Engineering/Architectural Graphics – Part 1 Orthographic Projection

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Lecture – 03
Sheet Layout and Fixing Sheet

Good morning. Welcome to the third lecture of this course on architectural graphics. So, today we are going to learn how to fix a sheet. So, before I tell you about how to fix a sheet and also about how to prepare the layout of the sheet we will first understand how to ready your board. **(Video Starts: 00:45)**. So, you may be using a big board like this, this is the full size board which is available in the market with a stand and it is very easy for us to work.

So, we could be preparing this board or we could be preparing a smaller board either of the boards they need to be prepared for reducing the unevenness of the surface. So, if you look at any board the board has certain texture. So, if we do not cover this entire surface we would see that the pencil would not actually run very smooth, there will not be a straight line. So, what we will do?

We will cover it with multiple layers of paper. So, in the first layer I have used some two, three sheets of paper and these two, three sheets of paper we will first paste it on the board. So, half I have already done for you we will preferably try to paste it in such a manner that there are no creases on the paper, it has to be absolutely smoothened out. So, that is the first part.

So once we have readied this entire newspaper thing, we will then stick a thick sheet of brown paper, thick paper on to this sheet. So, let us now stick this brown paper. So, you can get hold of this brown paper and if you see the texture of it this brown paper is little smooth from one side and it is absolutely smooth from the other. So, we will try to put the smooth side on the top and if you look at your board always you actually have an edge here.

This is used this edge on the left hand side is used to hold the T. Here, I would be telling you how to use a T pulley so we would not be using it, but in case you are using a T you have to

keep this edge uncovered. So, right now I am covering this edge here so let us cover this brown paper as well. So, this is how your board should look and if you now feel your board it has actually become little cushioning.

And if you draw on top of this the pencil will not wave and it will not pick up the texture from the board. Now after this we will first fix the T pulley. So, there are three different types of equipment tools which we can use, we can use a mini drafter or a drafter this board will require a drafter. This one is called a T pulley as I have told that this T has pulley. Now, to fix this T pulley what we normally do is it comes along with a thread a T pulley thread.

So, this is the thread if you buy it from the market you will actually get a synthetic thread like this or you can actually get a spool of thread which is of cotton and not a synthetic thread. You could use either one of the two and both of these they work fine. So, what we have to do is we will need some thumb pins T pulley comes along with these small acrylic plates along with spools.

So, you could also fix these plates to the end or before ends of the board or you could also use these thumb pins. So, what we have to do is that we have to put these thumb pins on the four ends of the board. So, we put the thumb pins on all the four sides and once we have done that we will just properly secure the thread to one of the pins. Now once this thread from one side has been secured firmly you pass it through one of the pulleys.

And over the opposite sides bottom pulley. So, on one sides we will take the top pulley and on the other side we are taking this bottom pulley and then we bring it to the pin which we have secured slightly holding the pulley in parallel to that. It is not absolutely parallel right now, but it does not matter because ultimately it will become parallel and then from one side of the board we come to the other side of the board.

And bring the thread back over the bottom pulley and then to the top pulley and then we will firmly fix it to the last pin and your T pulley is now set. So, if you move this T pulley like this it is actually running parallel. It does not matter ideally it should be parallel to this we

should preferably try doing that, but even if not it will run parallel. Now next what we have to do is we have to fix a sheet which is parallel to this.

So, whether it is parallel to the board does not matter. What matters is that this edge of the T pulley is parallel to the sheet. Now, let me show how you fix the sheet. So, again this is a cartridge sheet. So, cartridge sheet has one side which is textured and the other side which is smooth. Now that is up to you what you want to use, but just remember that the smooth side can actually take very thin lines.

While if you work on the textured side you will be able to make thicker drawings, but you have to be carefully as it may smudge because there is a little texture. So, try your hand with both the rough side, little textured side and the smooth side you can see the difference and it is totally up to you what goes better with your hand, so try on both the sides. So, now what we will do is we will actually slide the sheet beneath this.

Now this is a small T pulley this is a 75 centimeter T pulley, you could also get hold of a one meter T pulley which is almost up to the end of the board. This T pulley 75 centimeter T pulley is good enough for making a sheet a full sheet this is an A 1 sheet. We are not working on a A 0 sheet. I will also tell you what are the different sizes of the sheets, but usually for architectural graphics and engineering graphics either we work on an A 1 sheet or we work on an A 2 sheet we very rarely go for a A 0 sheet.

