Enclosure Design of Electronics Equipment
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Lecture – 07
Sketching Part 2

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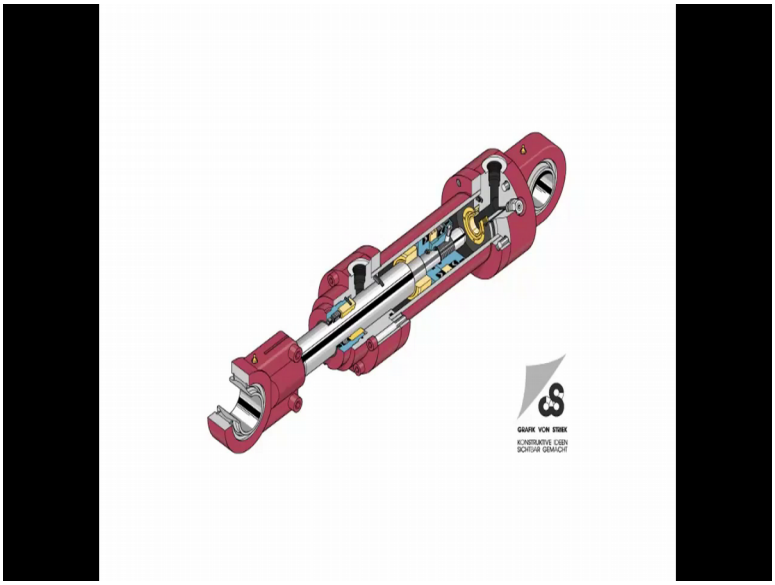

I think any mechanical person will know that this is a pneumatic cylinder the one types you see activating all these your earth movers and any type of power equipment in all these things this part of it is well known you have a fixed member and then you have a what you call movable or extension member. And then if you see very clearly here there are small rings here and then there is something to feed the oil here and then you have something here to feed the oil and then we have a piston here which is moved up and down. And then you see this nice detail here this is a spherical knuckle or the end of a tie rod the spherical part of it even if there to be a slight misalignment the spherical part will rotate like this and ensure a small rotation, it is not like a full drive rod that this small rotation helps it in align itself.

And then even if you have to fix the inside thing very rigidly it will sit properly the this inside part is nicely this inside part is nicely fixed to the thing here and then there is a lubrication also this is small lubricating device here a lubricating nipple which ensures

that it gets lubricated things are getting complicated that was a relatively simple nothing what could this way this is part of a agricultural equipment.

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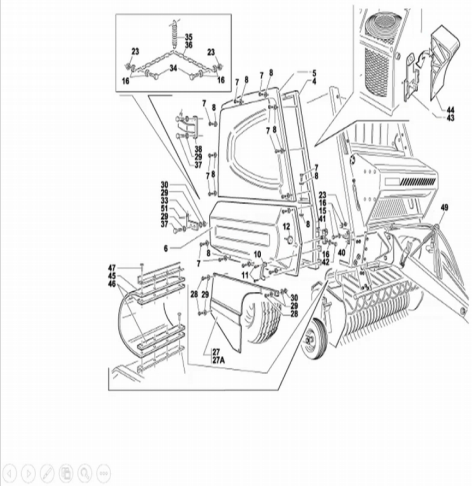

So, you see here we have tires you have the pneumatic there is the pneumatic tires next to that we have the device which does the I do not know you would call it a hoer had not known my reaper are this thing there is something which collects all these details this particular sketch is not a design sketch it is taken from the user manual and then they have numbers here and then you can order this point it is part of the repair manual you can all these order all these points saying in case something is broken.

So, you have here a place where the filter is stored where to take the parts from the filter this is where the filter thing is there saying you just shows that direction saying this particular filter or something can be replaced by accessing here. But every small thing know is seven and eight are generically there a what you call a screw and then there a either a washer or a spring washer the same thing repeats everywhere like that and somewhere at the bottom we will have a part count saying in this particular sub assembly required twenty 4 of these screws oh as it gets it seems to be getting better.

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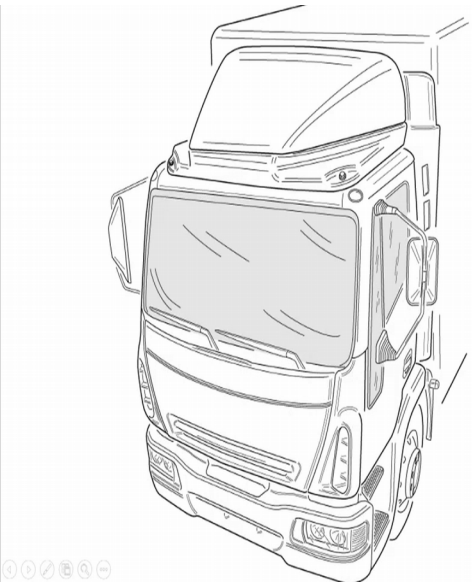

There is a cabin there is a cabin of a truck it may be a what you call a trailer or it may be a master truck and then all these elements here now you see here there is a volt here bolt here to bolt on this axis what you call like wind I mean device is to deflect the wind and reduce the drag coefficient.

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And then you have this beautiful mirrors here and then you have a step here and then you see here they have steps then you have various locks everything is clear nobody needs to explain it to you oh this is even getting better you have seen this I am not very clear what

it could be, but it looks a little like again one more agricultural equipment by which somebody can sit here and they can do this could be an attachment by which know.

