Technical Arts 101
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Lab - 04

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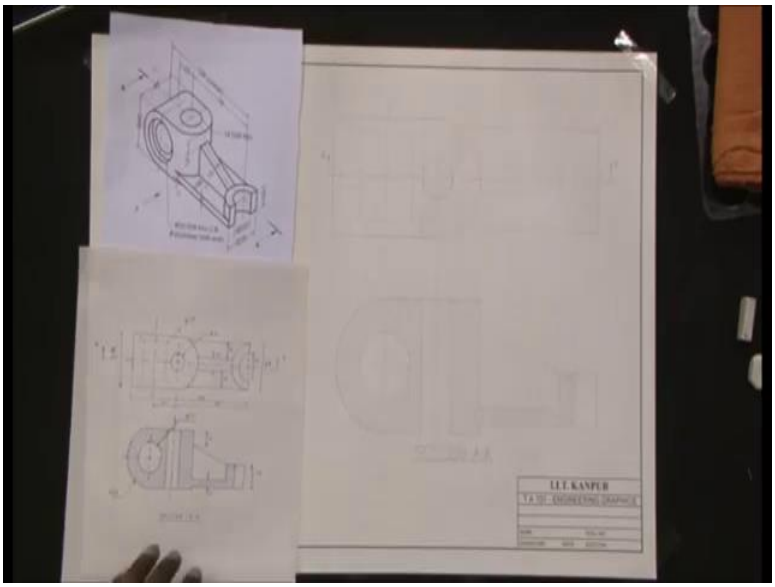

This is an example on sections. So, what I have at the top is a solid and what I would wanna do is I would gonna section the solid using a vertical plane; that passes through the center of the solid. And, I want to show this part of the solid in section and I would want to show that in the front view. So, the viewing direction is this and of course I will also be drawing the top view. So, I would make certain modification in the dimensions over here. So, this dimension initially was 43 now it is 38; this dimension was 16 I have taken that as 14 and the height of this base from this platform or the other way round the height of the platform from this base is about 3 millimeters. So, this time I am already prepared with the sketch. So, what I have over here is top view and this is the sectional front view; I have also marked certain important dimensions this time in my sketch. So, that well I am transferring this drawing onto my sheet; I tried to do this as efficiently as possible.

One thing that you would want to note is the way I have dimensioned this in a circle; this is probably not a good idea, because none of the lines should be appearing within the hatched region with the center line, with the solid line or with the hidden line. For that

matter even this part of the center line and this part of the center line the presence of these center lines or these pairs of central lines is not a good idea. Well, do is that transfer this drawing on my sheet here in 1 is to 0.5 scale; that is I will double the size of what I have on the sheet; on my sketch sheet over here. So, that hopefully the object looks better; once again introducing my friends this is my 2 H pencil, this is my H pencil and this is my colored pencil, blue in color which I have not used so far; my 2 friends set squares which I do not think I will be using for this example. So, I will keep them aside. And, of course my stencils or circles which I might use depending on whether I have these circles in here or not of course my compass.

So, with my friends with me I will start drawing; once again it is always a nice idea for me to get an idea where my drawing is gonna be. So, I will start with the bounding boxes; I will first draw the top view and then later the front view. Because hatching would take some time; top view seems a little bit easier for this example ok. So, this overall dimension is about 128 millimeters twice of that is 256; I have my scale here this is about 25 may be I will need a little more. So, and then this is about 43 twice of that is 86. So, maybe I will chit a little lap and left and I will draw the horizontal of the bounding box; this is about 24 millimeters and perhaps 2 more millimeters from here; I forgot to take if my craft ((Refer Time: 14:51)) all right or not I should have done that. Now, that I have done that I will need to use this ((Refer Time: 04:59)) of mine have been telling you all not to be using this ((Refer Time: 05:06)). But you know at times is very handy, my sheet looks as fresh as it was before all right.

So, 256 millimeters possibly from here; 0 to 24 and 2 more millimeters from here; I am intentionally drawing dim lines hopefully you can see that if you cannot may be I will darken it a little; I will use a backside of my horizontal scale for that perhaps this is k. And, then the vertical dimension is 86 over here perhaps; may be a little dark, not too dark just a little dark a 6 from here till here perhaps gentle vertical line. And, again using the backside of the drafter I make this horizontal line; this is just about double the size of the top view here. Well, I am working with the bounding boxes it may be a nice idea for me to draw one for the front view as well; where I am gonna be drawing the sectional front view. I will have to using the projections; it may should have enough gap between the table block and this horizontal construction line; always a good idea to have gaps because they bring neatness to ones drawing.

