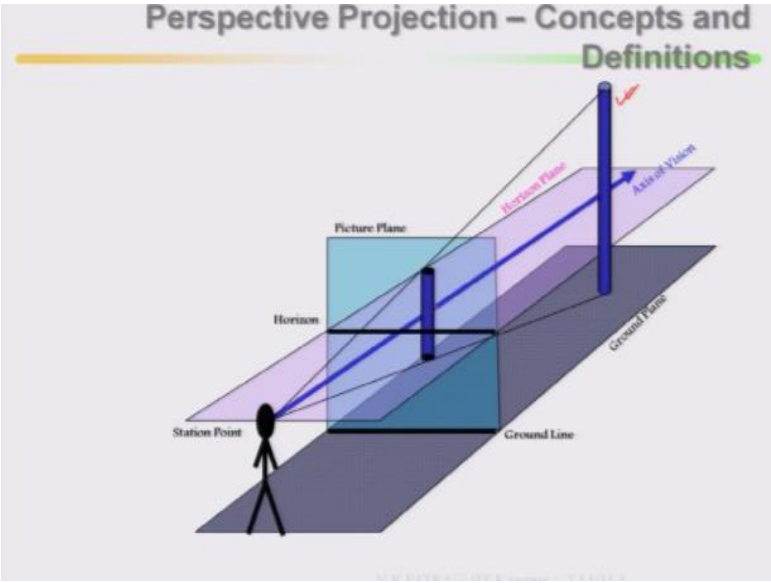
Then in this picture plane where it cut your ground line this has been marked. Then look at this, from station point this is the eye where the ray is going means visions that has been clarified as horizontal plane. Then this horizontal plane where it cut your picture plane that has been classified or in definition it is called horizon means this is my eye, I am looking the camera from the eye, looking the camera from eye to this camera this is horizontal plane. If I put a picture plane, picture plane in between where it cut it that is called horizon.

(Refer Slide Time: 6:56)



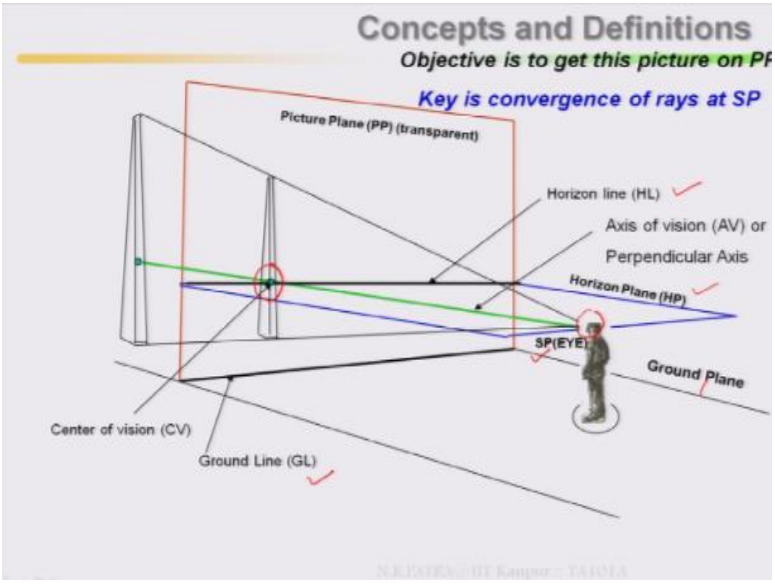
Now this is called axis of vision that means from the eye where you are looking towards this object that is called axis of vision.

(Refer Slide Time: 07:13)



Then look at this, this object is here this is your object, object is here from your eye axis of vision you are looking at it then looked at it. then once you are looking at there it has been marked in the horizon in that particularly horizontal plane you mark it then this is your object in the picture plane particularly long distance object. you have to bring back to a picture plane how it looks like that down range that in the sense says perspective.

(Refer Slide Time: 07:58)



Now this is a simple concept vise in 2D view let me go to your three dimensional how it looks like ground plane then your picture plane, then stationary SP stationary point eye is called stationary point, then looked at here this then ground line this is your ground plane this is the observer suppose you are seeing your eye is your station point, then you put picture plane in picture plane where it got our ground plane that you can say that it is your ground line, then picture plane transparent then come to horizon plane.

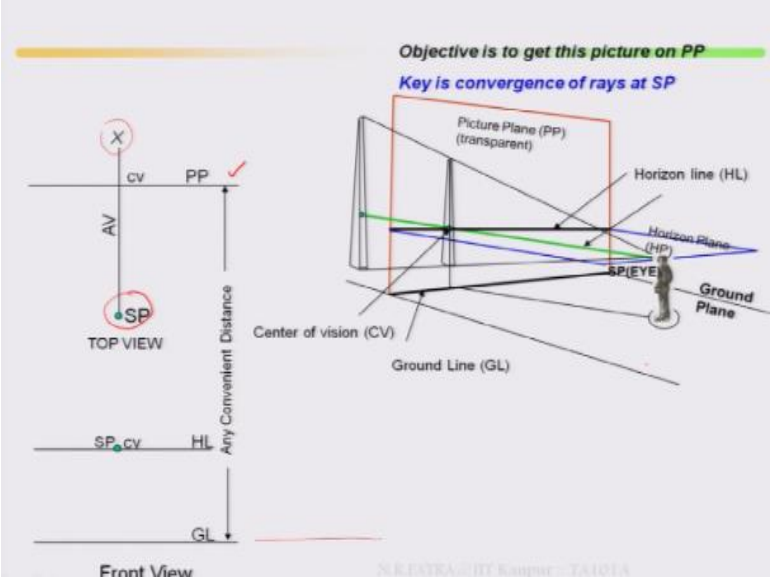
As I say from rays, ray of vision from the eye the ray of the vision where it intersect your picture plane that means from here to here where it intersect that is called horizon plane HP, then horizontal line the horizon plane where it cut your picture plane that is called horizontal line, these all are definitions be careful here, SP means station point, GL means ground line, then Hl means horizontal line, HP means horizontal horizon plane, not horizontal it is horizon plane.

HL means horizon line, then come here this is your object once this is your object look at this object in your picture plane or in a transparent sheet, now take your eye of ray axis of vision, axis of vision from eye this is your axis of vision then centre of vision there is another term called CV center of vision, center of vision that means your axis of vision where it cuts your

projected object this your object, projected object on picture plane this is called center of vision CV now objective is to get this picture on picture plane, basically perspective view objective is this long distance picture you bring it back to a picture plane on reduce scale.

Key is convergence of rays at station point, if you look at here this is my station point this is the station point in this station point the object it completely converge.