So, what we will do now is we will see that how much can the T pulley go? What is the maximum that it can go up and what is the maximum that it can go down and then we will check if the sheet is parallel to the pulley and if it is we will just firmly secure the sheet in place with the help of these tapes. So, you can use a sellotape, you can just fold it, make a loop out of the sellotape and stick it to the back of the sheet like this and now you can paste it.

Now why am I doing this so that the mark of the glue does not appear on the top of the sheet. So, this is an easy way and your sheet does not become dirty. So, we will fix the sheet to the board and now with this we are all ready to start drawing on the sheet. Now you can check so

we can check with the help of this set square this one is an adjustable set square as I showed earlier.

So you can check that this sheet is absolutely parallel to the T pulley and the vertical side is parallel to the set square. So now whatever we will draw on to this sheet will actually be in line and it will be parallel. Now, the first thing that we will do in a sheet is to draw a border. If you look at any sheet whether it is architectural sheet or it is an engineering drawing sheet, we will always find a border to the sheet and the title block.

Now the title blocks may vary. So, before I tell how to actually draw the title block of the sheet we can see how the sheets are divided. Now this one is an A 1 sheet the sheet which is here and the size of this particular drawing board is actually A 0. So, it can accommodate a big sheet of A 0. **(Video Ends: 13:00)**.

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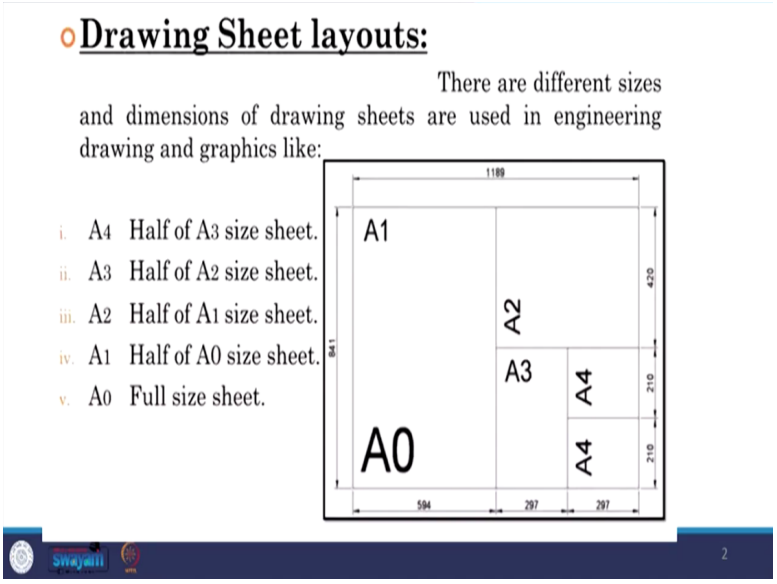

So, if you look at this screen A 1 is actually half of A 0 half of A 1 is then A 2 and further half is A 3 and further half of that is A 4. So, how do you actually divide? If this is A 1 I fold it like this and this half will actually become A 2 and I further fold it like this so this will become A 3 and I fold it like this so this will become A 4 that is what the sheets are. You might be working on A 3, A 2, A 1.

Usually we work on these three different sizes A 1, A 2 and A 3 A 0 are also used in architectural and engineering drawing, but they often require bigger board anyway as the world has progressed we have moved on to CAD software. There are so many digital tools available, but if we are doing it by hand then A 1, A 2 and A 3 is what we are normally using.

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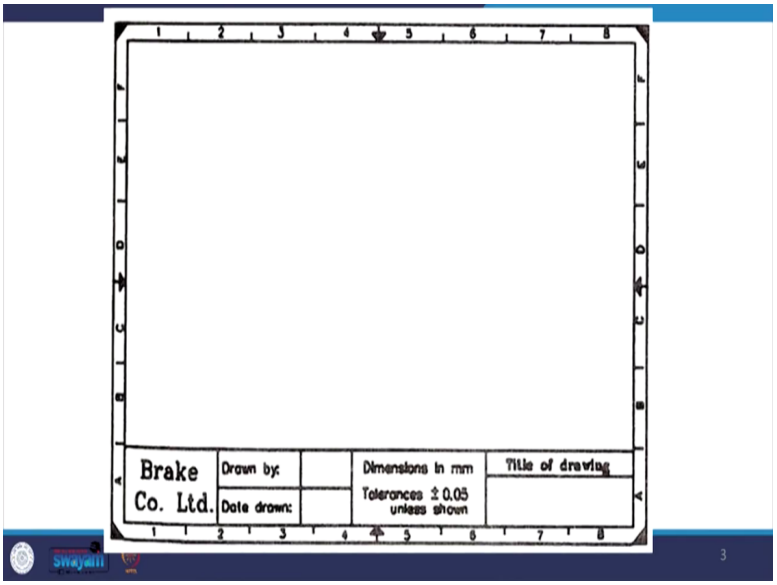

We can see how the border or the title block of the sheet would be drawn this is not a sacrosanct method, it is not mandatory to make a title block like that. There could be multiple ways so instead of bringing the title block in the bottom we could also be writing the title block on the right hand side vertically or we could just be making a small title block in the right bottom corner of the sheet.