The way it is shrouded and covered possibly there are blades underneath this something does the cutting it could be a harvester or it could be a divider or it could just a lawnmower and in the back we have a bin here and then we have some other devices here. I do not know whether all this stuff gets transmitted and transported to the bin it probably transported to the bin because you see here I see a jib like thing and then I say this thing is submitted I mean suspended from here and then we have railing here most likely this will rotate and then you can keep it there and then try to dump the materials.

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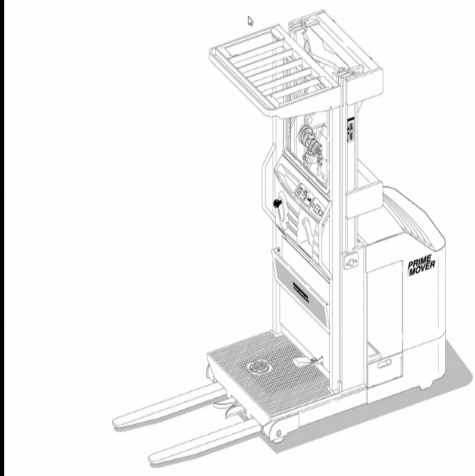

It is a very very interesting stalker you can also call it a what you call pallet trucker pallet handler the only difference is people may not be riding on it in some of them if you have something like this it is probably people are riding on it another ways you can stands somewhere else and then try to operate you have this forks here then you have an emergency button there and then there is a way of increasing decreases there is a telescopic section.

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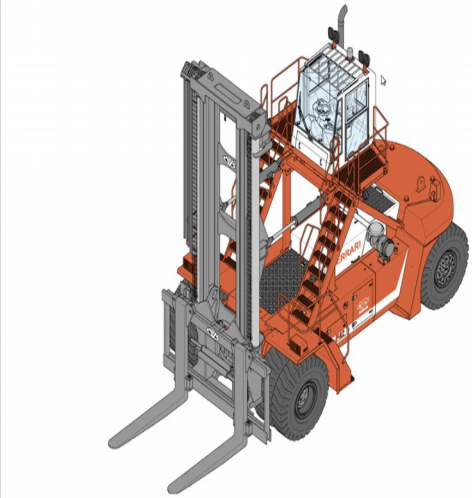

All this very easy for you if you can have your thing ready here you have seen this. Now, that is a real beautiful a very generic full fledged forklift truck how I a look at it very simple.

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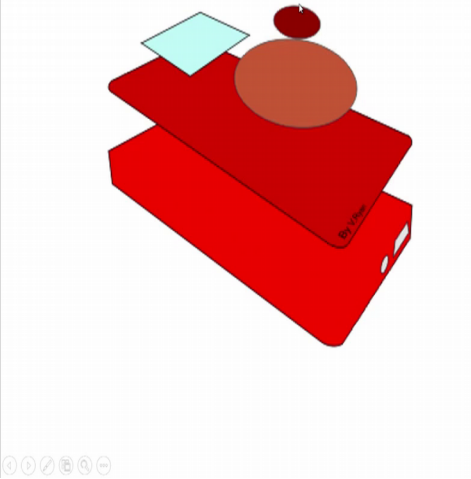

But effective probably the earliest the way they said this is how we are going to assemble and this is how the components are going to be which will make sure that this is probably where the I-pod was born or the mp 3 player saying.

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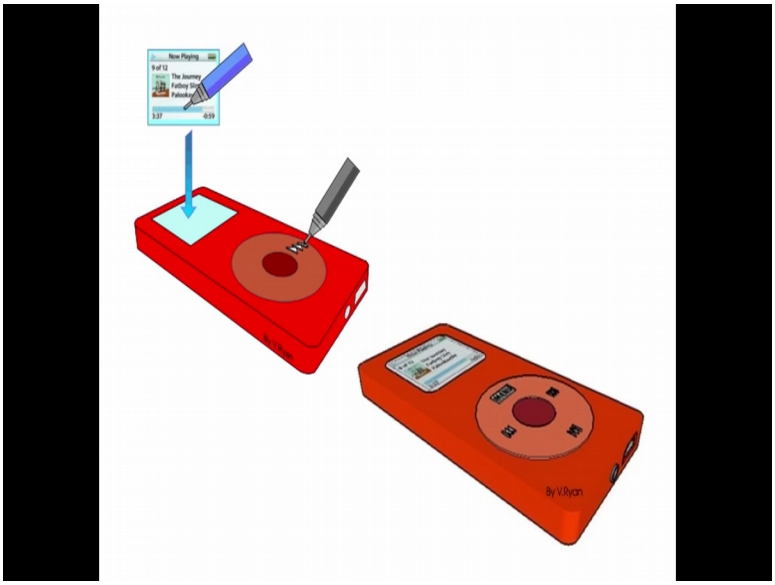

Now we have an option this is a key we are able to operate the key as you move it up and down or remove it left and right something here also moves saying in which section of the file we are playing.