(Refer Slide Time: 11:37)



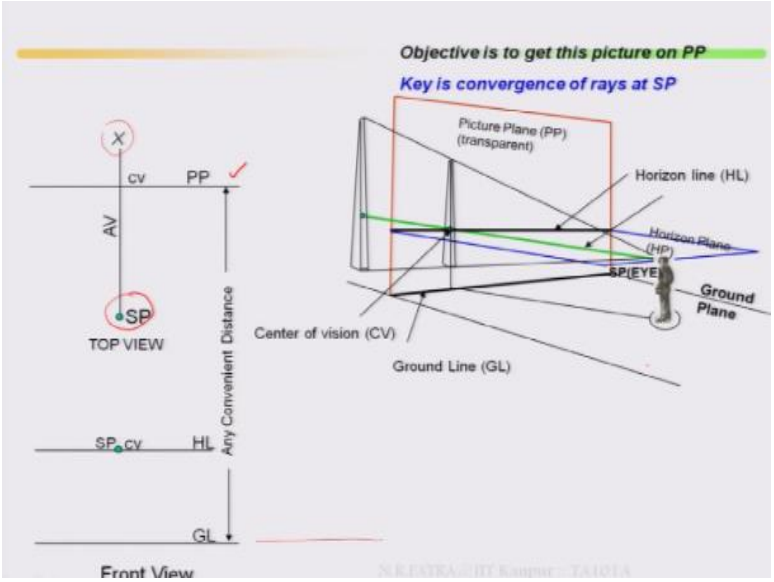
Now if I take this 3D view actual in drawing practice of the drawing if you look at here so picture plane, this is my picture plane a simple line has been drawn picture plane, then from picture plane to how far you are standing suppose you are looking station point will be definitely given the coordinate of the section point will be given, how far you are there so that is in the top view or in may be in the font view so generally we take in the top view will come back to next part, so in the top view from picture plane what is the distance of your section point.

This coordinate will be given then center of vision CV with respect to station point along the horizontal line, this coordinate also will be given, then ground line will be also given, in the ground line you can draw your front view, in the ground line you can draw your front view, so

this is how you represent in a simple two dimensional drawing sheets where this is your actually top view object x, then center of vision, then is your station point, this line is your picture plane.

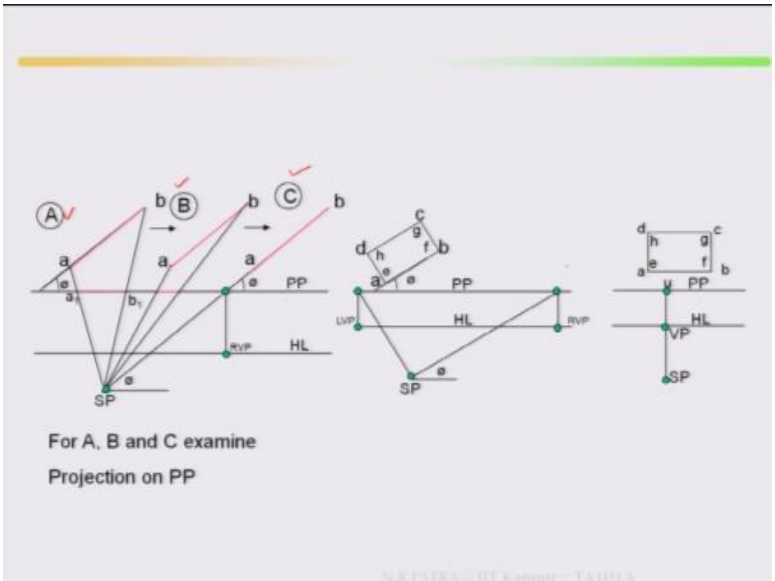
Then your horizon line, ground line it will be given the coordinates and any convenient distance from here to any convenience distance you can take it, that you can put your ground line it is up to you, you can take your ground line at any convenience distance your ground line, from picture plane to at any convenience distance you can put your ground line. It will be slightly confusing but if you understand this basic 2D and 3D then this part will be easier and easier, if you do not understand then this, this will create then it will be confusing.

(Refer Slide Time: 13:34)



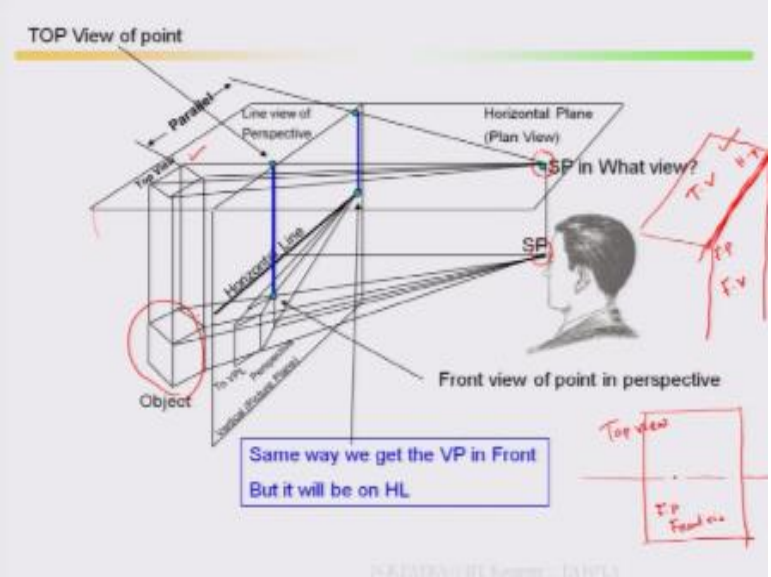
Oh horizon line where it is, ground line where it is, then station point why it is in the top view, then picture plane

(Refer Slide Time: 14:43)



A,B,C, examine projections on picture plane A, this is you're A, B, then C, then again A, B, C, look at this this is your station point horizontal line, horizon line, picture plane, station point, horizon line, picture plane, how it is moving A, B, C? Before I come to this.

(Refer Slide Time: 14:15)



Let me go to the 3D view. All we are doing 2D view, you can imagine in a drawing sheet generally what happen in a drawing sheet we divide into two parts, we say these are my hinge line and this will be my top view or top view plane or this will be, in this case I can draw or this will be my frontal plane you can write it FP where you can draw front view, I can draw this in this way.

