Evaluation of Textile Materials
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Lecture – 10
Evaluation of Fibre Length (contd..)

In the last segment what we have discussed different parameters related to fibre length. How do we express the fibre length by different methods by different parameters of expression of fibre length. And also we have discussed different parameters for expressing the fibre length distribution. Now we will discuss here the different methods of measurement of fibre length that is staple fibre length. First there is a simplest method it is hand stapling method.

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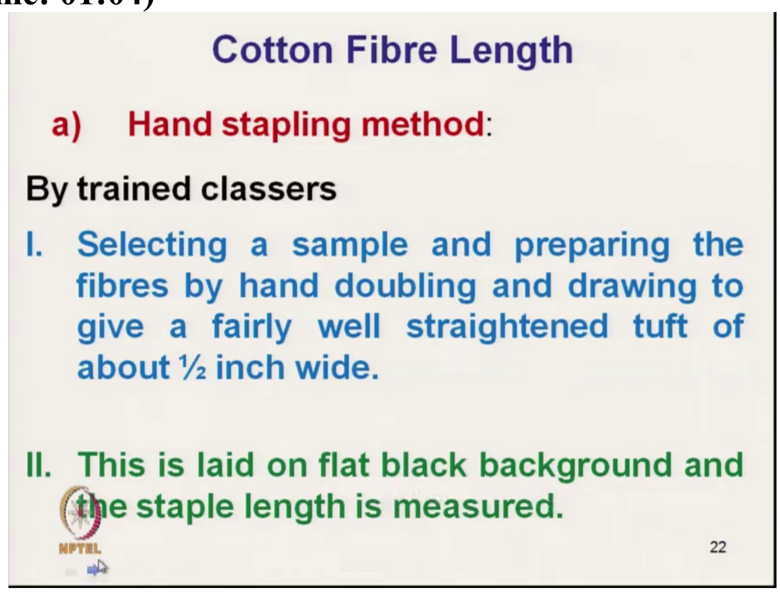

As I have mentioned in the last class actually it is done by trained classer so any untrained person he cannot do if he does it is erroneous so there will be wrong result. The selection actually it is very important, selecting a sample and preparation of fibres by hand doubling and drawing to give fairly well straightened tuft of fibre about 1/2 inch wide.

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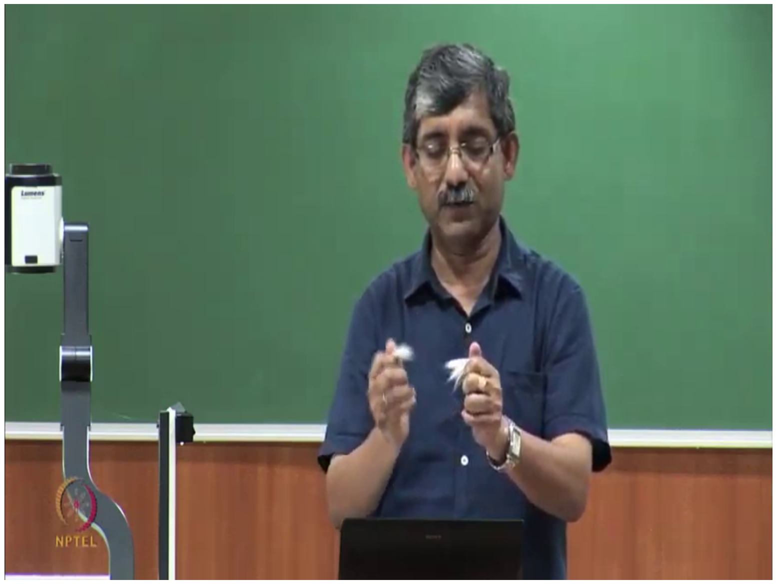

So first we have to select the fibre, as we have selected then what we have to do is draft and double, draft and double in this way we have to do repeatedly. To make the fibre strength fibre total parallel in this way we can do. Now if you see here you can see here, fibres here are drafted repeatedly.

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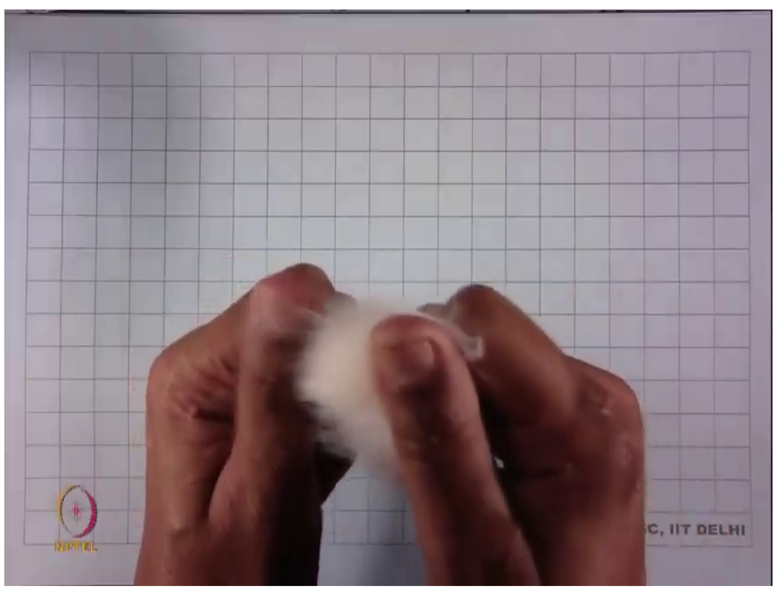

Drafted repeatedly and then doubling drafting and doubling in this way we have to do repeatedly so that fairly straightened fibre strength and suppose it is a black velvet the norms is that we have to keep the fibre strength on the black velvet.

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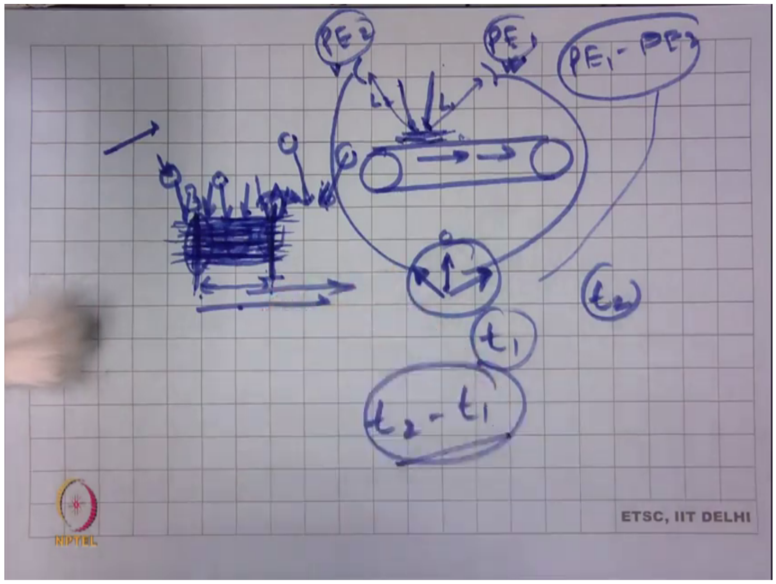

And here after placing we will get the fibres in this form. In the last class also explain the little bit in this way this is the fibre strength. The majority of the fibre will be at the centre ok and maximum fibre. And if the background is black here then we can see through the fibre the portion which is not covered ok. Now we will see at the edge, clear edge we can see where the density as suddenly changed the danser portion as suddenly changed this is line A and this is line B.

So, right side at this point suddenly it is changed this is we can draw rough line here and here also you can draw rough line so this distance AB distance is the; is called the staple length ok and width is approximately, width of the fringe is about 1/2 inch. This is laid on flat black background and because the black background against the white fibre normally, so we can see normally and the staple length is measured ok.

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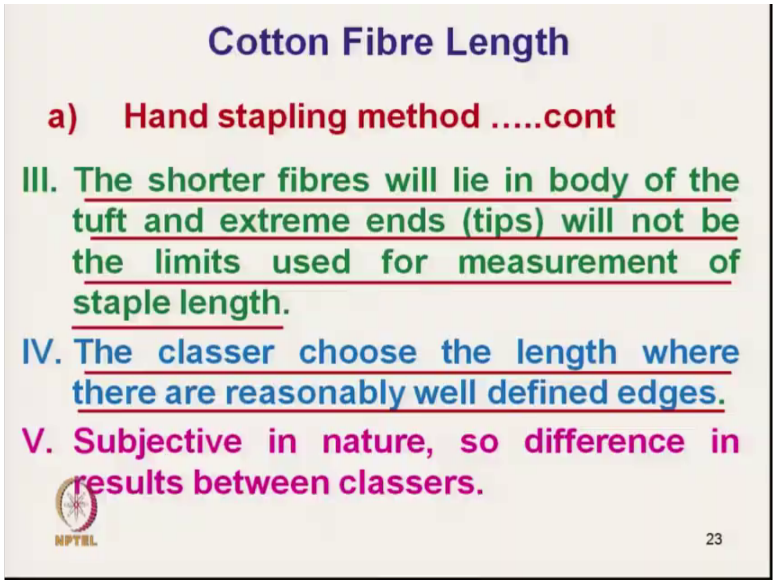

The shorter fibre content will lie on the body of the tuft and it will never go out in the edge because we have done repeated hand straightening and drafting and doubling and we have to take precaution and we have to take care no short fibres are lost ok fibres are we are not discarding any fibre ok so short fibre will lie on the body of the tuft it will not the extreme, extreme ends as I have mentioned it will not be the limit used for measuring the staple length.