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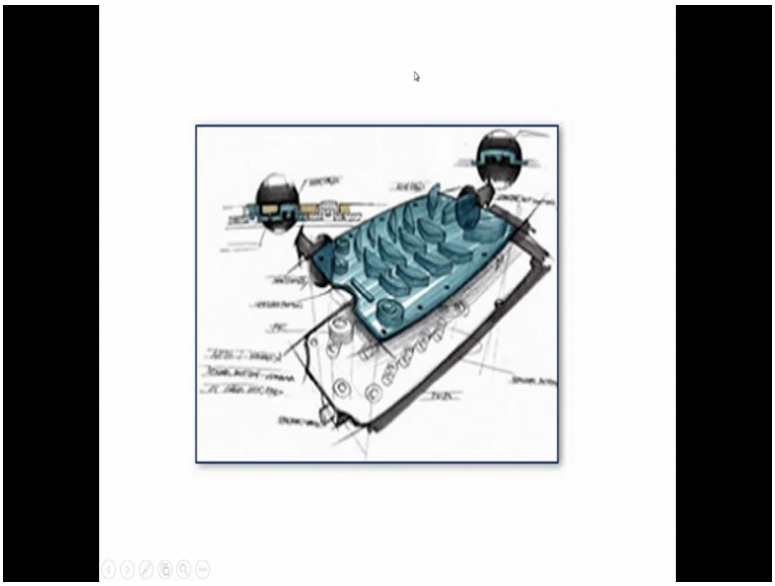

This is where or mechanical and then usability and marketability ergonomics and finally, manufacturability come into place a very early stage you need to work out of it after this you can now look for a technology which can satisfy all these conditions.

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I have shown this you already this is about the old Siemens keyboard and then all these details orbit decides script showing your last time after having decided all these things somebody uses rigid polyurethane or rigid acrylic that is poly meth acrylic methyl meth acrylic foam to make all these objects to see how well they feel how they how will the feel in their hand have a hand here this is expected that things look naturally it needs to nest lights lay here.

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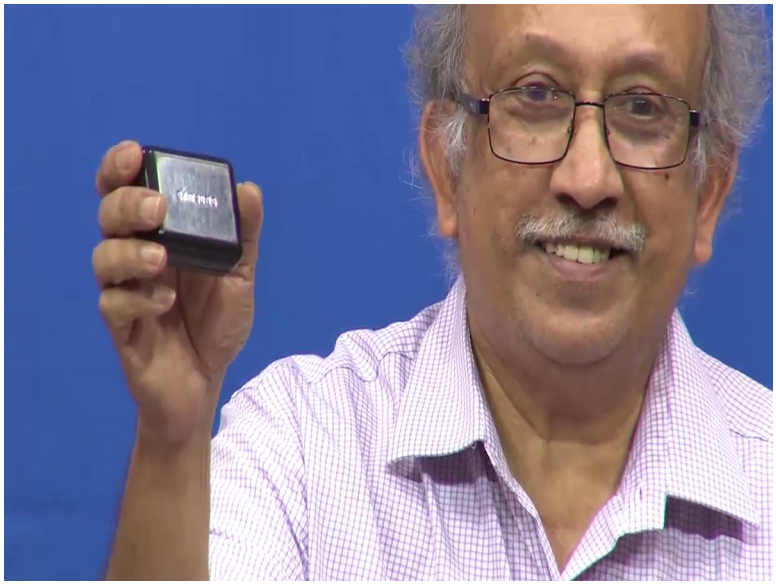

Something here you see here or I just carry at around and then yeah I think some of you if you are lucky no you will probably be able to read what it is you know it say Samsung I do not know what it comes for what I use it for putting my hearing aids inside.

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Coming back to my slideshow here next level is using these farmers they have been able to make all these parts using by a process of thermoforming or electro forming these days it is not used anymore for small points much easier to do things by rapid prototyping also loosely call 3 D printing rapid prototyping is a generic name in 3 D printing.

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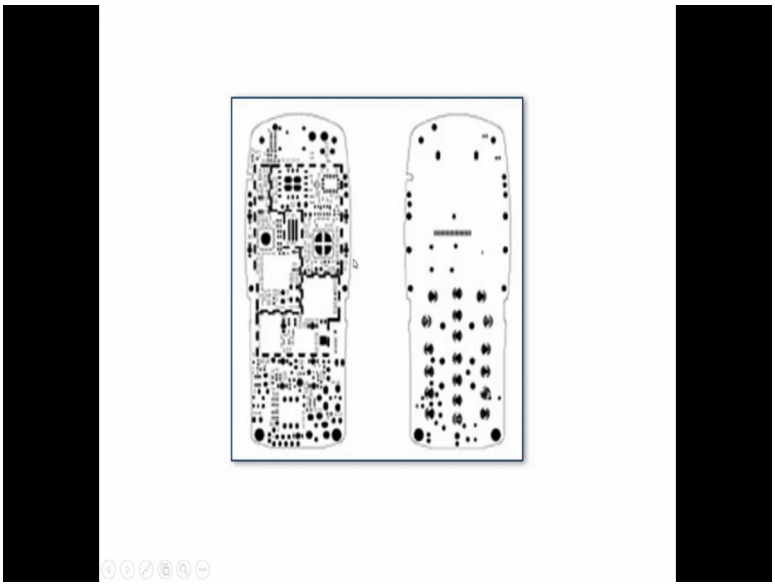

We have to we have they liquid type or we have the fewest filament deposit method which I will cover in another slide and then once the things are in place its possible for you which I have shown you already that the person who lays the PCB will know what it is then how these things are all stacked together and then how these things are all manufactured and we have.

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Now, we can take it (Refer Time: 08:39) the magic is it may or may not be real. In fact, this is transparent we do not know whether it is real.