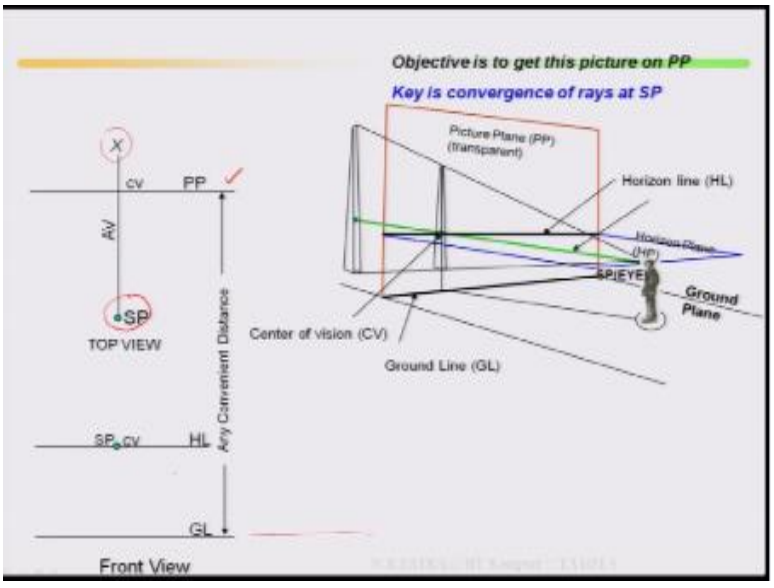
A piece of paper move it, so that what happen? This is your horizontal plane HP, this is your frontal plane, then here it will be your front view, from here it will be your top view, and this will be your hinge line, along this hinge line if I rotate then it becomes like a two dimensional case. Now if you take this arch and put it in this way, put it in this way look at here, here is your object and this is your station point.

This station point, suppose this station point is there, if this station point parallel I take it to up to my horizontal plane. So it will be the same station point, either you can take this station point parallel you can project it to your horizontal plane it will be the same station point, then from this same station point you are looking at this object, this object is looks like here along the horizontal line.

Now this object along this line this object you project it back. So this will be your top view, here this object what you are looking at in third angle projection this will be your top view then this object what you are looking at here this will be your front view, right? This will be your front view, this will be your top view, now this station point I have taken it, now once you take it you look at here.

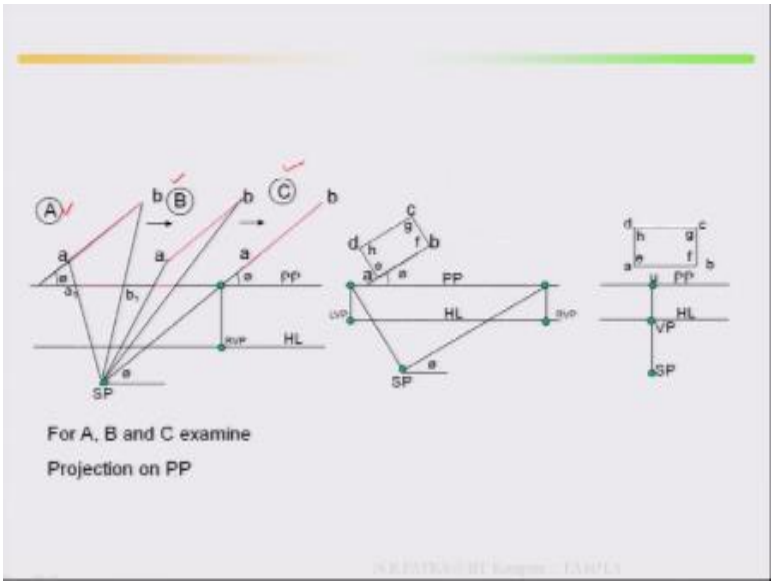
Top view will be in your top view line, then there is a center line, then it has been rotated back, then your station point comes here, then this will come back side. The way I have drawn this has been explained only for top view, same way you can do it for also front view because this station point has been taken it here and this part has been rotated back, this part has been rotated back. So same way this can be top view can be rotated back and put it in the front view. So in this way if you look at here.

(Refer Slide Time: 17:31)

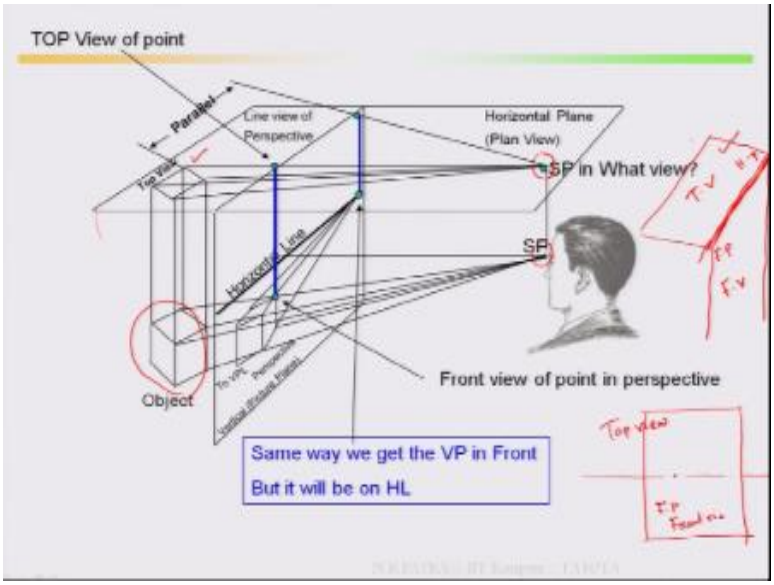


Go back to this side if you look at here top view, station point, then your front view is somewhere else, front view will be somewhere else.

(Refer Slide Time: 17:42)

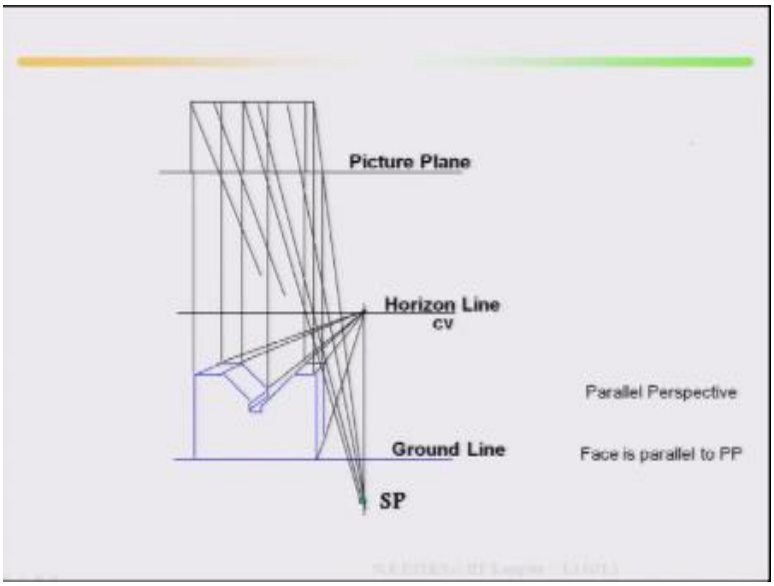


(Refer Slide Time: 17:43)