So, we will not take into the extreme end into account ok. We will take the limit where the where we have a clear change in the density. Suddenly from the denser portion it has gone to the lighter portion. We can see the clear line rough line we can see so the classer chose the length where there are reasonable well define edges. So, these extreme edges are not taken well defined edge is there between these two edges is the staple length. So, this is done by the experienced person and the problem here is the subjective in nature.

So, the different classer will land up with different evaluation for the same cotton. So, this will give us rough idea about the overall length of the cotton but we cannot take any decision based on this result. This result will give this cotton has longer length this will be having a shorter length. But it will not take any action on that ok. And so looking at this problem of this hand stapling and judging, so there is another instrument which has been developed which is called the mechanist version of this hand stapling technique.

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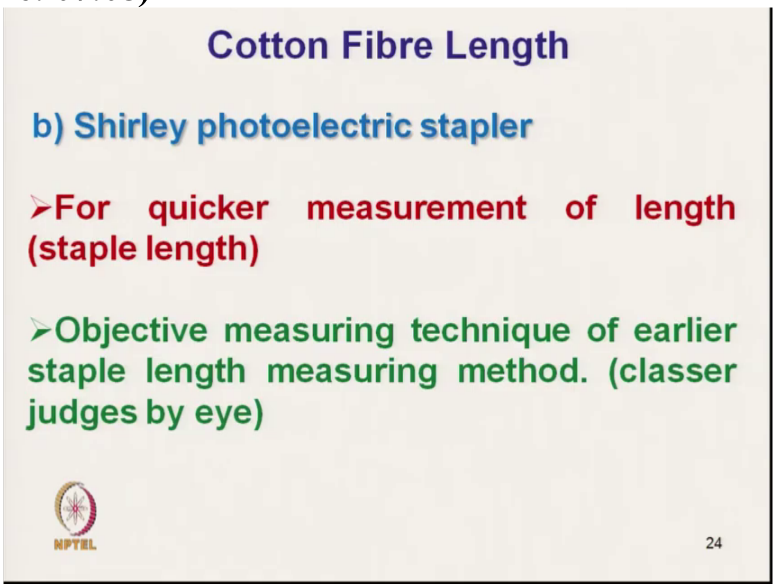

This is known as Shirley photoelectric stapler. The principal is exactly same here, Shirley photoelectric stapler.

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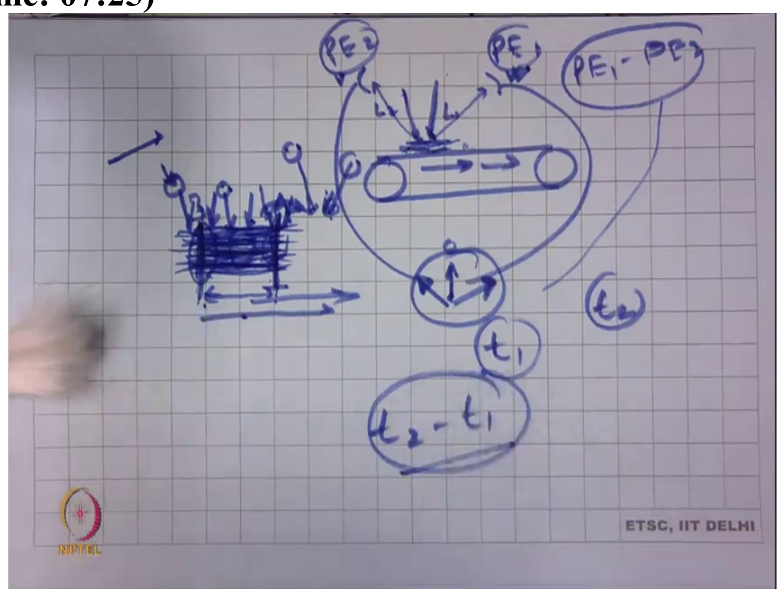

And again you can come back here so what we have seen here in photoelectric stapler in same way we can prepare the fibre strength fibre top we can prepare. And here and earlier hand stapling technique we have see in the classer will decide the distance A and B type A and B this is based on his experience. But that subjectivity we can remove we can eliminate by using one technique it is Shirley photoelectric stapler.

Where in this fringe it is taken and the point where sudden change in density of the fibre are located point A and point B will be located automatically using the photoelectric system. Now here the system is that suppose one belt conveyor belt is there this is the conveyor belt where we are putting this fibre, fib re frame this is moving from one direction to other. This is suppose this fibre fringe placed here. This fibre fringe placed here and this is moving.

And here suppose two light source is actually projected here, two light sources ok, L1 and L2 two light sources the distance of these two sources are very, very small may be few millimetre maybe 1 millimetre or 2 millimetre distance and from here the sensor will keep it will after deflection it will give to one photoelectric sensor and from here suppose it is going another photoelectric sensor ok. Now this sensor will sense the intensity of the light.

Also in this will also sense the intensity of the light. Now then the it is moving fibre fringe is moving along with the belt, at the centre at the centre suppose here two lights are falling here this will keep as it is the dense portion this will send the signal almost equal signal this photoelectric sensor PE1 and PE2, they are receiving the light of same intensity. And this will the difference of the intensity is measured. The difference instance of light which is received by the photoelectric sensor is measured here.

So, as and where this is calculating PE1- PE2 this difference is measured here. So, as the different here is exactly same, so this will give a signal of zero there is no difference. Now as it is moving suppose it is moving from at this point it is it is giving signal ok, it is taking signal at this point ok. This is fringe is moving when it is reaching at this point what will happen. Here the signal of one photoelectric sensor will be entirely different from another photoelectric sensor ok.

At this point so here when it is reaching here, so this point there will be very high deflection it is the difference will be very high at this point. So, there will be a deflection. So this point is noted, so this is the point suppose this is the time T1, so there is a maximum deviation this point ok. Now it is moving further it is moving continuously when it is reaching at B point, the source the light B point suppose one photoelectric sensor will keep one sensor send signal.

Another photoelectric sensor will send signal entirely different way but it will be in the opposite so this way and this way and it has deflection maximum deflection only on other side so, that is the difference. So, this time we will measure the time T2. The time difference between these two t2- t1 is the time difference between these two extreme points A and B. And if you know the speed of the conveyor belt then from there we can calculate the distance travelled buy the conveyor belt where the two extreme deflections are there.

So what is this distance? This distance is there staple length, this is the thing here it is actually the mechanised way of evaluating the staple length.

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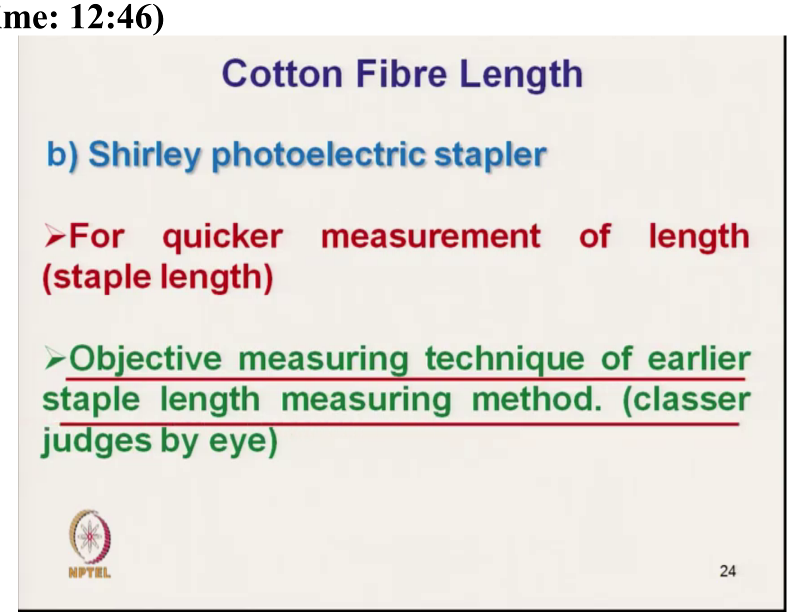

With this principle here Shirley photoelectric stapler works here, it is a quicker measurement of length staple length. Photoelectric stapler measures the staple length. It is objective measuring technique of earlier hand stapling method. So in earlier method what we have done which is done by a classer. Classer does the judgement by eye, here it is by photoelectric sensor technique is the principal is exactly the same ok. Here there is no subjectivity. It is objective technique ok.