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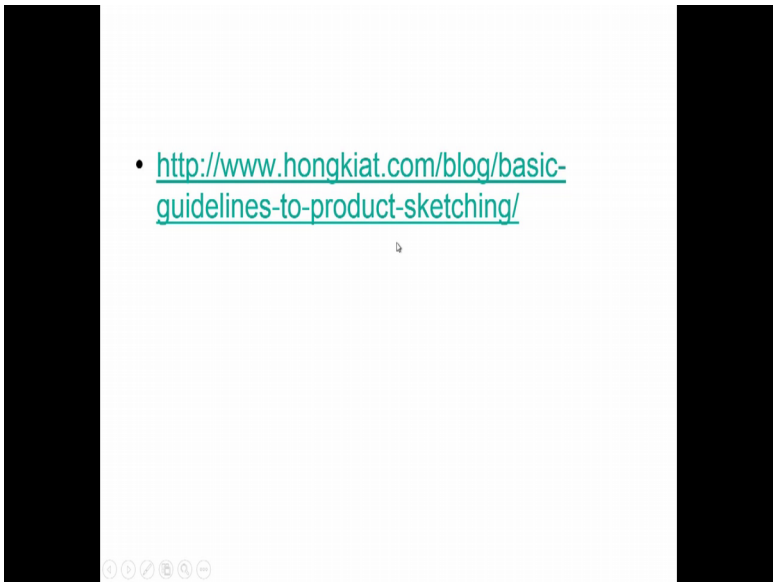

So, I will just give you a small this thing I suggest all of you go look for this hongkiat basic guidelines to product sketching and then we have several you tube videos you should watch them it is a full fledged course.

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And this course is done by the music is a little irritating. So, I think we need not worry too much about it since it is a very long video it takes around fifteen minutes I will just skip it to the important aspects where it is how the corners have been rounded off we started with a this thing what they call a rectangle and then it has all the elements of a

vanishing point we have a left hand vanishing point we have a right hand vanishing point.

So, and by rounding of all the corners and all that and adding is shading lines you see all curves can be shown. So, I am not claiming a copyright or a Patrint on it I suggest you must go and look for this Anton Rukhmans courses is Anton Rukhman if you subscribe to the channel you has something which will keep you occupied and then those of you do not know sketching well tend to learn from it and those you will know sketching can improve on your things tremendously. So, I will take your little towards say towards the end you see here it is getting slowly improved and then towards the very end if I take you we have an object or a method of learning how to do. So, I suggest that you go and try these things here.

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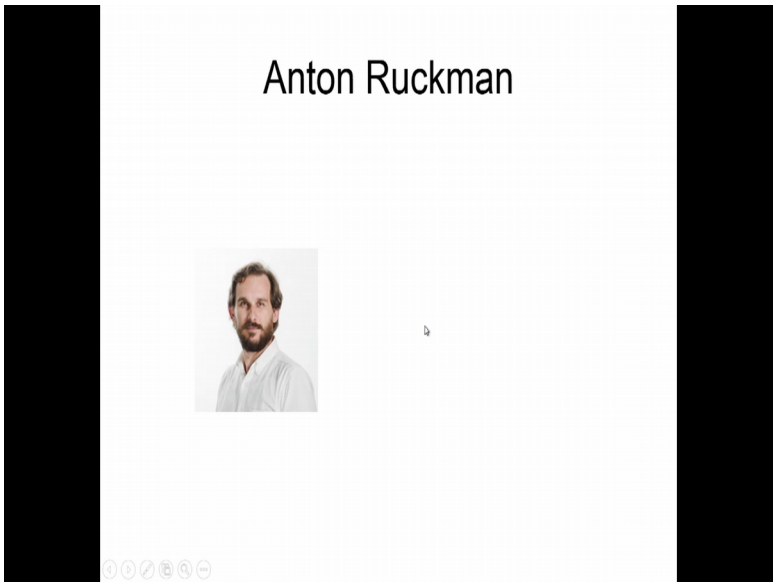

So, I have given you these YouTube links and then I have given you that name of that person Anton Ruckman go to Anton Ruckmans YouTube channel. He run I mean they run it is a group of five people who run a beautiful design service and then as just public service they have attached these things since it is a standard YouTube license and I am not in this available free you can I acknowledge him by the way for all these things and then try to see.

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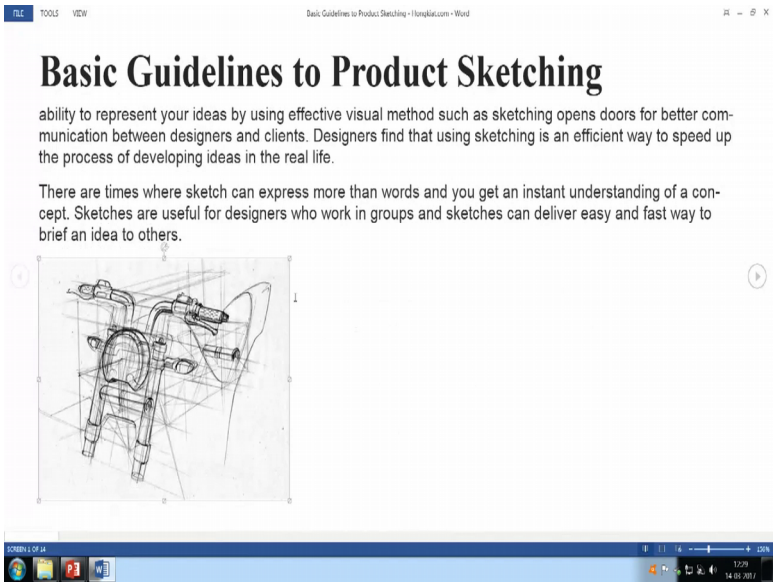

Similarly, the same way you have one more interesting thing saying this is hongkiat dot com you can go to product sketching on home I do not know how do you probably hongkiat dot com and then try to look at this beautiful way basic guidelines for product sketching and ability to represent your ideas by using methods such as sketching open doors for better communication between designers and in the case they keep on saying clients. In my case I still feel in our case I still feel you need to what you call get a concusses or your ideas being implemented in within the organization otherwise would not have had. So, many products we will not had a touch screen phone where it is no longer a resistive touch can its capacitive and then it seems to work well and then some part of it is risky.