So, this dimension here is 48, 48 times 2 is 96 think I would have that covered; to see this line better I use the back side of the drafter looks better all right. So, let me start with the top view getting that is not a problem; I have pretty much all the features covered up let me start from the right hand side. So, it is symmetric as you would observe. So, there would be a center line passing through the center of this bounding box. Let me draw that first; this would be at 43 from below possibly here and let me double check, yeah. So, I have marked the center of this bounding block or bounding box have these 2 vertical edges; I will use my horizontal side of the drafter. And, straight away with my H pencil; draw the center line long dash, short dash, long, short; this should its twice may be this part of the drawing is little lighter; perhaps I can go with this line once again. Now, from the other side or maybe I will just let go this.

So, starting from right hand side there is about 22 twice of that is 44. So, I would need a compass and I need to measure this radius as 22. So, I will mark my pencils over here; mark this is 22 pretty much over here, pretty much over here. And, let me also draw this center line and may be will this time little darker. And, then using my compass giving this as center making sure that is meeting both these points; let me double check of this dimension all right; looks like it is well I am add it I will extend the central line; looks like I am pretty much ok. And, then will be study from the bottom giving some pressure I draw the suck; I will do that one more time possibly the third time from the other side looks good.

Now, for the bigger arc so this is about 38 half of that is 19. So, in this sketch there is nineteen but twice of that is 38; so I would need this dimension 38; pretty much over here. So, this is 5 m m from the bottom edge may be what I can do is I can do the same thing 5 m m from the bottom edge; I can mark this point spread my compass a little same center larger radius. So, notice that I am drawing a 1 is to 0.5 scale drawing; some virtually magnifying this entire figure to scale 2 my hands are little shaky. But I guess I have this curve; once I have this I will may be join these red lines. So, remember that solid lines they get precedence over center lines. So, I can take the advantage of that maybe I can go left and try to work out this feature.

So, from here to here is about 79; 1 less than 80 twice of that is 2 less than 160. So, 2 less than 160 is about 158; mark this point over here and I had this center line. So, maybe I will go ahead and straight out make a center line at this position; while I am art it I might

as well project this center line here; I forgot to switch my pencil I should have taken a 2 H pencil. And, while I am working on the construction lines and might as well project this part down below and perhaps this part down below ok.

So, this vertical line is solid I know that. So, I take my H pencil and straightaway draw a dark line supporting the vertical scale of my drafter probably; there I go I have marked this center I need to be careful. So, between this and this center line there is a gap of 25 twice of that is 50. So, maybe I will mark 50 from here get this switch my pencil and perhaps draw this center line. Now, once again using my solid 2 H; by now you would have figure the convention for representing the center line. Now, if you look at this area so we have a counter bore here. So, there is a hole which is of diameter 25 which is drilled through and then there is another counter bored hole which is of diameter 35 and which is 5 deep on both sides.

So, let me first draw this outer feature and then go to the inner one; 535 double of that; I have to measure 35 on both sides maybe I should be using this on the line; marking these points on the line. And, use a projection to my these points here and these points here rather this point here. And, then I will go so this is 5deep twice of that is 10. So, I will perhaps go 10 deep and from here may be I will go 10 deep towards me all right.

Now, these are dashed lines I am gonna make them dashed, hidden lines; maybe I will extend this a little. And, perhaps here try to make sure that I draw a small dashes as supposed to long ones and then the vertical dashes; pretty much time. So, this would be a solid line and there is an arc here. So, I need to be a little careful; the center of this arc is the same as this. Well, so from till here I can make this line solid. So, may be let me work on the bottom horizontal line and then the top horizontal line; probably this object is taking time. Because I am drawing this in 1 is to 0.5 scale that is I am magnifying the views by 2. Anyhow so I have pretty much all these features ready except for well now not right.

So, let me also work on these vertical dashed lines working at this 2 hole the inner diameters 525. So, measure 25 from both the ends and draw vertical dashed lines, short dashes and over here all right will be its time for me to draw this; smallest circle this is of diameter 14. Then, we make sure that lower surface of the stencil is clean. So, that it does not spoil my sheet go up there I look for a circle with diameter 28; reminding

myself that I am still working on a doubled figure; looks like I have my center lines align with these 4 lines would not be very lateral. But do the job; importantly I will get a much better looking circle. This is one thing that happens when you using eraser; you need to continuously wipe your sheet.

Now, for the larger curve here, radius is pretty much well known; take this a center this would be my radius pretty much. And, I will make sure that I reach this point as well looks like I do; just a little away from that point I draw this arc; and truncate this arc little before to get a point. Let me draw this again and perhaps I can do a full short touch looks I can good; how I done pretty much everything in the top view; yes except for these horizontal lines and the rib; let me work on the rib first. So, this is 10 thick twice of that is 20; let me measure 10 on both sides I have to be a little careful its10 here, 10 here. Let me take this pencil away compass away. And, then I first draw the rib change the pencil 2 H first; edge of the rib perhaps the second edge of the rib now; looks pretty much. And, what remains now are these horizontal edges; which are distant 38 from each other and symmetrically placed about the horizontal axes. So, I will probably have to go 38 up and 38 down. So, 38 up change my pencil pretty much over here perhaps and 38 down.