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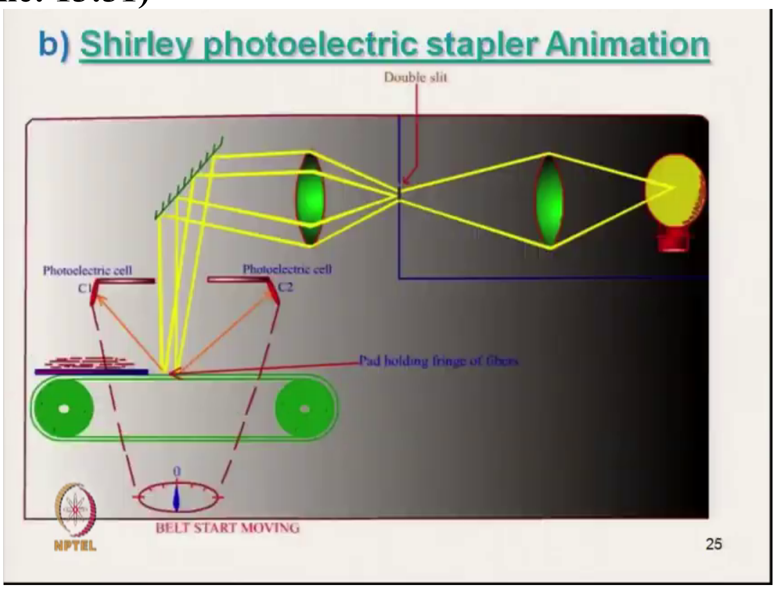

Now this is the principal ok, here this is the fibre fringe we have mentioned ok it is placed on some black pad is placed and this is the placed on conveyor belt. It moves gradually. And one light source is there which is actually gives the light, it is a light source through the lens arrangement and it is the double slit. From here there is two light source is coming ok. This is one light source another light source and ultimately these are falling in two different points which are very close to each other.

And from this point the reflection and photoelectric sensors C1 photoelectric cell C1 and C2 they are receiving the light ok. So then there is nothing here, so this is the here from this point the fibre fringe. Again that time also it is getting signal. So this signal the signal received by C1 and C2 are will be sent exactly same. And this is the sensor which actually get signal from these two sensor this is a metre with which shows the deflection.

And the deflection here is actually the difference between the signal from photoelectric sensor C1 and C2 this is the difference. And at these point as they are receiving the same quantity of light are the impact intensity so this difference will be zero here. And gradually it is moving still it is in the black portion so it is giving the same signal it will give there is no deflection. But as soon as it reaches particular line where the intensity suddenly changes and that time the maximum deflection will be there.

Otherwise there will be little big deflection because then it is coming under this action under the action of these fibres there will be reflection and it will start at the point where maximum change in intensity there will be deflection and it is for similarly other side actually it is releasing this point this will be moving out and that point also there will be deflection, what deflection will be on the other side opposite side ok. Now let us see the animation here.
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The light source is generated this is the light source and through it is coming through double slit it will actually move out and going to the some mirror is there and the mirror reflects and coming two sources of lights and it is deflecting ok. Now the fringe is coming, now see there is no deflection at a point no deflection that point has been noted down time. Again it is coming and going centre towards the centre and that centre then it will be;

And here as soon as it is coming to the centre there will be no deflection. Again it is moving out the point with the maximum density difference will again So, the maximum deflection in other direction so that will give us; so this is the point A , here suppose this is the point B, this distance where it is the staple length ok.
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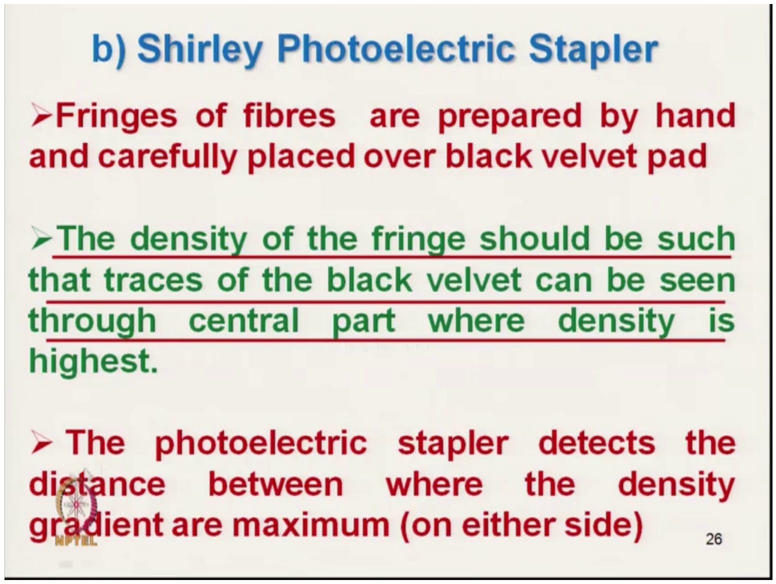

The fringe of fibres are placed ok over the black velvet after the preparation. Why black velvet pad? Because it will give clear idea about the deflection, the density of the fringe of fibres so it will be such that so it traces the black velvet it can be seen through central part of the where density is the highest. So, density we cannot have highly dense material. So, the density should be very thin ok.

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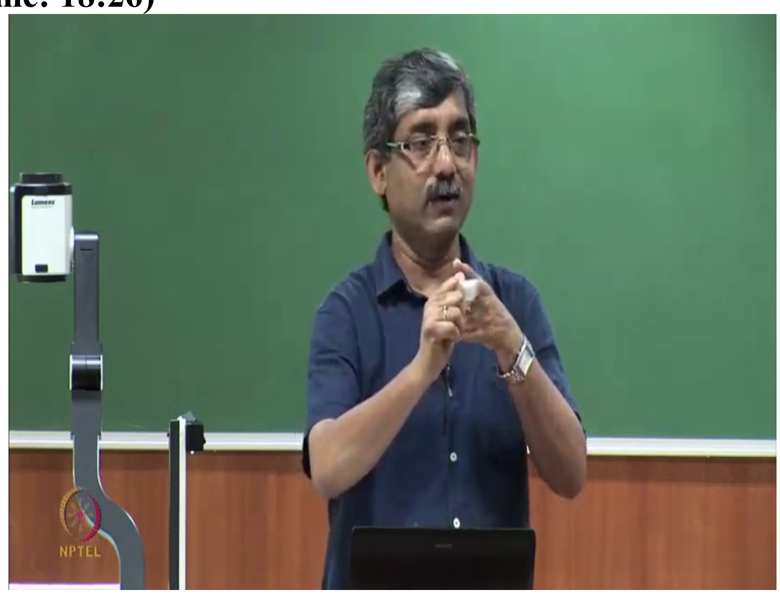

So, that steel, even through the central part the black velvet at the bottom of the fringe should be visible that way we have to we cannot have very thick fringe ok that is important. The photoelectric stapler detects the distance between where the density gradient or maximum ok density gradient are maximum in either side.

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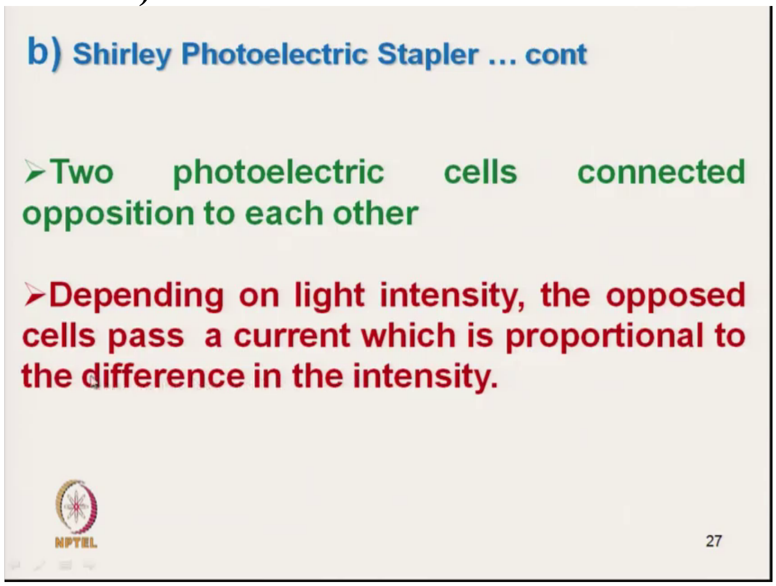

Two photoelectric cells connected opposite to each other depending on the light intensity the opposed cells pass the current which is proportional to the difference between the intensity ok.

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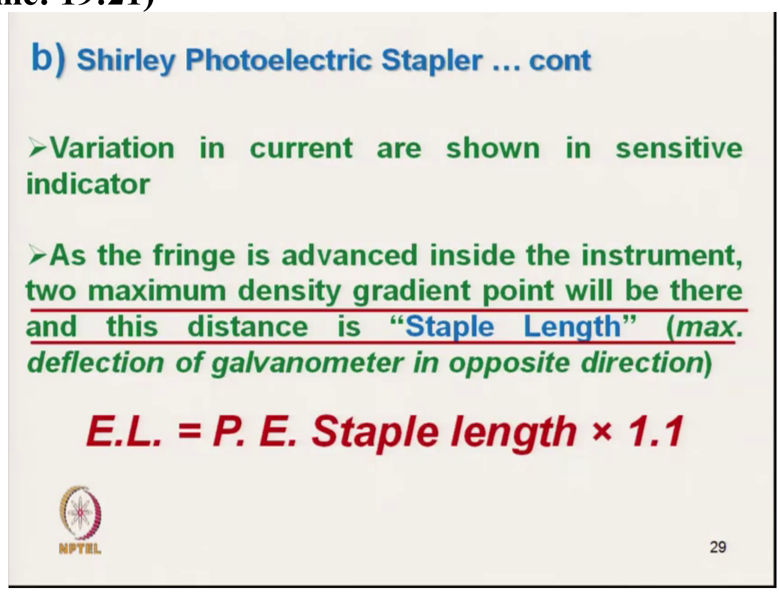

The variations in the current are shown in sensitive indicator. As the fringe is advanced inside the instrument to maximum density gradient points are deducted and this distance is staple length ok. Maximum deflection of the galvanometer in opposite direction that is the distance we can calculate and from that photoelectric stapler the staple length if it is multiply by 1.1 you will get rough idea about the effective length so this is the typical equation.