In my case that this phone is a I mean it has taken a beating and then the. So, called you know very good glass has broken and still waiting for a small replacement to come same thing has happened to the front, but still I have a technologically superior and I am not playing around anymore with the visual cues I need to make products like what I have shown here, but this is all because it has been communicated between designers and internally find using sketching is a way to speed up the process developing ideas in real life.

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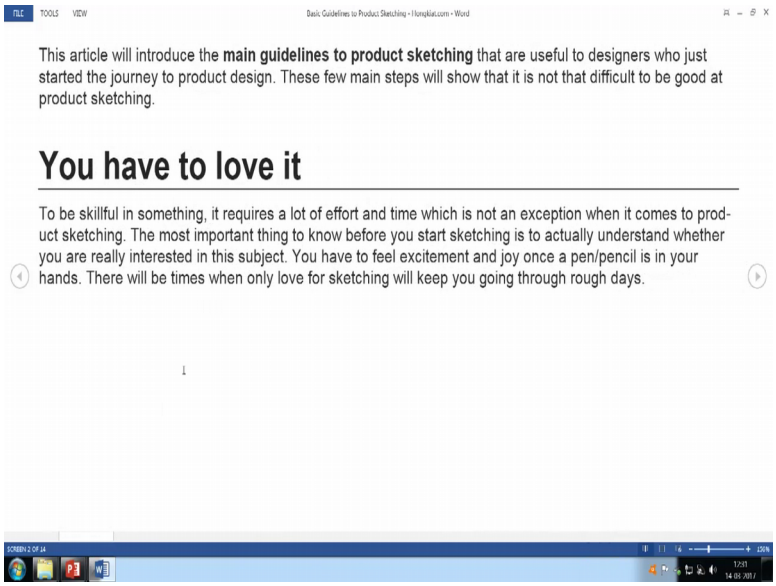

So, you can see here this is part of a motorbike main guidelines one is you need to love it.

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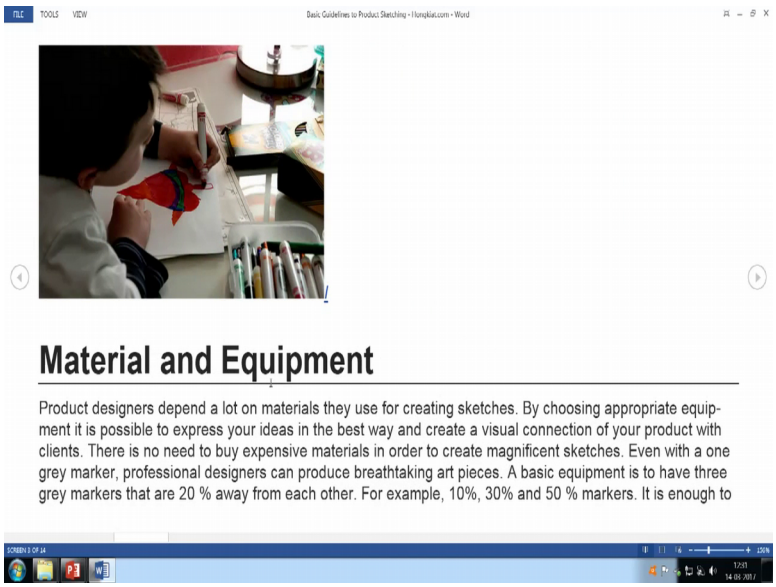

Then you need this sort of equipment which will go with it what are all the different things.

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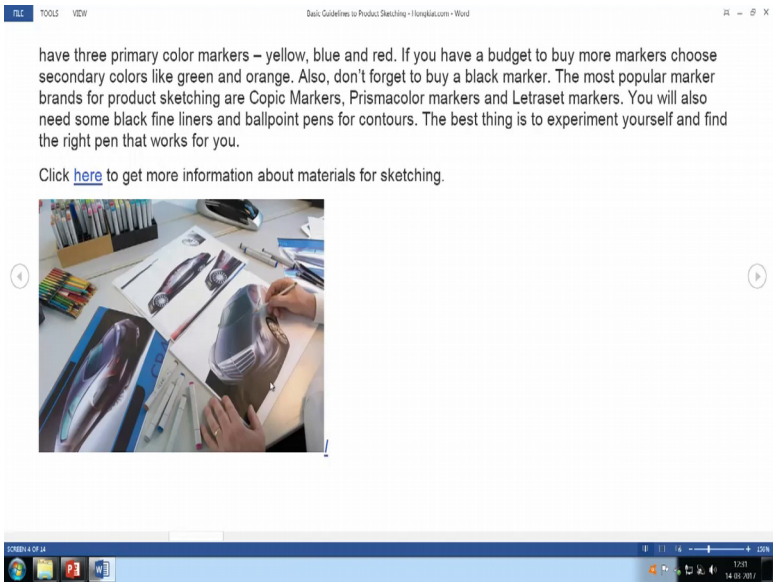