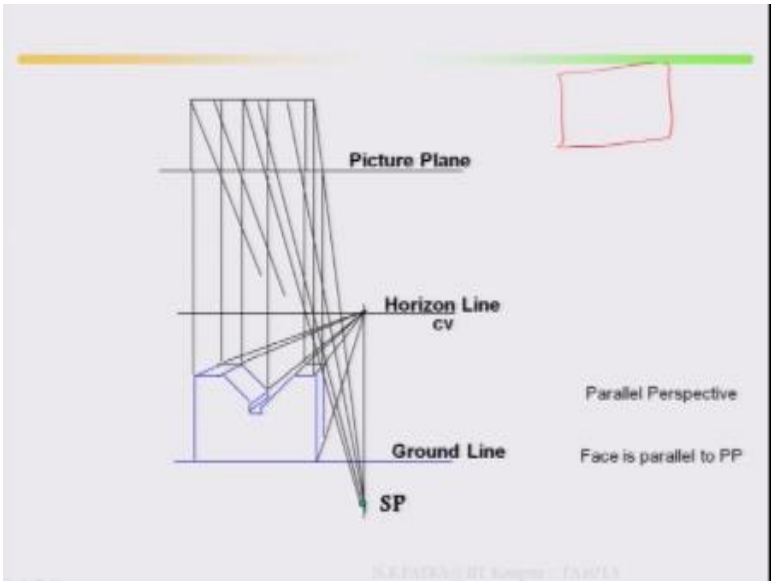
Now if I come here top view, station point so if I rotate it back this station point will be somewhere else because this is my hinge line with respect to from here to picture plane to some distance station point, again I have to rotate it back then your front view will be somewhere else. So this is the basic principles.

(Refer Slide Time: 18:08)



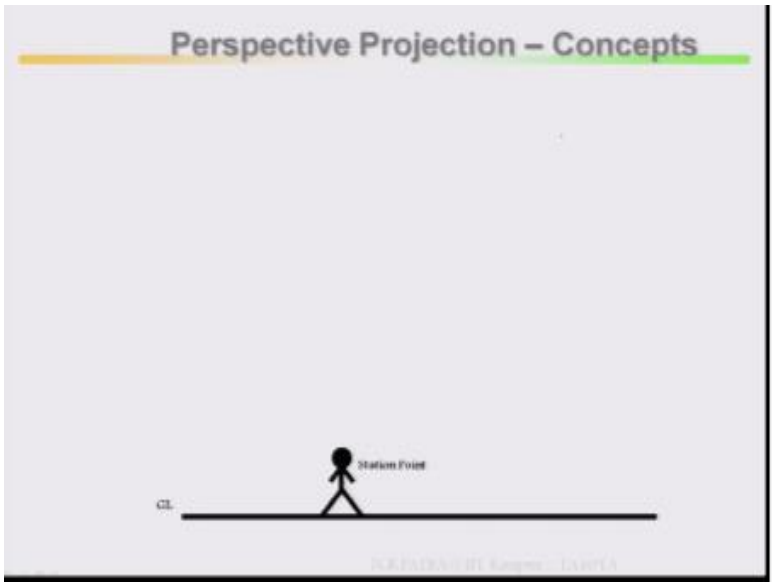
Now earlier I have said one perspective view, one vanishing point, two vanishing point, three vanishing point, this we are going to discuss as maybe in the next class. So parallel perspective

(Refer Slide Time: 18:27)



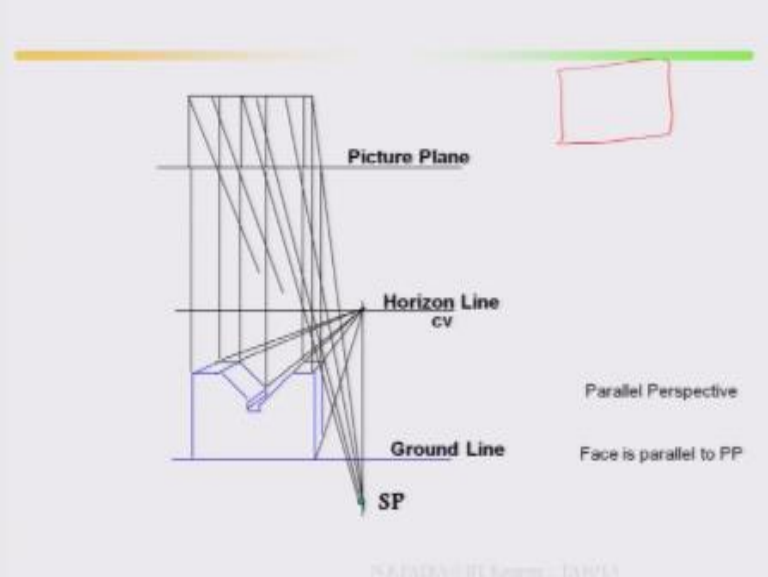
First let us consider parallel perspective, face is parallel to picture plane, in parallel perspective face this object face, this is the face this face is parallel to picture plane, face is parallel to picture plane and there is a horizon line CV, ground line, and station point.

(Refer Slide Time: 18:52)

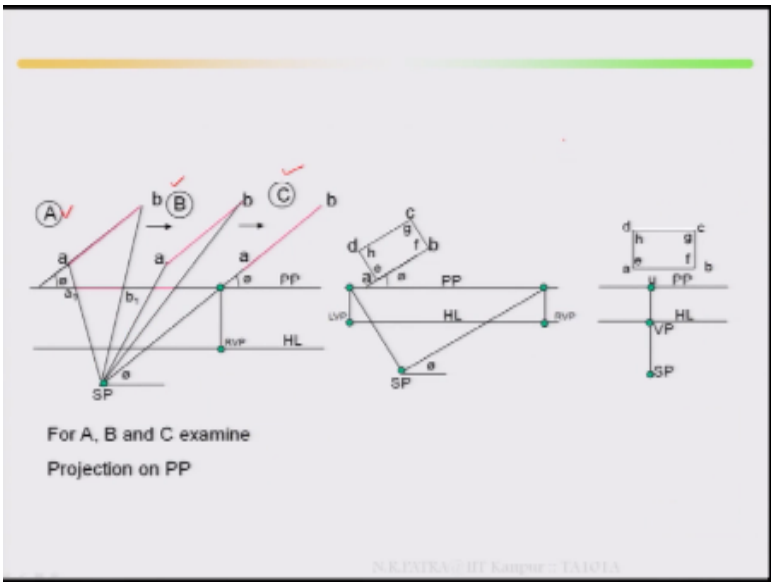


Ground line, station point, I am saying station point if you look at here.