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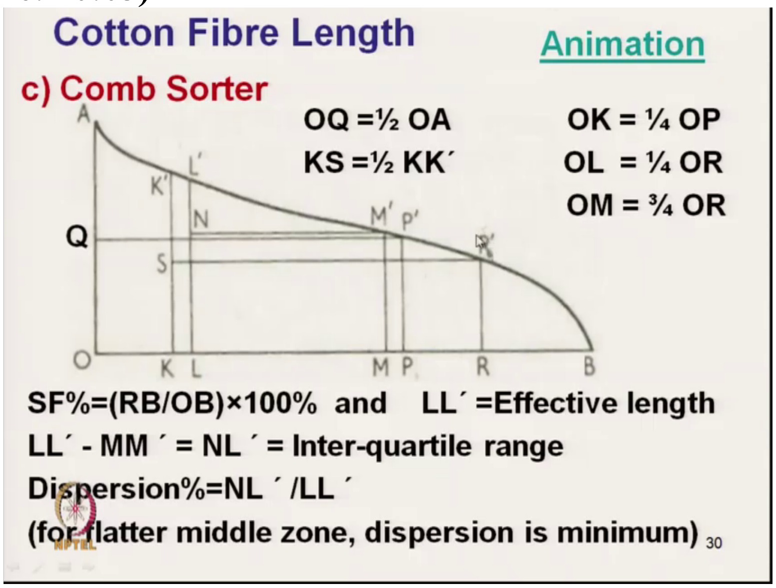

Next is that comb shorter diagram ok so this Comb sorter diagram this is typically used for cotton again. Here the fibres are arranged in terms of length ok. Now let us see other comb shorter diagram formed.

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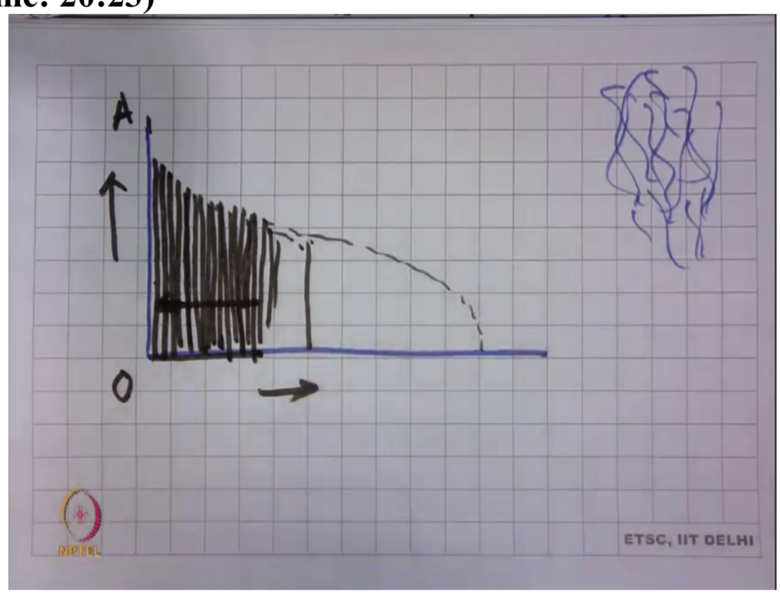

This is the length ok here is the proportion suppose we have the fibres these are the fibres. These fibres are the first we have to take say this is OA and here it is a; this is the length here it is the percentage of fibre. Now the system is that the wool pick by some means. We will pick the longest fibre first and we will arrange and put the longest fibre at the left side left most side and we will select fibre almost with very few fibres of the same length, longest fibre we are putting here.

Next length we will put here gradually length in order of descending order, by length we will put in this fashion. One has to be taken here which is very important the density of the alignment of placing the fibre should be exactly same this density like we cannot put a fibre here it is subtle. We cannot put the next fibre here there should not be gap. The gap between the fibres should be exactly even ultimately we get a curve like this. This is known as the shorter diagram ok.
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So, let us see how the shorter diagram is formed starting with the longest fibre as I mentioned if in aligning the fibre this is the shorter diagram. Now what is that Q point has been; OA is the length of the longest fibre ok Q is the point which is the midpoint of OA and from q parallel to the horizontal line except the earth drawing one line and from that line that is the; that is intersecting point P dash. from P dash we are drawing a vertical line.

And from there we are having one point OK is the point is one fourth of OP and from K point we are drawing 1 vertical line K K Dash and we are taking 1/2 of OK. From 1/2 of OK, We are drawing which is point S we are drawing again one horizontal line which is intersecting the curve at points R dash. so from R dash we are drawing another line vertical line RR dash and that RR dash is the length and from there this is the KH is the 1/2 of that; now from RR Dash we draw a length from OR, we are dividing OR into four equal parts.

So OK; OL is the one fourth of OR ok. And then from AL we are drawing again one vertical line that means it is the second approximation. The first approximation of upper quartile length is KK Dash the second quarter of upper quartile approximation is AL dash. So, effective length is defined in another way which is the second approximation of the upper quartile length is known as the effective length ok. From this is LL dash this is as we have mentioned earlier OL = NR ok. MR is ON is the one fourth of OR ok. From there we can calculate dispersion percent

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So, we can see OQ is the one fourth, 1/2 of OA then KS is1/2 of KK dash, OK is one fourth of OP it is fast approximation and, OL is one fourth of OR that is the second approximation and that is the length LL dash is the effective length and OM is 3/4 of OR that is the lower quartile length. And this upper quartile length minus is known as inter quartile length as we have mentioned lower quartile length. And from there we can calculate the dispersion percentage.

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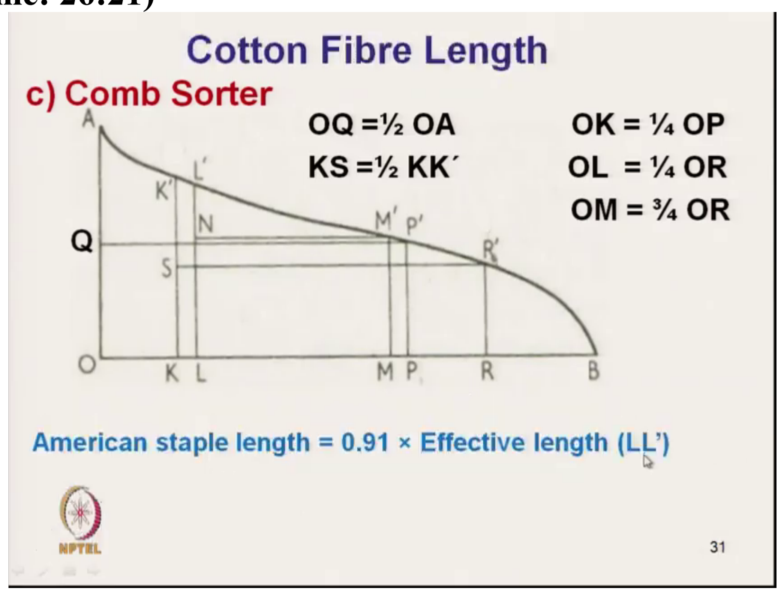

And the American staple length =0.91 multiplied by effective length we can calculate

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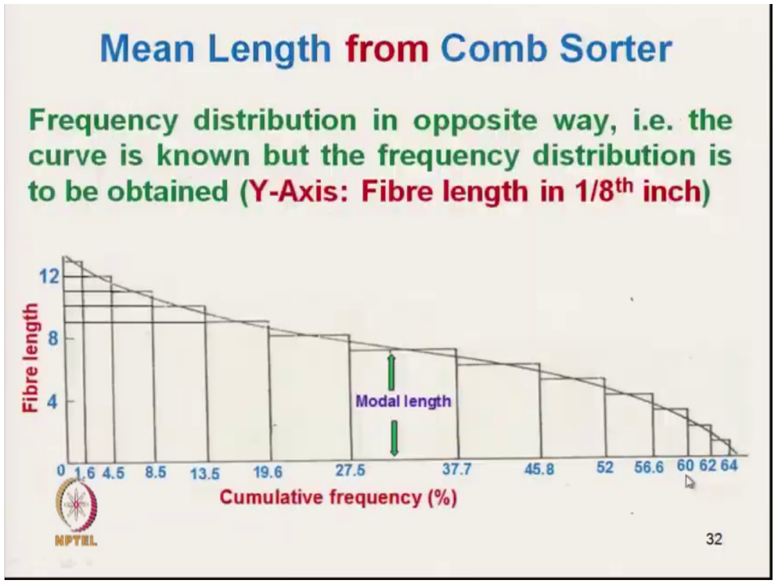

From this shorter diagram we can also calculate the mean length ok. Now the mean length calculation we can, we must understand here how to calculate the mean length. This is just goes in opposite way to that of the frequency distribution curve. Here the frequency distribution is in opposite way means first we know the curve then we are trying to frame the frequency distribution. In normal case we know the frequency distribution then from that we can brought the curve ok.