Well, on second thought I do not need to make those measurements; because I already have these features which from which I can take the horizontal line. So, perhaps I can take one from here support my crafter. And, then I can take one from the top; looks like I am done. Now, if you look at this object over here. So, this is horizontal platform is a kind of tangent to this part of the surface. So, may be it would not be so this platform this horizontal edge would not be hitting the cylindrical part of the object here; it would not be hitting it hard. So, maybe I can just you know due to little touch. So, that it is tangential; a miner flick of the pencil on the paper done with the top view. Now, getting onto the front view which is a more important part. Because this is where the details are of the hidden feature; before I do that well I will come to that later; with the front view now may be it will be a nice idea for us to cover the complex part of the front view; to start with and then work on the simpler part.

So, this is a semicircle of radius 24 here will be radius 48 it is again placed symmetrically about the horizontal and the vertical; well in this local region. So, let me draw the center vertical center first, vertical center line first. And, this distance is about 48 twice of that is 96. So, maybe I will measure 48 from here; I keep reminding myself

to switch the pencil. So, 48 and I draw this about the center line the horizontal part; you have a central part; you know what may be it was not an nice idea for me to draw this extended center line. Because I know that I will be hatching the address of the portion around it. So, what I will do is that I will erase a major part of the center lines. And, I am using my eraser in such a way that I do not leave an impression on the lines where I just drawn. Well, with a careful eye you would be able to see that; but once I wipe the surface, once I wipe the sheet probably to you even to you it would not be visible.

See I do not think it is visible to you nevertheless. Let me first draw this circle is of diameter 25; I will have to use my compass I can do with my stencil anymore. Because I need one of diameter 50 my radius first. And, then draw the circle; this is the tricky part I have to be little bit careful; I hope I am doing this right; no I am not doing this right, I am drawing a circle of 35; I should be drawing one of 25, I will be using my eraser again. I seem to be making quite of few mistakes today 25 here, 25 here; I contract my compass little bit to get this dimension and looks like I am from both sides. So, maybe I will start from here finish the circle; once again I tried to give as uniform pressure as I can; much nicer to draw them on the screen than on the sheet.

Now, that I have my circle maybe I can extend the center lines; just about to the periphery of the circle; the vertical ones and possibly the horizontal ones as well, all right. So, I have gotten this part right to get these vertical lines and the corresponding center line I can use the projection coming from here; remember for construction lines I use 2 edge. And, maybe I can draw these edges using my H pencil directly because I know that they are gonna be solid; and they are gonna be consequently dark. So, I will draw these edges hard; that was not a nice idea for me to stop and between and then continue again. Because that is what happened the intensity of the pencil was not uniform throughout; when I was making that line anyways. So, let me draw the center line I am done that.

Let me work on this arc. So, that at least I am done with this portion of the sectional front view; you can this is a bigger arc. So, I need to be a little careful when I am drawing it need to make sure I touch both sides possibly I do not. So, maybe I need to reduce my radius little bit or may be my center is not proper looks like; it is not. So, I will just about leaving a little bit of gap I will come back to that later and do a Photoshop touch; I will draw the rest of the semicircle arc; just to get it uniformly. And, then I draw the rest of

the horizontal line may be using the backside of the drafter; because I can see it from here, I will go the other way. So, that by the time I reach the arc I go easy on it. And, then from here the same thing I go from right to left; and then here just a little free hand for short touch; so this part is done.

Now, maybe I can increase my speed a little bit. So, this vertical line is coming from this part of the top view here. So, I will take a projection I have already switched my pencil; this horizontal line is getting extended up to this. So, maybe I will draw this line of course I can do this a lot better I should have ideally drawn this entire line to start with. But anyhow nevertheless this is my horizontal line should have little more careful but that is all right. So, now let me focus on this feature. So, this feature is about 3 m m high from this base line. So, let me extend this projection line little come down; so twice of that is 6 so may be its here. So, let me draw this part and let me draw this part; maybe I should redraw this; yeah this is a risk that you take that if you do not draw this entire line once some like this happens. Anyhow, so let me draw a lighter line and once I am comfortable may be I will draw a thicker line just a kind of this.