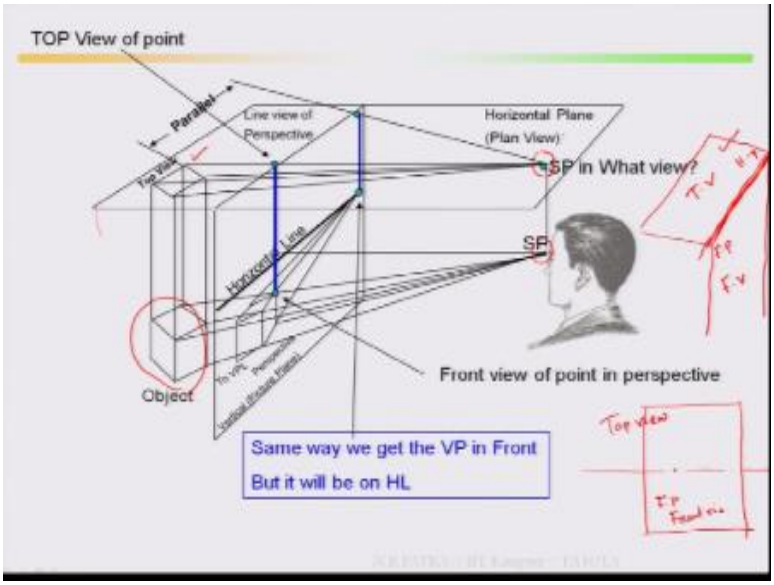
(Refer Slide Time: 19:04)



(Refer Slide Time: 19:05)

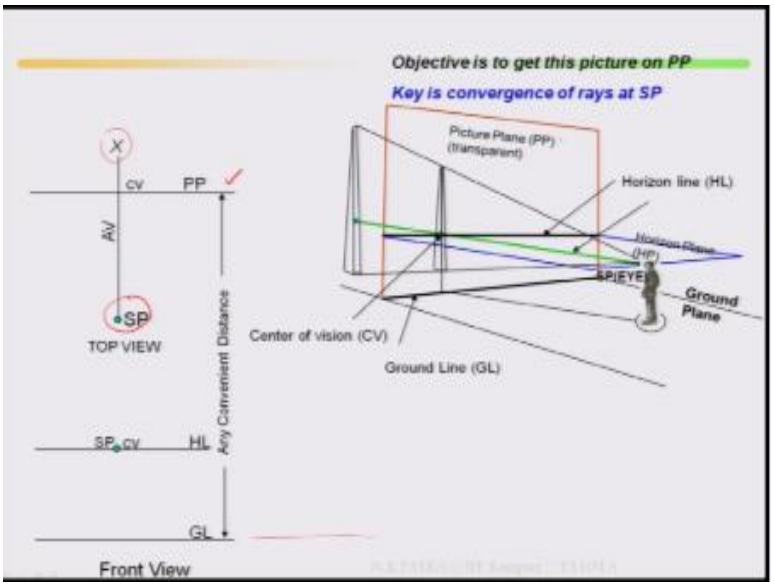


(Refer Slide Time: 19:06)



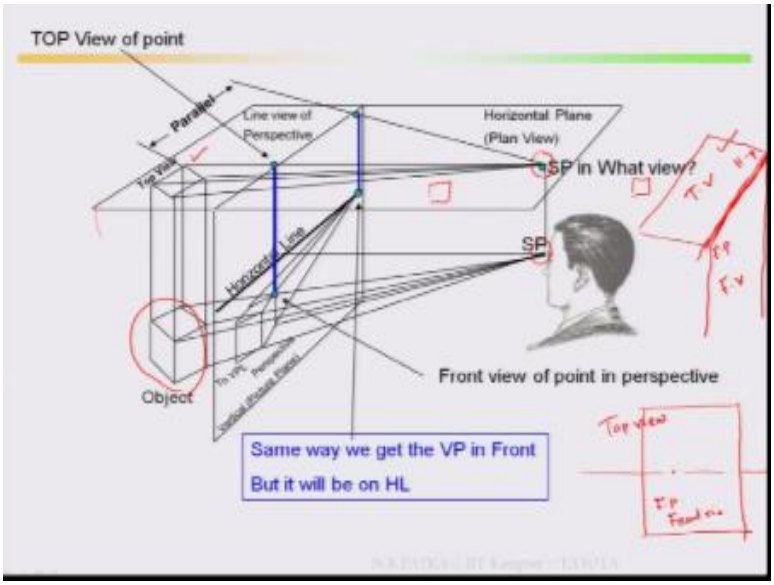
This may be confusing.

(Refer Slide Time: 19:09)



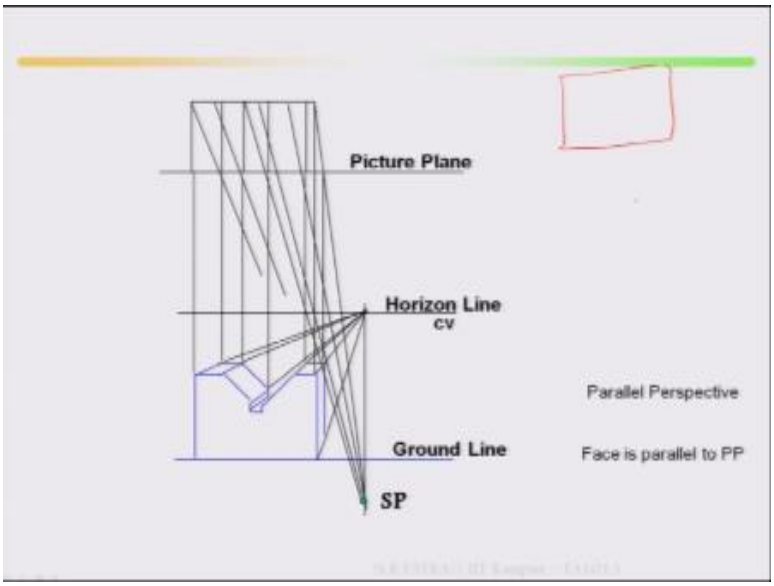
If you look at this point here station point is here it is not necessarily that station point will be here, station point may be coming here depending upon the distance from your picture plane, how?

(Refer Slide Time: 19:20)



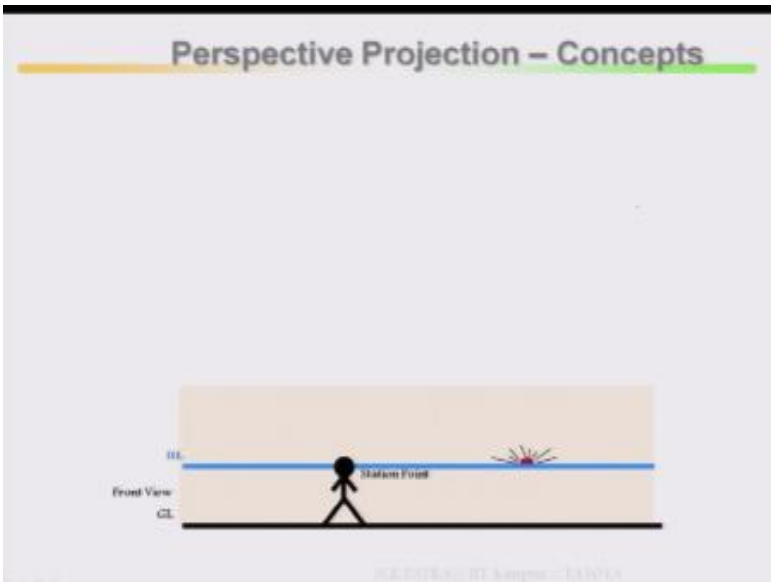
If you come here from picture plane where is your station point line, if this is my picture plane, this is my picture plane, with respect to picture plane where is your station point line? If I rotate it back the front view if I rotate it back it may possible that front view may be somewhere else here, maybe it may possible that front view may be somewhere else here. So this station point will be varying.