Where is the histogram or different types of curve we can draw if we know the frequency distribution here our curve is known. Here the curve is from there in x axis the values or fibre length in terms of say, 1/8 of an inch. That means this four means 4/8 half an inch, this is 1/2 an inch, 8 means 8 by 8 is 1 inch. Like 12 by 8 inch so this is the length and in x-axis it is a commutative frequency ok. This distribution we can calculate we can get fibre length upon;

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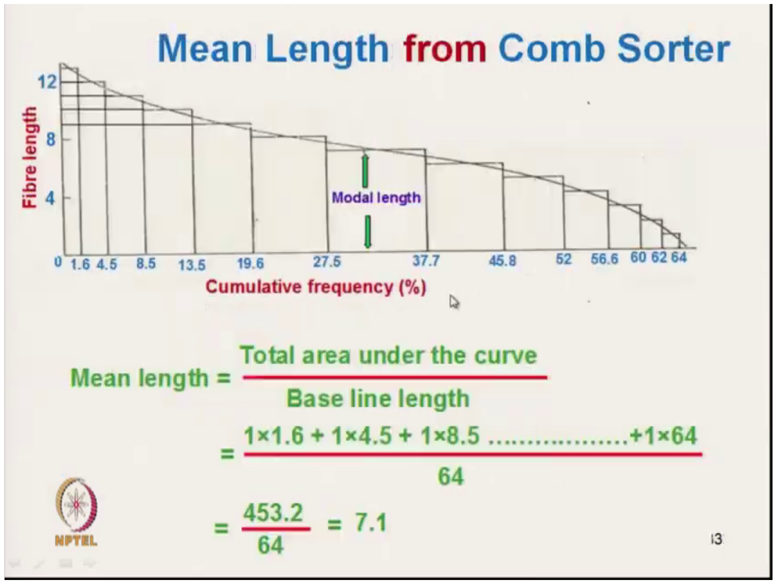

Now we try to see here how to get this distribution here. Now this is the fibre length ok and we say 13, say 12 this is a 12 of an inch from there we can calculate; we get the histogram here. How to get histogram from this point; this is the point where it is actually this point is intersecting that point is at the midpoint.

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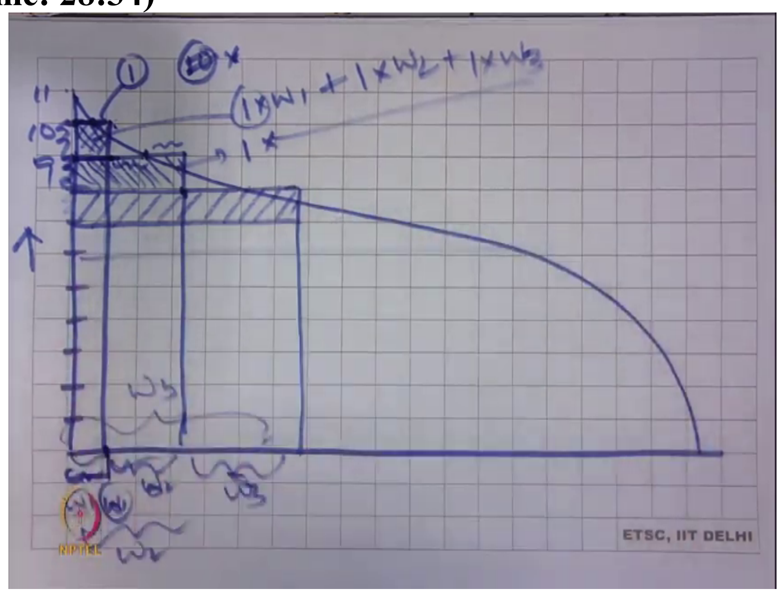

Let us see 1 so 1 2 3 4 5 6 7 8 9 10 say 11, ok now from this point we are trying to get the histogram. This is the point where; now we are drawing it here and this distance suppose it is equal to this distance And so where the point intersecting is the midpoint ok. This is one bar diagram, this is number one. Now the next point is that; this is what is the length? The length is 10 and width we know is this point we can calculate now, w1 is the width. So, the area of the rectangle will be 10.

So, here it is 10, now what we are doing we are trying to draw another histogram here. Now and from this point, here extended two equal point, this is second one. So now we are trying to measure the area of this rectangle. Almost it shows square it can be rectangle. Second one will be this one because this is the point intersecting; this distance is equal to this distance ok in this way we are forming. Now this is another rectangle and from this point.

Again we are drawing another rectangle here this we are extending to the other point and this is the point, so we are getting another rectangle here, the second one. In this way we will go first if you know this distance, if we know this is w1 if you know this distance w2, this distance w3 in this way if we know. So what will be the area of this rectangle or looks about say it is a square. This will mean what is that height? It is one ok and this width his w1, w1 into 1.

Similarly what about second one this is second one, the second one will be again the it is one and the width will be this one up to this point w2, this is w2, similarly this one will be w3 ok. This will be 1 + 1 * w2 + 1 * w3 because we are divided into equal 1/8 of an inch in this way. In this way we can calculate the; this will be the total area of the curve under the curve that is the total area and if we divide by the width. Summation of it will give that; if we divide the summation of the width we will get the height mean height.

So, here you can see so this is the height this distance is the one and as per the curve we are getting 1. Here this distance from the zero point it is the 4.5, this distance is the 8.5, 13.5, 19.5, 20.5, in this way it is the distance. Now here the; the area of the rectangle first rectangle is 1 into 1.6. Similarly area of this rectangle second rectangle total rectangle this one height is one and the width is 4.5, this is 4.5 second rectangle, 3rd 4th in this way we will go.

In everywhere the height is always 1 unit, so in this way if we calculate the mean length and the total length is 64. Total length it will be 64 and so this divided by 64 and 7.1 is the length of the; 7.1 means 7.1 by 8 inch is the mean length of the fibre. Mean length of the fibre we can calculate from this comb shorter diagram.

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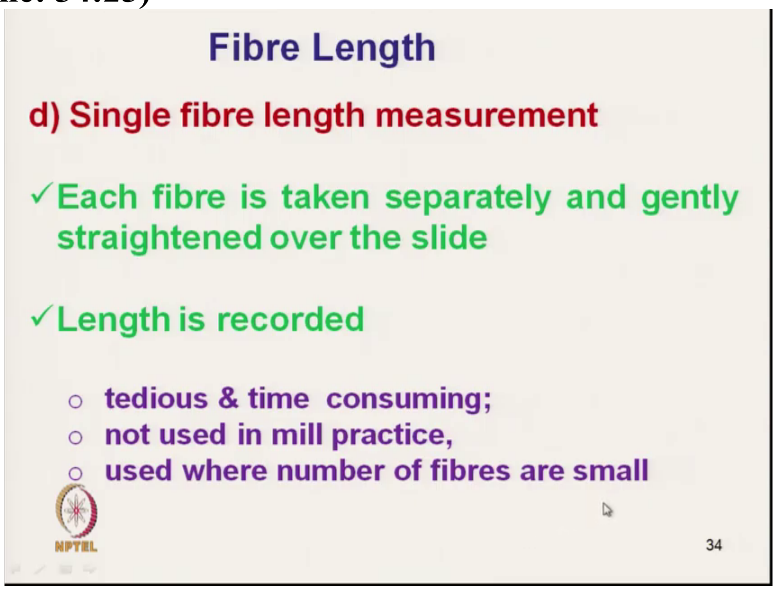

Next is that single fibre length measurement, so single fibre length measurement normally it is not done in or this industry because it is time consuming. But for specific research or specific defect analysis we can always do ok. Each fibre is taken separately and gently straightened over the slide. The fibre you are to remove all the creams. Anything any paint any loop type formation so we will have to straighten the fibre gently put on the slide and length is recorded, we can record the length.

So, the problem is that it is tedious and time consuming process and in mill practice it is not advised but for any research or anything we can use this process. Used where number of fibres are small. Suppose we want to measure the fibre length taken out from yarn small yarn, I want to know fibre average fibre length. I have suppose this quantity of yarn.

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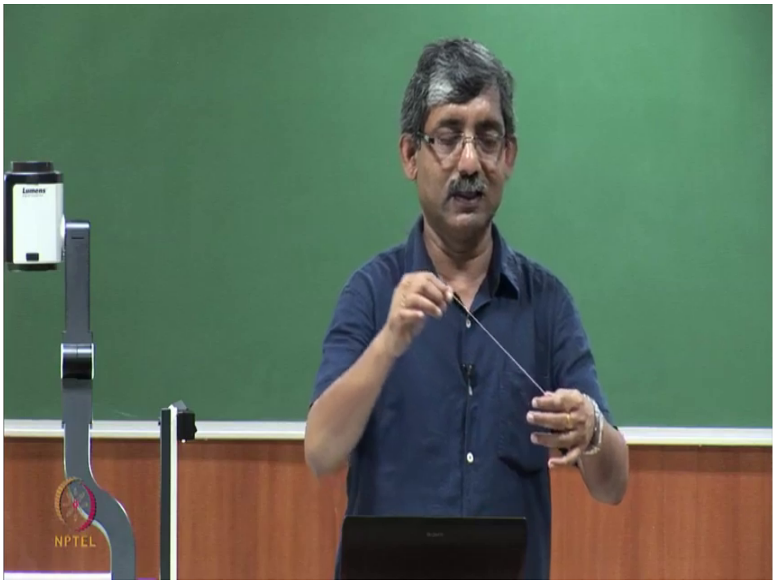

I want to guess this is yarn I am having which is available with me, I want to know the length of the fibre from here I cannot use the comb shorter principle or I cannot use any other principle but what I can do I can take out few fibre and I can measure the length ok so that I can get the rough idea about the length of fibre.