And then we all know no we. In fact, it is a small thing saying these are fifty shades of grey, but if you go to pantone or if you buy any of these markers you will see that there are hundreds of shades of a given color. So, you can go to any of this pantone color thing select a particular color

So, even if you look at my feature you will notice that little bit of shining you see here it catches the highlights I do not want it to catch this is the one that makes my face look different and then I have this beautiful shadows here can you see here this shadow is the one that makes this stand out same thing. It is I have all my wins and all that then I have all these things all of it is though you are saying it on a 2 D flat surface the brain is able to integrate and tell you that about the texture about how the highlights are.

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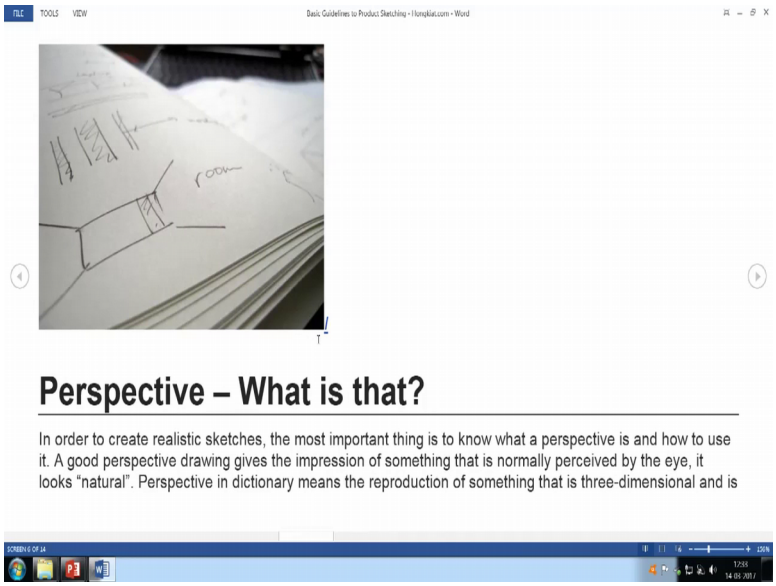

Another important thing is you need to get a sketchbook buy and then learn a little about perspective. In fact, when we talk about empathizing when we talk about any other communication they will say what is your perspective about it saying how do you perceive things about it perspective is all about foreshortening you seen this now and then how to hold the pencil which I explained to you yesterday and then start with simple geometries and then at this point probably I should show you that there are different type of sketches.

We have simple explanatory sketches process sketches main is about understanding an assignment they are more writing then sketching focuses examining problems and analyzing.

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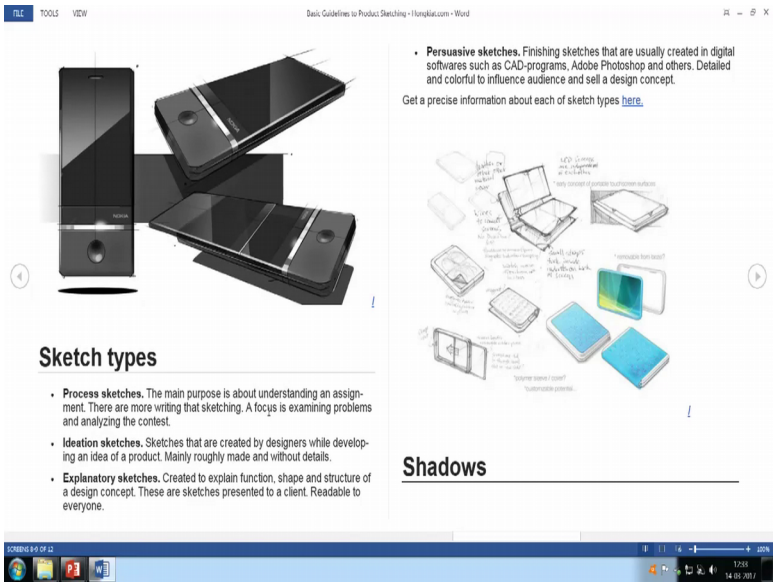

The context they are all familiar with it they draw a lot of circles and then they give connections and then they try to analyze problems saying this is what it is all about teaching saying I am able to hold the attention of the students and then saying what is it you are trying to convey.

So, in my case I hope you do not forget that I keep saying even when you talk about a mechanical enclosure for a product your concept was a design is very important saying what goes where and then what is it you would like to do with the product which are the inside what is the outside and all that at one level in the case of a prospect sketch we can say we have certain inputs then we have certain outputs. Outputs can be again split into they can be a simple visual display or that can be an alarm or that can be electrical output and similarly we have a source of power and then that power can be inherently build solar cells and so on.