(Refer Slide Time: 19:44)



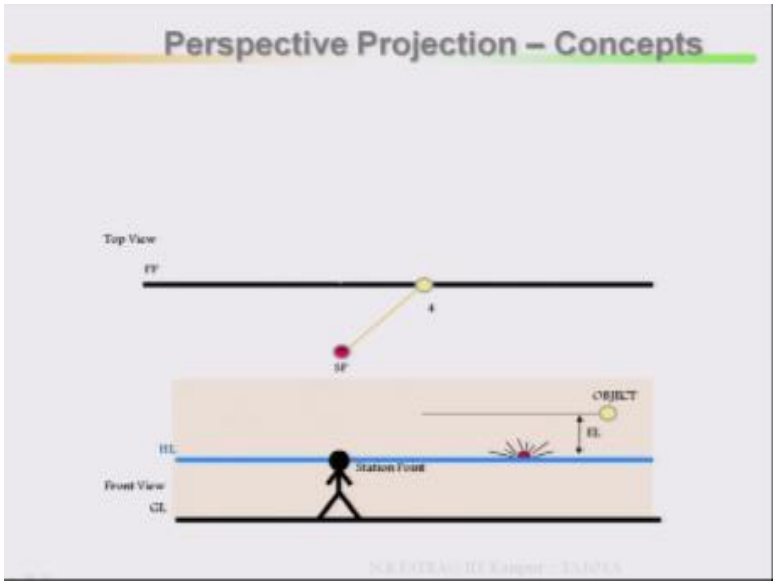
Now ground line, horizon line CV, picture plane, and station point.

(Refer Slide Time: 19:51)



Now concepts, ground line, station point look at here animation station point then from there you can draw your front view, then horizon line, horizon line where it comes where you are looking ray, from the eye it start the ray that is your horizontal line then.

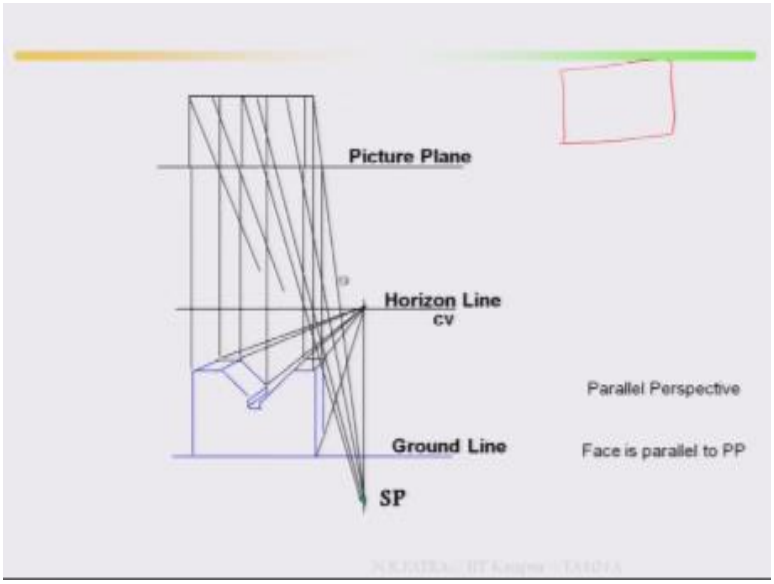
(Refer Slide Time: 20:24)



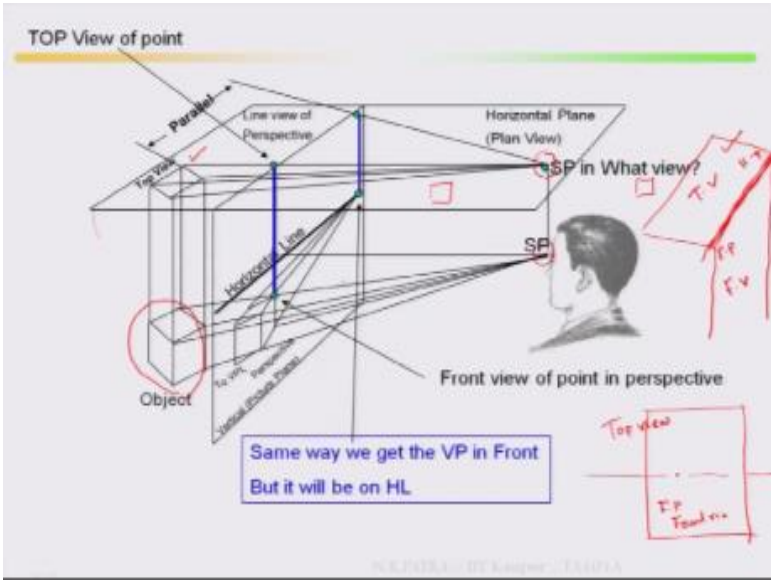
Picture plane, picture plane will be somewhere else in the picture plane after from view, then top view look at the top view on the picture plane then find it out which in the picture plane there will be top view, then station point where it is located the coordinate will be given, so once you get this station point then object is somewhere else here, then elevation, then from station point to look at the picture plane.

Because everything with respect to picture plane, everything with respect to picture plane, why I am saying.

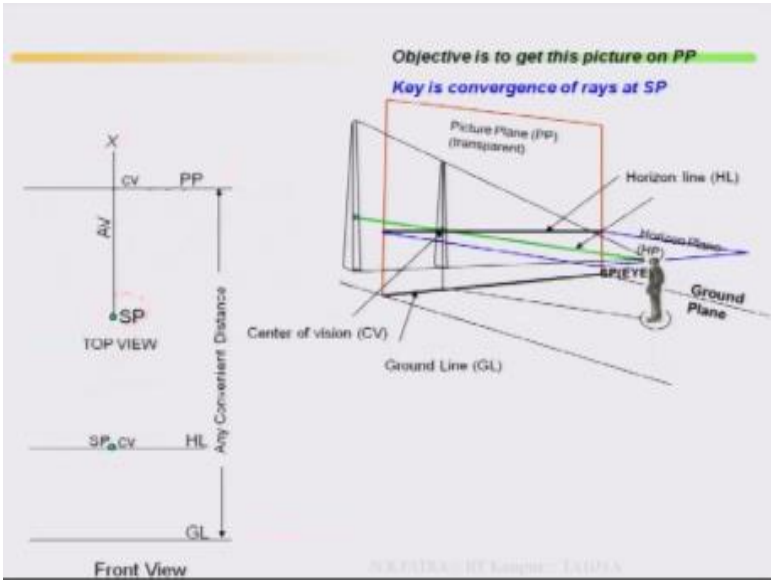
(Refer Slide Time: 21:09)