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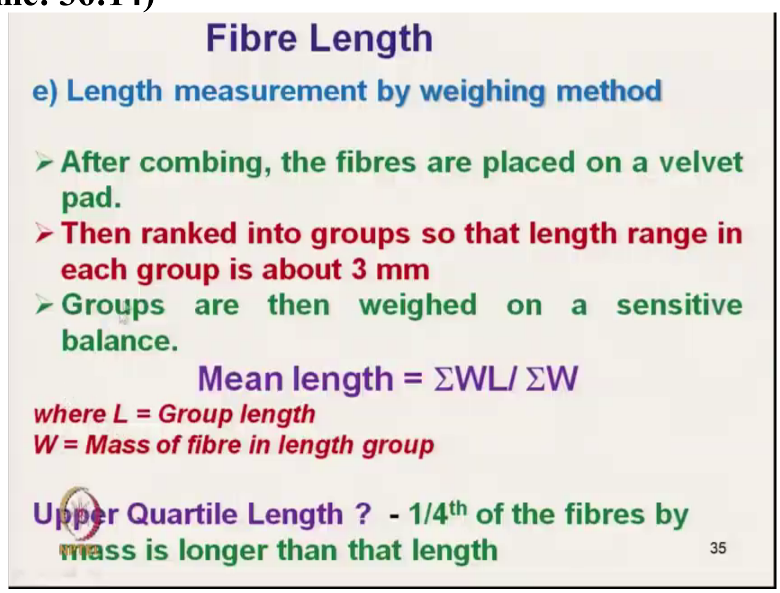

So, length measurement by the weighing method; this is actually done this is used in woollen industry and also in cotton Industry. So what it is done? After combing we can comb or we can we can do multiple drafting and drawing ok. Fibres are placed on velvet pad. Then what we will do be rank into groups so that the length range in each group is about 3 mm. So we are grouping the fibres of different length groups. And the groups are there weighed on sensitive balance.

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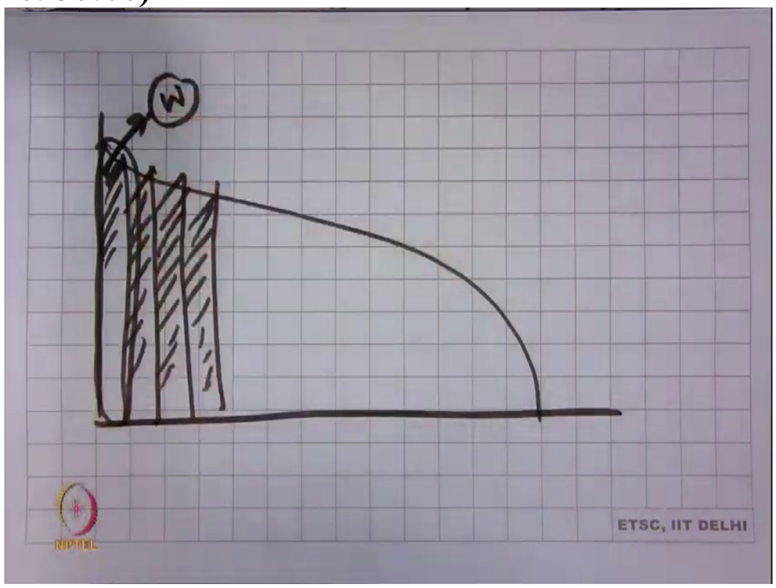

And mean length is so again we can see so suppose this is the fibre in distribution we are trying to group the fibre here. So this is one group we are taking the mass, second group taking the mass, third group. Mean length this is nothing but mean length based on weight. From this group the length group we are taking; so w is the width ok. From there we can calculate the mean length.

So, the length group is w, length group is L, W is the mass of the length group, W1 L1 + W2L2 +W3L3 in this way in this way divided by total width. And upper quartile length is that the one fourth of the fibre by mass longer than that length it is the upper quartile length. Rank first you have to rank in to the groups of so that length are arranged, or arranged between the groups ok. So, this we have already discussed the upper quartile length.

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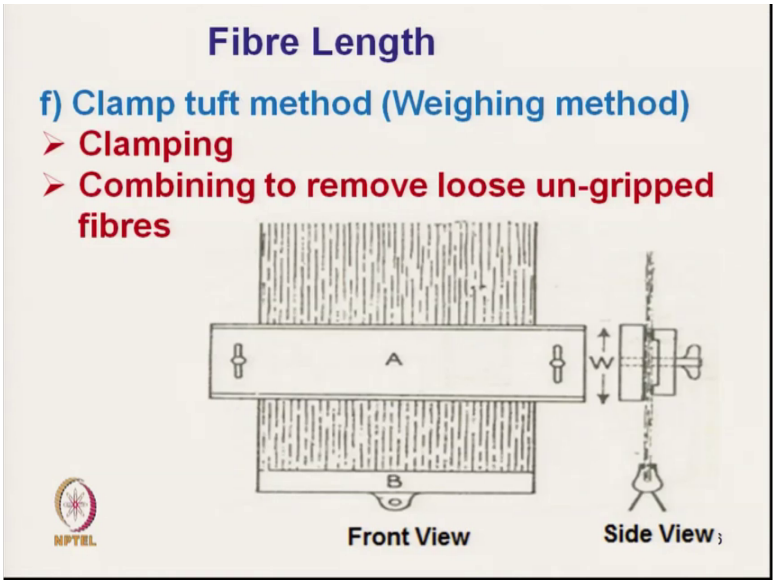

Next principal is that clamp tuft method, it is by weighing principle. Clamp tuft method up basically this is used for sliver or any parallel drop. So if you want to measure the fibres the length of fibre from The Sliver. What will have to do you have to clamp the top first so this is the side view. So here it is the clamped fibres are clubbed with clamp of known width. Here the width of the clamp is W it is known.

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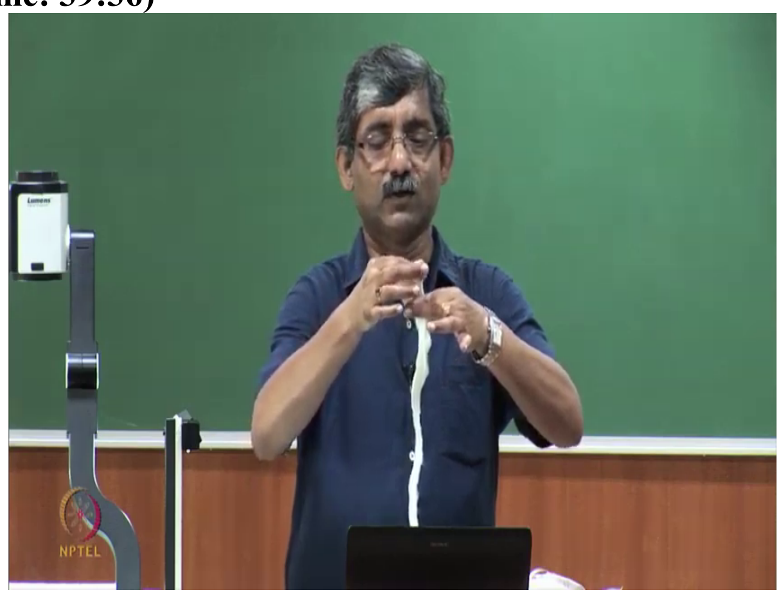

So, after clamping so this is clamped so we are removing their fibres then what we are doing by coming we are trying to remove the loose fibres. So, whatever loose fibres which are not gripped these are removed, by combing it is removed. Now this fibres are it is a total clamped fibre ok. Now after that what we do we can cut the fibre we can cut the fibre from this end which are projector from both the side this side and this side we are cutting the fibre. So, combing to remove the gripped and ungripped fibres.

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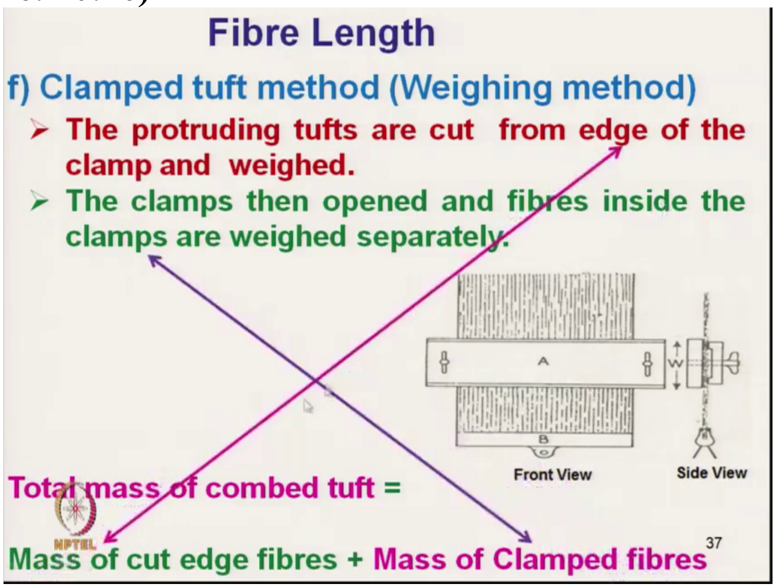

So, these are the fibres gripped, the protruding fibres are cut whatever protruding fibres are cut are kept separately we have to take the mass and weight from both the sides cutting ok. Now then after we are opening the clamp, in the clamp what we will see the fibres of this size rectangular with the parallel length or entrapped here. And that those fibres are weighed separately and clamps then opened and fibres inside the clamp are weighed separately.