It depends upon what kind of sheet is being drawn, but what all information will the title block contain that is almost mandatory. The first thing that we require to represent right on a sheet in title block is title of the drawing. What is this drawing about? For example, I might be explaining to you how to draw a plan. So, maybe plan of this room so I will write plan of room A, B, C whatever. So, title of the drawing is plan of the room.

The other information which is required who is drawing it. So, if I am drawing it so drawn by Avlokita. Now somebody will also be checking and verifying whether whatever has been drawn is correct, checked and read it by whom then we also mention the name of the

company for whom do I work. So, maybe I work for, IIT, Roorkee, department of architecture you may be working for different firms.

So that information will also be given on the title block. Now for one project there are multiple drawings which would be made. So, if I have to draw the drawings of this room then there will be a plan, what we see from top there will be an elevation what we see in front, how the building looks if it is cut. If I want to see the sealing, if I want to draw the detail of the chair, I want to draw the detail of the table and whatever.

So, we often give the drawing numbers. So there is a project number and then drawing number so there will be a unique drawing number which will be given to each project which will also be mentioned here the date when the drawing has been drawn that will also be mentioned here. So, all this is mandatory information plus at what scale the drawing has been drawn if there is a uniform scale for the drawing then the scale is mentioned.

What side is North, North point will be mentioned. If there are doors and windows the schedule of doors and windows is often brought in the title block. So, in this title block we will always have all the common technical information related to whatever is being drawn on this sheet.

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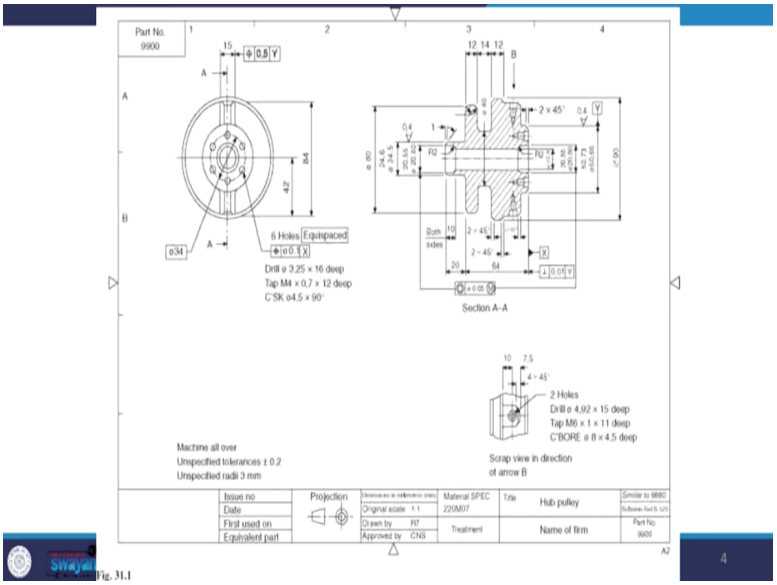

Fig. 31.1

So, tentatively the border of the sheet looks like this what we are seeing on the screen and that is what if the drawings have been done, this is how the sheet would ultimately look like. So, the common information will be on the title block either in the bottom or on the right hand side vertically all this information will be there and there will be drawing in the middle of the sheet.

So, that is what we will draw now I will show you how do you actually draw the border of the sheet and how do you make the titles? **(Video Starts: 17:39)** So, what we are using here is one is an HB pencil the other one is a 2 B pencil and I am also going to use one 2 H pencil. So keep it in mind that we should always use start working with an H pencil and then move on towards the B pencil.

Since I am showing you only how to draw the border, I will be using all the pencils, but if you are working on a sheet which also has a lot of content which has to come on the sheet then you should initially work only with the H pencil and then once everything has been done then move on to finalizing the border. So, what we have to see from the left hand side we would normally leave at least 2.5 centimeters because this side may be required to actually punch the sheets.

So, there may be multiple sheets and we may be required to fold them and hold them together. So, from the left hand side we will actually be leaving 2.5 centimeters while from the top we will only be leaving so this is a 2 H pencil which we are going ahead with from the top we will be leaving only one centimeter. So, we leave one centimeter so we will only mark a 1 centimeter in the corner and 2.5 here.