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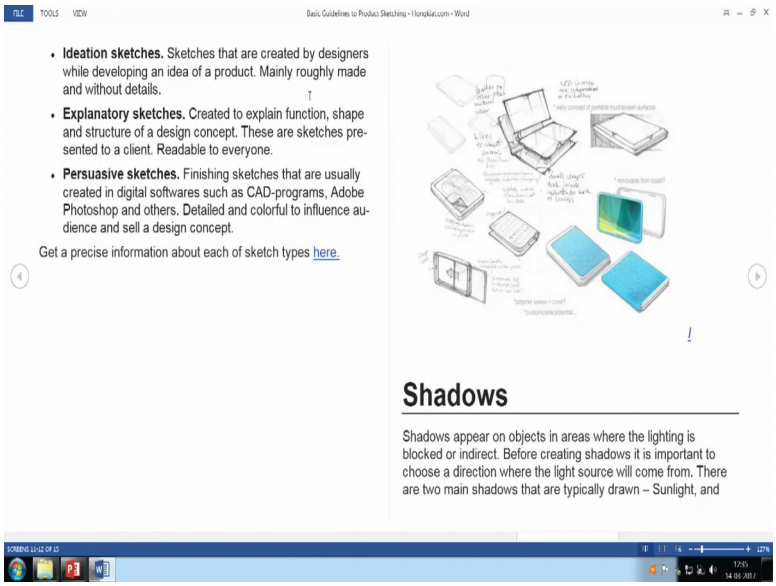

Ideation sketches that are created by designers while developing an idea of a product you see here this ideation sketches I receive I can enlarge it and get it into the middle yeah sketches that are created by designers for developing an idea of a product mainly roughly made in without details which I think know is very very critical about it. Next explanatory created it explained function shape and structure of a design concept if you remember I will again get back to my old reading lamp remember this reading lamp then you remember the picture associated with it.

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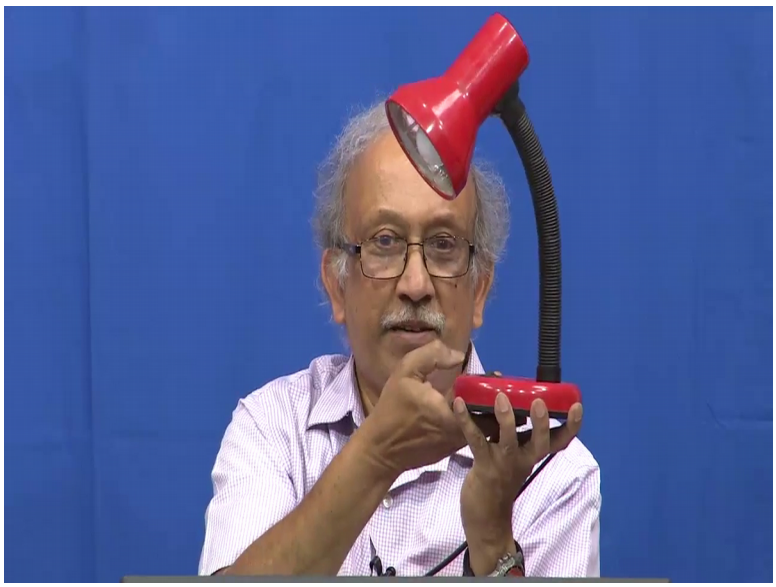

So, in the reading lamp in this reading lamp we thought we talked about something which concentrates a light then we talked about something which is a stable base and then we talked about a gooseneck these are the things which come under explanatory sketches these explanatory sketches to explain function shape and structure of a design concept persuasive sketches finishing sketches that are usually created in digital such as cad programs adobe and others detailed and colorful into influenced audience and sell a design concept.

I am happy that this is become up to date now it is very much possible now to use some illustration software if you are lucky if you have an illustrator or some type adobe illustrator or nothing can use it you have Photoshop its fine otherwise Corel draw is there otherwise online you have several simple programs for people at the starting level you can go and try to do only thing is very complex shadows very complex textures. And all cannot be mapped onto the surfaces easily that you cannot do things which would like to do in a and this thing at that time now maybe it is time for you to buy your own personal or a student license and just wait do not get on to that immediately.

Now, we will come back to the main this thing here saying how are shadows created you seen this you see this beautiful way it shows here the moment you have a continuity here it shows that it is a foldable thing you are something which you can move in here then we have something here and then we have something which is it has a book form saying can we make something out of a book.

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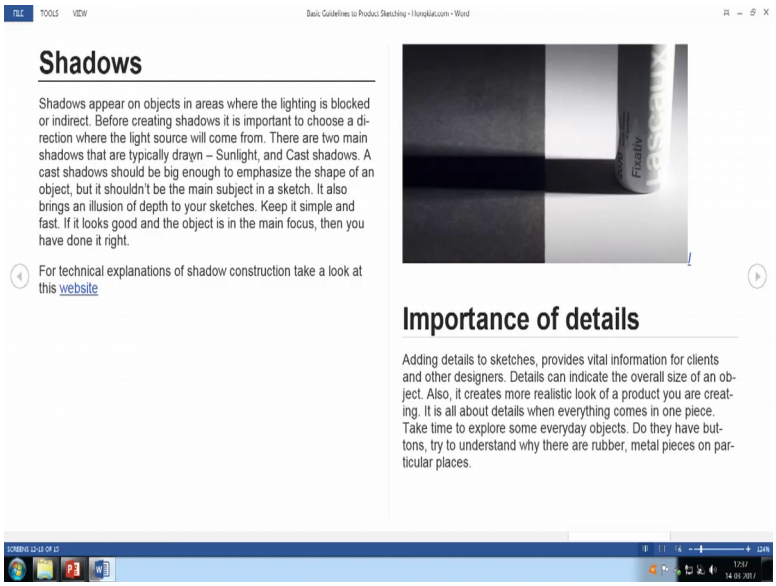

And in the case of these shadows we I think as I have explained to earlier you see here we have a cylinder in the way say you see how it is going into this the sharp then this is shadow.