So, we have now two masses, so one is the combed fibre masses another is the projected fibre another is the weight of the clamped fibre. Now the total fibre mass under clamped or under combed. If we have added these 2 we get total fibre mass. Now the total mass of combed tuft equal to is that mass of cut tuft that is the cut tuft mass of clamped tuft. This is clamped ok. These are the mass of cut tuft and mass of clamped tuft. Now these are now this is the total mass.

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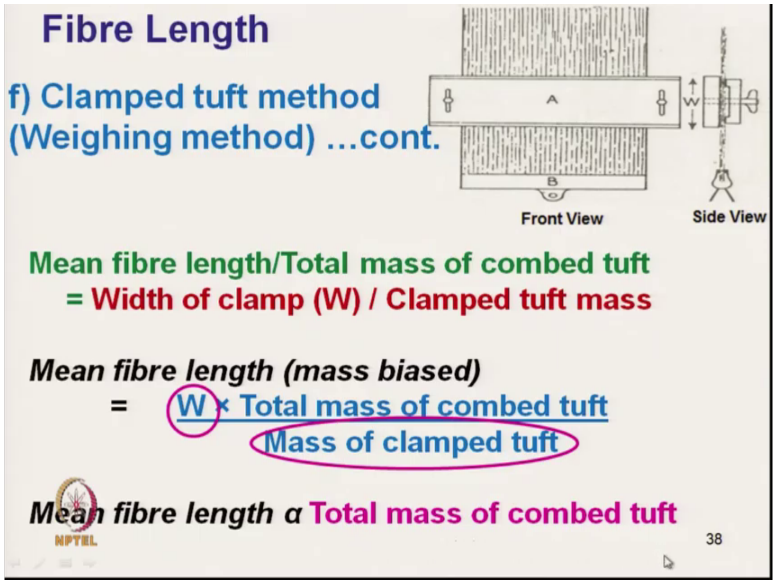

Now the mean fibre length by total mass of clamped tuft that means total mass that is equivalent to mean fibre length it means compare with the width of the clamp by clamp tuft mass. Clamped tuft mass means this is the mass this is the mass of the fibre within the clamp. Here assumptions are that fibres are arranged uniformly ok they are arranged uniformly. So mean fibre length by total mass of combed tuft total mass it is including the clamp ok. So mean fibre length we can calculate.

Using the formula w * total mass of clamped tuft / mass of tuft ok now if the distribution are same distribution of the fibre is same the mass of clamped tuft will be always same irrespective of the length of the fibre. Now you should be very careful here this is important. Now suppose you have two types of fibres.

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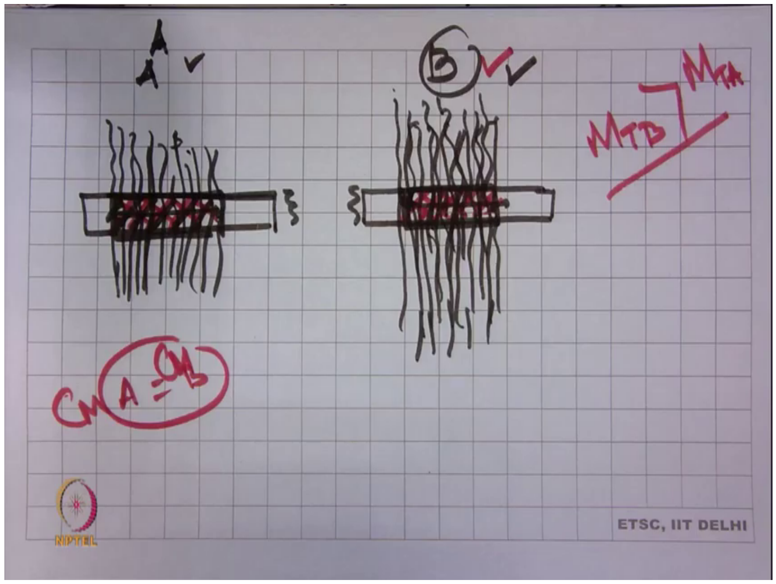

This is the clamp, fibre A, fibre B ok now these fibres are from same source same fibre ok same variety, same fineness. These fibres are actually arranged same fineness with same fashion. Same fibre same fineness arranged in the same density and width is exactly the same now as this width is same and here the fibres are same and now which one is longer apparently B one is longer, A is smaller. Now if you take the; if you cut if you take the only mass of these clamped mass of these two fibres clamped mass.

Only we are trying to only we are interested in clamped mass what will happen with the clamped mass. The clamped mass of the both the fibres A and B will be equal ok clamped mass. Why because they are same fibre. But there this one is longer that means that total mass of B, total mass combed mass will be B is higher than mass total of A, why? Because of its mean length that means total mass is actually proportional to the mean length.

Considering the same fibres their width and everything is same so this will get nullified this is constant approximately so here if you see the mean length is approximately proportional to mass of the combed tuft considering that the clamped mass will be equal if the we are trying to see same pattern.

So, this width is constant for two fibres width of clamped tuft and the mass of clamped tuft if we assume it same I am talking about idea ideally to get concept ok mean fibre length is proportional to combed fibre. And when the mass of clamped tuft to generalize that the it is not possible always to have the same width this not always possible to have exactly same mass of the clamped tuft is not possible so we can have different.

To generalize this thing we are dividing it by the mass of the clamped tuft. That is how we are getting the mass this is the formula Width * total mass of combed tuft by mass of clamped tuft ok this way we will get the mean length of fibre it is called most based length. So mean length is proportional to mass of the combed tuft only on in the case where mass of combed tuft is constant that is the ideal case.

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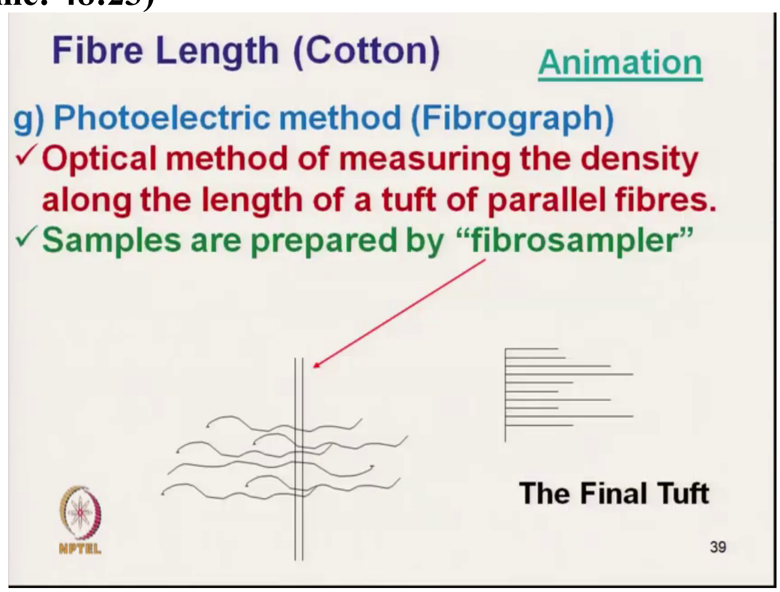

Next is that using the photoelectric method which is done by fibrogram using the fibro sampler, fibre sampler. So, as we have already discussed here it is an optical method of measuring the density along the length of the tuft or parallel fibres. It measures the density number of fibres it measures samples are prepared by fibro sampler. So, fibre sampler is there which actually grips the fibre from randomly from any fibre. So, here in the fibro sampler we try to actually they sample is the length by sample.

Longer length or fibre with longer length are or actually basically will have higher probability to get selected. After that has been explained the final tuft is in form of this type of form and which are absolutely loose form we can see once again this animation.

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This is the principle of fibrogram so this is the clamp and the scanning process is going on the light source, the scanning process is going on and where it shows the number of fibres depending on the density of the fibre it is proportion of number of fibres. Initially it was 100% then it is gradually as the distance increases. The proportion of fibre reduces so we are getting the; this curve which we have seen it is the fibrograph ok.

And then automatically the sensor will get the data and automatically all the parameters will be calculated.