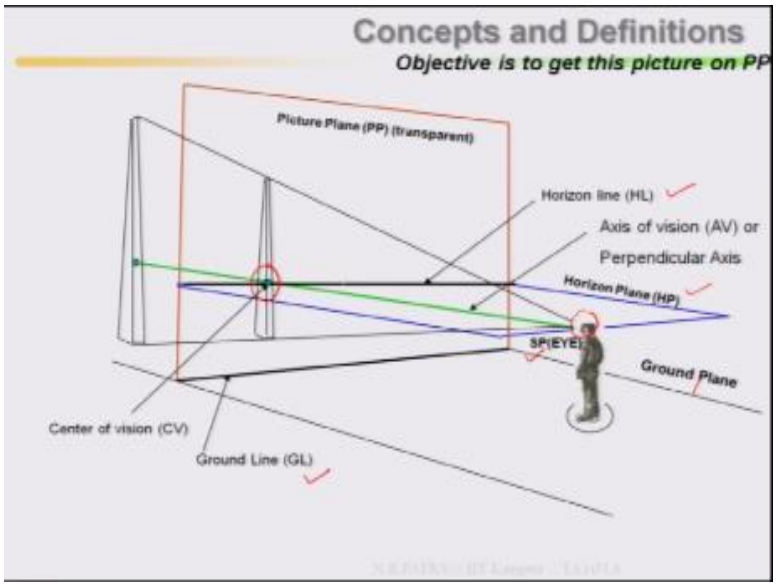
(Refer Slide Time: 21:09)



(Refer Slide Time: 21:09)

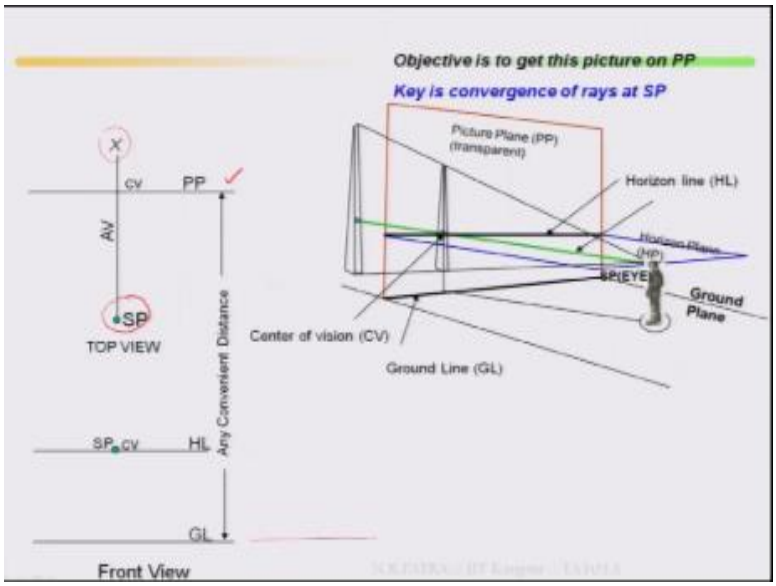


(Refer Slide Time: 21:10)

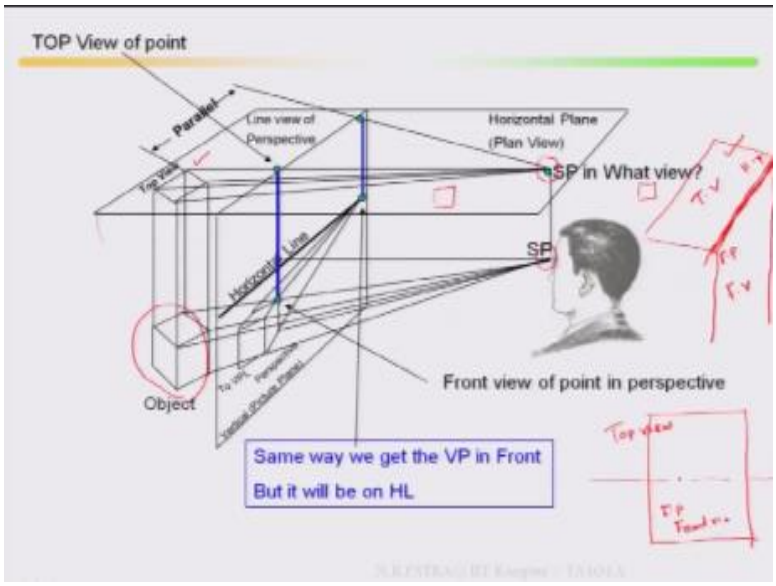


Ultimately the object has been projected back to picture plane, that means from station point to you have to look at the picture plane.

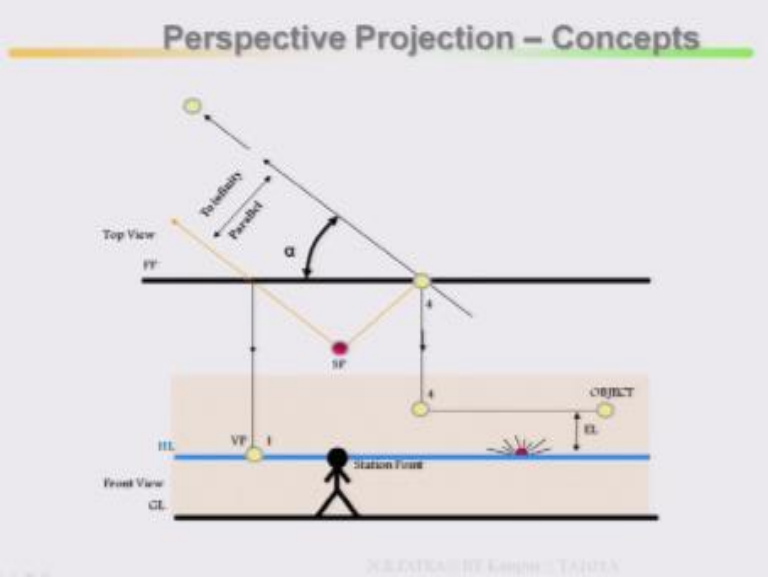
(Refer Slide Time: 21:20)



(Refer Slide Time: 21:20)