So, may be looks like I am so 6 from here, 6 high from here rather all right and then a straight horizontal line from here or till the end that I know it is gonna be throughout. And, I would not making an error that I made here. So, I will straightaway draw this line bit. And, then this height is 19 twice of that is 38; perhaps I will draw this directly. And, take a projection from here already have this may be I will project it down little. And, using that projection I am gonna make this solid horizontal line this height is about 6 twice of that is 12. So, perhaps I will mark that may be I will take this projection down again and then this would be a solid line. So, I draw a solid line; let me draw this vertical and draw this vertical. So, pretty much done with this; I will have a line corresponding to this projection. So, let me already have this projection; so let me extend this and draw a vertical from here ok.

Now, am I left with anything? The rib part; so I have rib thing pretty much covered this drawing looks humongous but nevertheless. So, pretty much covered over here everything just a rib part remains; otherwise I think I am in control. So, this distance is about 12 twice of that is 24 I mark that here. And, using my stencil scale; finally, I draw this line; yeah pretty much done can I do something about this horizontal line? Since, I have been using this eraser anyhow and I do not want my grader to get the impression

that I was not serious enough in my drawing; maybe I will just erase this part. And, erase it well; wipe this part of and may be try to redraw the lines around; not a good idea but well trying.

So, of this part all set pretty much this part all set and I need to be careful this time; maybe I got the same line all over again nevertheless. I need for little bit of photo touch here; possibly that is I would not pull myself too much for all this ok. So, except for the hatching part everything else is done; maybe I just wanted to finish this drawing. So, hatching is the tough part and the reason why it is tough is because you need to ensure that the spacing between the hatched lines that is uniform. And, if you are doing the hatches; they need to be at 45 degrees pretty much. And, if you have used hatch lines very much essentially if you have many components in your assembly; then you would probably need to change the angles. But for now let me retain this angle as 45 or close to it they are 45. So, this has a least count error of I would imagine minus 2 or something.

So, this is the only time that I am gonna be changing the way I used my drafter may be about 42 degrees may be 40 near its about close to 42 degrees. And, once I change it then I am gonna keep it like this to ensure that the angles of these lines they may remain the same. Now, for hatch lines I would rather prefer to use a 2 H pencil instead of an H pencil; for 2 reasons number one maybe I could hook together contrast between the H and the 2 H. And, may be of course a little of better of course the section view will look better. So, perhaps I will start from this region; I am gonna make sure that the hatched lines do not cross the solid lines; this is the most time consuming part. But once done the drawing will look beautiful, all right.

So, this is the way things are to be hatched; what I will do is to say if time and to say if roll I will ask my friend Asuthosh to stop the camera. And what I will do in the meantime I will hatch everything up; and then I will ask him to start or roll the camera again. So, that you can see the final picture; as I said before this is the tough part and it is also time consuming.

So, after some rolling effort this is how the sectional front plane would look like; if you do this right and if you do this a little artistically it will look beautiful. So, a few things perhaps this arc is a little dim compared to the sectional lines. So, may be what I will do is I will go with this arc again and make it dark. So, probably it looks better now. And,

may be last sectional line; once again these are things that in general I am not supposed to be doing. But you know just to leave an artistic signature on the sectional view; there you go. Now, if you remember let me first straighten up my drafter; if you remember I hesitated a little bit over here. And, the reason why I did that was because I should have marked this center line by a sectioning line as supposed to a center line. Because this is the sectional front view; imagining that you have cut this object along this line taken away this portion and turreted the object. And, then you are looking all the object at this direction.

So, this part of the surface is sectioned, the circular feature is not sectioned, this circular feature is not sectioned, the rib is not sectioned because the section plane is parallel to the rib. And, of course this part would not be sectioned and this part will be sectioned. And, this is a single object and that is the reason why I have maintained singe 45 degree sectional lines coming back to this line; what I should do now is erase this and replace this by sectioning lines. So, what I did was I went off lined and I replaced this line by a sectioning line. Now, you probably would not realize it but just to tell you the secrete; I have got 2 small dashes followed by a large dash followed by 2 small dashes pretty much like a hinge line. So, this is a different convention that I use for sectioning plane. And, to mark the viewing direction; I use vertical arrows on both sides, draw the arrow heads. And, then I say A and A; so I said section A A over there and here I will just write section A A ok.

So, I have marked these 3 horizontal lines for me to write section A A here; I will go offline. Because I need to keep my head close to these lines to do proper littering and after I have written section A I will come back and show this entire figure to you ok. So, I went off lined wrote section A A did some finishing around this; essentially erased a few light lines. And, my final show an example 4 I just draw a horizontal line; I think that will be ((Refer Time: 53:44)); I would not be worrying about dimensions in this example; though I should. But that is not the important part; the important part is to introduce you to sections. Now, let me take this drafter away and let me take my sketch and the main object off. And have you look at the final sheet.