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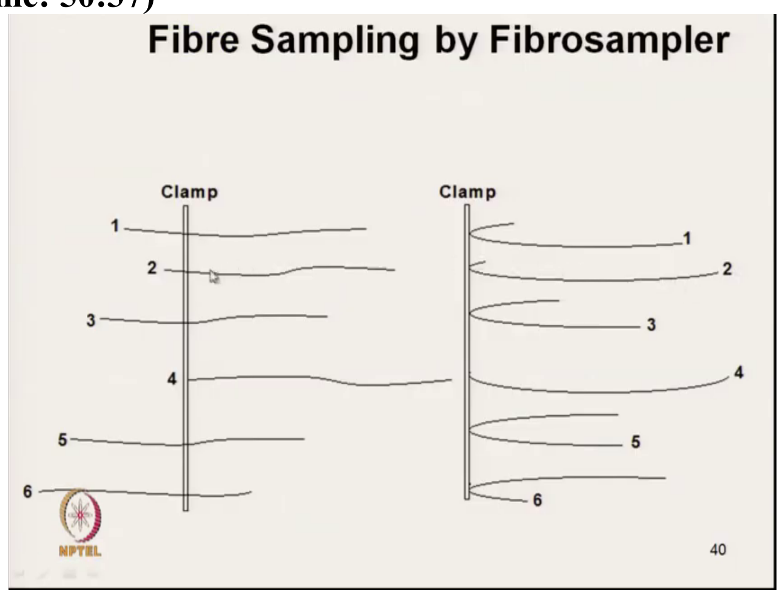

Fibres are clamped here and fibre one then it is getting looped in this way it forms the loop.

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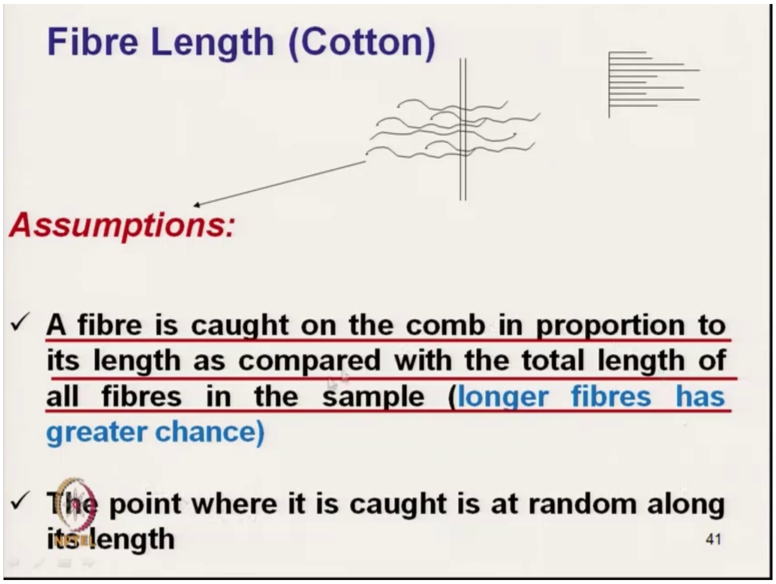

Here there are two assumptions are there, a fibre is caught on the comb in proportion to its length as compared with the total length of all fibres in the sample. The longer fibre has the higher probability. And the point where it is caught it is random along its length. So they will be they can be selected along at any point at random.

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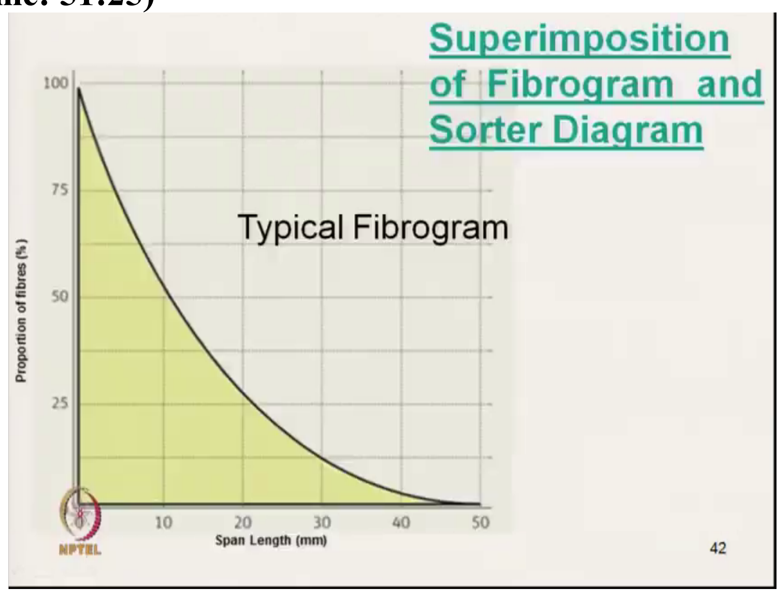

Here it is, this is actually very important to understand if we get the fibrogram is there any relation between the shorter diagram. What is the actual relation can we convert this fibrogram to the shorter diagram. It is totally it is totally different approach we cannot compare the fibrogram with the shorter diagram. So, let us see it will be very easy and if we take one easy example ok. Then we can incorporate complexity. First thing is that let us see.

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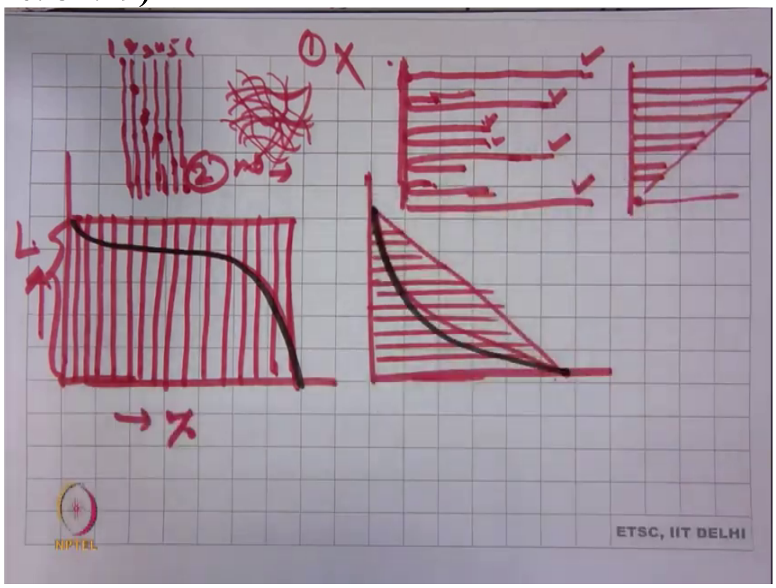

Cut polyester fibre of equal length, all the fibre or of exactly same length, same length of fibres. Now if you try to form shorter diagram. Shorter diagram let us see the shorter diagram. This is the shorter diagram, now if what is the shorter diagram? We have to arrange the fibre based on the length. So, suppose this is the length longest fibre ok. Length and this is the proportion, this is the longest fibre. Second fibre is second length again this will be the next length. Third this will be again this length.

So, what is this? This is the diagram, shorter diagram of polyester fibre of same length. So, this is the cut length where we are arranging the fibre of same length shorter diagram. Now let us try to form fibrogram of polyester. In fibrogram say suppose these are the fibres polyester fibres same length as we have explained earlier. The assumption the first assumption the longer fibre will have higher chance to be selected is not present.

First assumption is not present here we have to concentrate only on the second assumptions what is the second assumption? The fibres are selected randomly at any point. So these are the fibres now this is the clamp. One fibre which is selected so suppose these are the fibres ok I am selecting this fibre, fibre 1, 2, 3, 4, 5, 6 fibres are there fibre 1 is selected from the tip point, there is no end. Fibre2 is selected at the tip point fibre 2 is selected here at this point.

Fibre 3 is selected at this point the midpoint, fibre 4 is selected at this points, fibre 5 is selected here, fibre 6 is selected at this point end point. And if we rearrange this points Based on the length we are rearranging the fibres rearranging the fibres this 2 fibres longest fibres, so we are arranging suppose two fibres it can be 3 fibres also. Next is that these fibres, these two fibres. So these two as been selected these 2 have been selected next these 2.

These two points, next is this 2 ok, next these two has been selected ok, next is this 2 and then smaller some smaller fibres will be there we can see that. Here we will see the curve will be exactly triangular, this is probability wise at any point the fibres can be selected. If we try to draw the fibrogram, the fibrogram will be typically because of at this point there will be fibres like this, at this any point. So, we will see, so this will be shared staple. And in case of cotton the things will be much more complex.

Because they are it got it own variability that is why forgotten this fibre is diagram is like this and here ok if I draw with a black pen this is for cotton shorter diagram for cotton and fibrogram for cotton. It has got its own variability as well as it has randomly selected fibre length variation is there and it has got its own variability plus it is selected randomly and folded that is why it will never reach that is the maximum fibre length it will be less than that much less than that.
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So I am try to see here this is the fibrogram you have to see how to superimpose the fibrogram and shorter diagram for polyester you have seen ok and this is the fibrogram of cotton, X axis is the length direction is shown in red colour and proportion is shown in green colour. But in shorter diagram proportion is in X axis length is in Y axis it is in red colour and this is the shorter diagram. Now if you for the same fibre we are trying to superimpose.

Just to get the idea about the difference between that is fibrogram and shorter diagram now try to see it is the super imposing this is there this is the shorter diagram and this one is there fibrogram for the same fibre. So there is no relationship we cannot get the same parameter from both the end.

(Video End: 1:00:56)

These are totally separate we should not get confused ok. So, we will continue with this segment in the next class till then thank you.