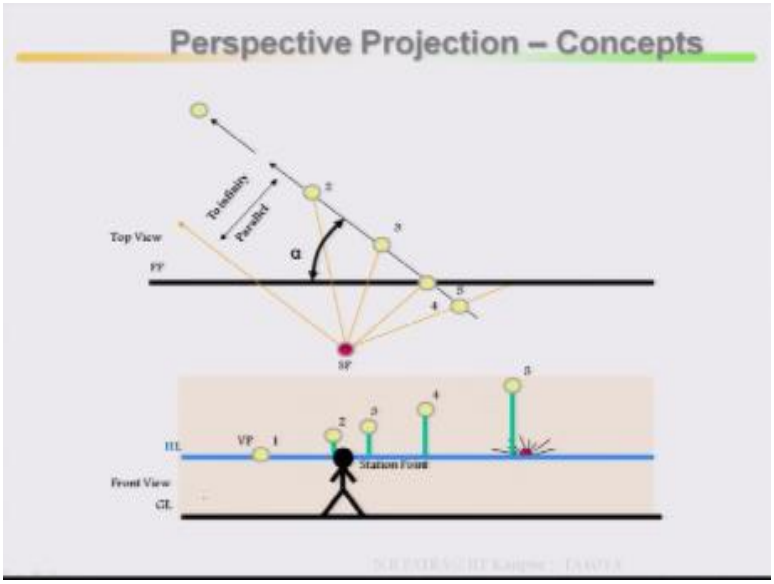
(Refer Slide Time: 21:20)



Now point four, suppose in the picture plane draw join from station point to point four, and once this because top view will be somewhere else here. So find it out the where the view point is there, then from there draw the line, perpendicular line where it cut your object, parallel to this mark this point, point four. Similarly from station point to mark objects from point, here is your tip view it is going, then infinity.

The distance object is infinity towards the object is infinity. So this is object is infinity towards, so mark your station point parallel to this ray then where it cut your picture plane bring it back that is your point one, that is your called vanishing point. How to identify your vanishing point? Station point to draw a line parallel to your.

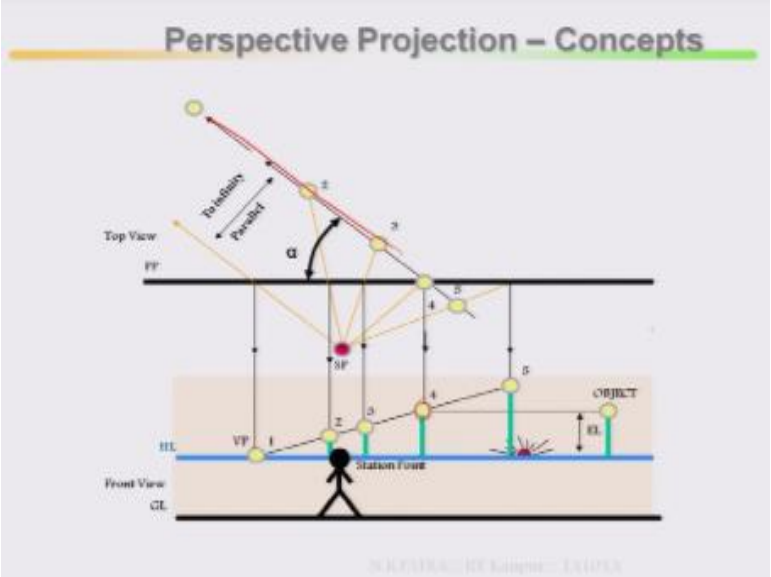
(Refer Slide Time: 22:24)



Ray of lines going to the infinity your object then where it cut or intercept your picture plane, that you project it back, that projection where it intercept your horizon line that is called vanishing point. Then from vanishing point to draw the object lines from where you project it back, this is your starting point your object, suppose there is a tree here then it is this tree is there are many trees moving in this directions so this is your starting point. So vanishing point you have identified.

From vanishing point to point four you join, then in this line particularly in this line, in this line your object will be there, project it back. So how it looks now, object reduced, reduced, reduced, then vanish. Unless if you have, you do not have the vanishing point then this may not be clearer to you. Once again, I am just repeating it.

(Refer Slide Time: 23:38)

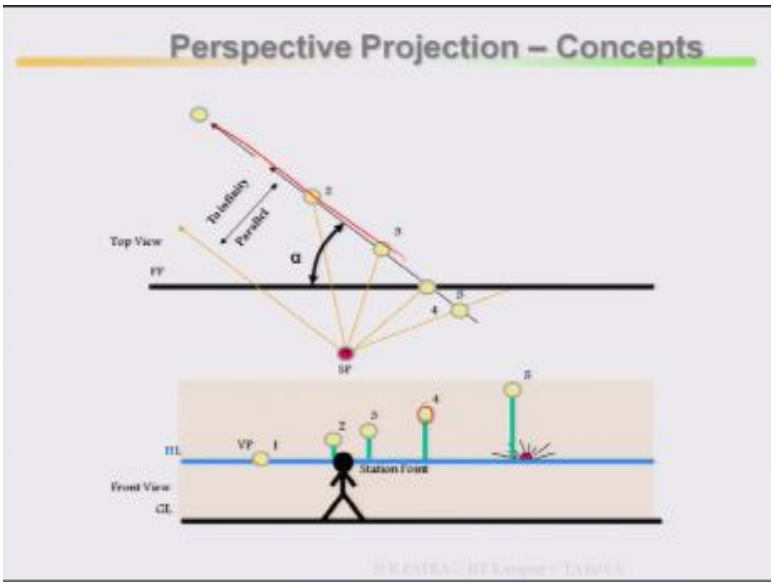


Ground line, front view, horizon line, horizon line is your coming eye ray then object and elevation you take it, station point and top view mark it and find it out where is your object starts, your object starts from here and it moves in this directions to infinity. So this is the big, so from here station point to object view look at there, then from there you project it back to your object line in the front view, this is in the front view mark it.

Then you identify where is your vanishing point, then from station point to this line draw a parallel line, draw a parallel line, draw a parallel line, then where it cuts your picture plane, this cuts picture plane at this point with from that point draw a line, draw a line where it intercept your horizon line that is called your one point or vanishing point. Now you got your object line projected back and this is your vanishing point, that means is your end point.

And in this line, in this line your object will be there, reduce object, so draw a line one and four, one and four and from there you draw all other points, where is your five lines, then where is your three lines, then where is your two lines, then draw and project it back.

(Refer Slide Time: 25:17)



And remove it, how it looks, object reduced, reduced, reduced, reduced, then come to your vanishing point. I will stop it here, next class I will go more details solved examples which will be useful to you, complicated one then I will proceed for single vanishing point, double vanishing point, and three vanishing points, we will discuss one by one. Thank you.

Acknowledgement
Ministry of Human Resource & Development

Prof. Satyaki Roy
Co-ordinator, NPTEL IIT Kanpur

NPTEL Team
Sanjay Pal
Ashish Singh
Badal Pradhan
Tapobrata Das
Ram Chandra
Dilip Tripathi
Manoj Shrivastava
Padam Shukla
Sanjay Mishra
Shubham Rawat
Shikha Gupta

K. K. Mishra
Aradhana Singh
Sweta
Ashutosh Gairola
Dilip Katiyar
Sharwan
Hari Ram
Bhadra Rao
Puneet Kumar Bajpai
Lalty Dutta
Ajay Kanaujia
Shivendra Kumar Tiwari

an IIT Kanpur Production