So, I am starting with this 2 H and I will work with a very light hand when I am working here. So, I pull my T pulley all the way up and very lightly I will mark a line. If you notice my hand, as I move my pencil I rotate it slightly. So, if you rotate your hand slightly you will be able to run this pencil for a longer time as it gets consumed evenly and then now if you have to put use the T pulley and the set square at the same time.

You should always press the T pulley with your left palm with some force otherwise if you do not press it hard the set square will get inside the T pulley as you can see it here and the angle will change. So, you have to press it so it remains firm in place and then lightly you can just roll the set square over the T pulley. So then you just roll the set square if you remember we marked a point here at 2.5.

And very lightly we will draw a line at 2.5 centimeters on the left side. We can do it the other way, we can keep the set square in the bottom. Now on the right hand side again we leave only one centimeter. So, you can also make a 90 degrees like this. So, a very light line using a 2 H. Sometimes you may not even be able to see these lines which are there and then we can also draw so in the bottom also we will have a 1 centimeter border.

And we can draw parallel lines with the help of set square as well. Adjustable set square comes really handy when we are working on big sheets. So, we can work we have mark these lines. So, if you can see I have very lightly drawn the border on all the four sides. Now we have to draw the title block if we are going for the bottom horizontal title block then we will take approximately 5 centimeters.

So we will mark this 5 centimeter and then we may draw another line in this. Now, since we are not drawing anything on this sheet right now I will darken it and I will show. So, this is the border now you may use an H B or a 2 B always start with a lighter pencil and see which one depending upon how much pressure you apply. So, different people apply different pressure.

Some people work with a lot of pressure so they may need lighter shades of pencils while some may need a darker shade of pencil so it totally depend upon you. So, you check for your hand pressure first and then you can go on to darken these lines. Now when you darken these lines give special attention to the points where two lines will be meeting, merging because often what happens that you when you try to merge them together there will be kind of disjoint or there will be kind of break which will come which is not very good.

And you should try to avoid that. So, for that reason you have to hold your T pulley and your set squares firmly and then draw these lines and any good drawing is the one where you have a uniform line thickness. So, the line thickness should be absolutely uniform throughout the drawing wherever whatever you draw. So, this is how we will complete the border like this you will complete this entire drawing.

And keep a duster all the time along with you because when we work with graphite pencils they will always leave some dust and that dust has to be cleaned continuously so that the sheet does not smudge and it does not become dirty, keep your equipments, keep your instruments clean whatever you are going to be using because just like a writer keep (()) (26:01) creations we as architects and engineers have to keep our drawings.

So that is what we will do. You can anyway darken the entire thing and then you will know that your sheet is ready at least the border of it. Now, I am going to tell you how do you ready the title block. So, we will leave approximately 15 centimeters from both the sides and then make these two title block. So, we are dividing this bigger title block into the smaller blocks and then whatever we have to write so you will draw the guidelines.

So, in the middle portion I am going to write the title of the sheet. So, for example the title of this particular sheet could be introduction to graphics. So, this space is what we will be using and please be assured that we do not use scale to do lettering on graphic sheet you always do it freehand. Yes with guidelines with the help of guidelines, but without the scale. So, when we write on graphic sheet we also write a no fancy writing because this is not to make our sheets look good.

But this writing is required to convey the essential information related to this design. So, how this design is going to be constructed is going to be communicated through this texts. So, there has to be no ambiguity and that is why we will use the very simple and usually in engineering drawing, engineering graphics we use Gothic as a font. So, in the next lecture I will be telling you what are the different types of lines that we use.

And what is the lettering how do we do the lettering this is called lettering. So, that is what we will be learning in the next class, but I will quickly wind up here. So, this is where the title of the sheet would come, the main title. Here, the side we will write the name of the person who is drawing his or her affiliations. So, you could write your name on the right hand side it should be clearly seen on the right side.

Try to keep your alphabets uniform if possible try as much. So, you will write the name and you will write some other information whatever is required on the left hand side of the block that is what you do when you ready your sheet to be drawn with other things. **(Video Ends: 30:57)**. So, we will stop here I would expect that you all learn to fix up your sheet on the board.

You learn to ready your sheet with the border and when you come for the next class you will be ready with at least one or two sheets with the light border without any title. So that as you start working simultaneously along with the lecture, you will be able to draw along with me. You can keep looking at the lecture over and over again and you should be able to draw it comfortably. So, that is all in the lecture today. See you again tomorrow for the next lecture. Thank you.