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And then we come to large number of details how detailed can you make a sketch well there is a general lecture meant for designers I feel you who are sincere people who can go through all these things.

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And see how best you can have it a design concept sketches supposed to show a visual appeal of a product uses basically main detail often exaggerated to present best of the product character elements describe product itself and that is why they must be enlarged in order to emphasize the details.

So, you see here it is a car you can only make out that it is a car probably by looking at this small what you call helmet, but you see the way the tires are made to little little big and then you see where the we call the organic nature of the whole product is being conveyed you cannot ignore these things that is how while right. Now it may you a they what you call it may not be ready for the market a designer always things a little ahead of it. So, as we think ahead of it and make all these things if not today in a matter of course, what is showcased in what you call car or automobile show depending on the experience people have and all that it is a matter of time before it enters the market.

So, they designing and sketching or. So, always a little ahead of the I will ask you to make a sketch a 2 point to level sketch of it this time saying coming back to my old previous exercise I want you to go to the internet find out the size of these 2 cells which are inside this, these are standard has a particular name for it also 18650; 18650.

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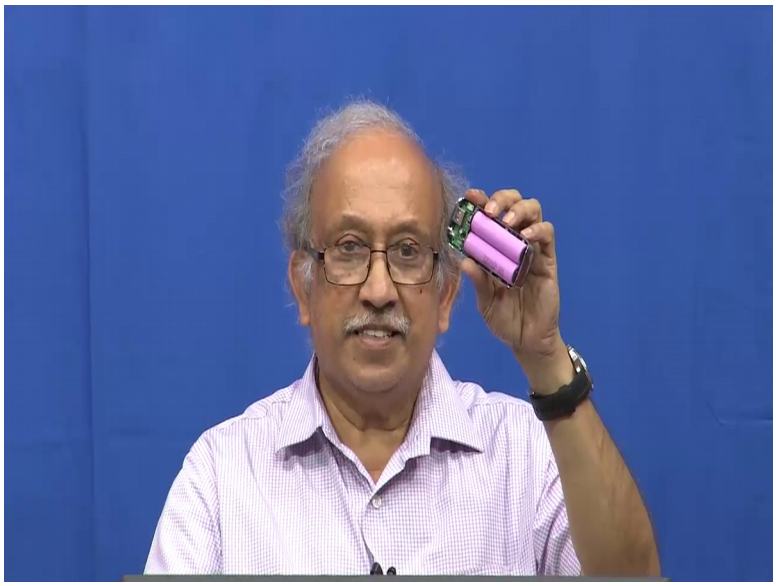

In this case eighteen seems to referred to the maximum diameter sixty five are refers to the length of the earth height of this cylinder take the 18650 cells you decide how many cells are required.

And you see 2 ways one of them is see if you can make since I have showed you and I have talking to you about a tabletop device like this by which the base forms typically a battery bank like this understood it should form a power bank like this the base and then you have an led light here.

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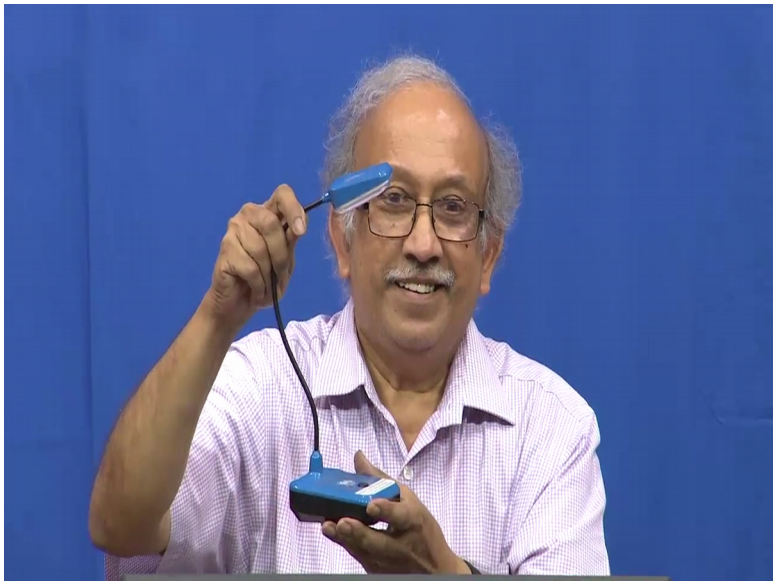

And then say how best you can enhance this product very simple thing will be can you put a clock to it putting a clock is no problem this where I would like to put a small thing now since the back is open there something you can do with it saying when you are lying down can this clock display something on the ceiling.

So, that by you just when you just need to touch it on one side and suddenly I know that what the time is this is mine do with this is only something to trigger your imagination and put it in a sketch then the end I need you to make a sketch which shows the concept of the bottom of the product what you have and how it looks like this and I have a projector which will try to project the time on top of it because if you look around you will notice that even with mobiles also had. So, there is a lens available from the mobile and then it can project whatever you want on it including in case you are watching that YouTube video which I suggested you can probably see it. So, this is going to be your second or third exercise which I will actually formally write down and then try to upload it later saying what I expect out of it.

So, thank you for today's lecture from tomorrow I will try to take on some other topic related to this.

Thank you.