Science of Clothing Comfort
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Lecture - 08
Psychology & Comfort (contd…)

Hello everyone, we will continue with the topic aesthetic comfort, which is actually purely psychological in nature.

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In last class, we have discussed that it is a complex interrelationship between clothing aesthetics and body attributes. So, we have discussed also that through clothing, person always tries to emphasise the positive attributes of the body, and hiding the negative features.

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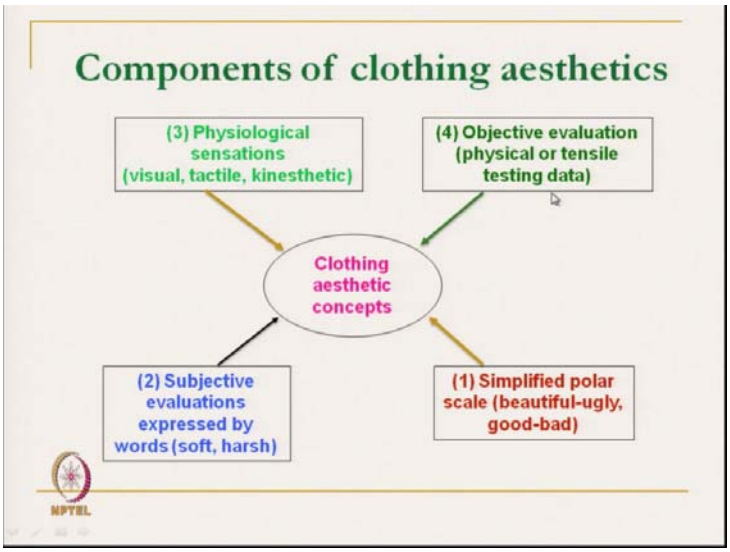

And there are four different components of clothing aesthetic concepts, and these are the simplified polar scale, subjective evaluations expressed by the words, physiological sensations like visual, tactile, and kinaesthetic. So, these are extremely important we will discuss.

So, basically the clothing aesthetics has to be one of 3 physiological sensations either visual or tactile or kinaesthetic. Like visual means it has to be in the term of drape, colour, and design. Tactile means it is touch, it is harsh. And all this physiological sensation, we have to see we can measure objectively. In this segment, we will discuss how to measure this physiological sensation objectively, so that we can get some objective value. So, we will try to see here how to evaluate the aesthetics.

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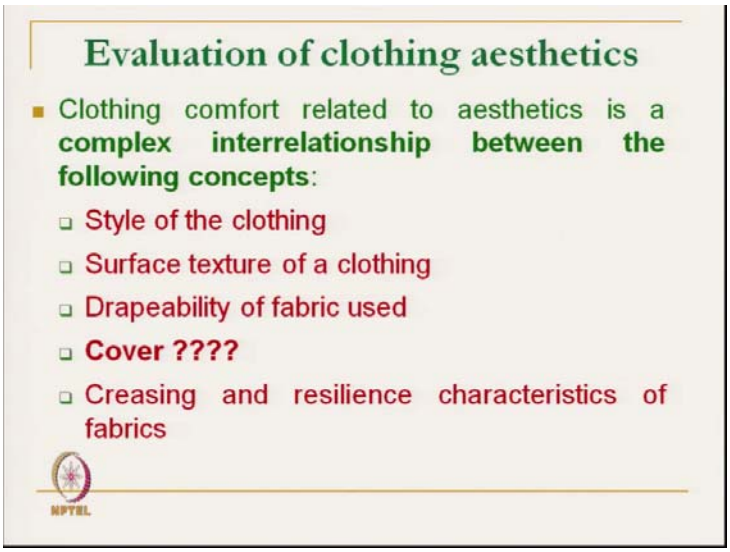

So, measurement of aesthetics is not that simple. Basically aesthetics is a complex interrelationship between the various concepts; these concepts are style of clothing, surface texture of clothing, and drapabilty of clothing. Cover means how the fabric is covered, it is top cover or how actually threads actually covered the total area; that is cover. Creasing, wrinkle, resilience characteristics of fabrics, these are complex interrelationship which gives us aesthetic concepts.

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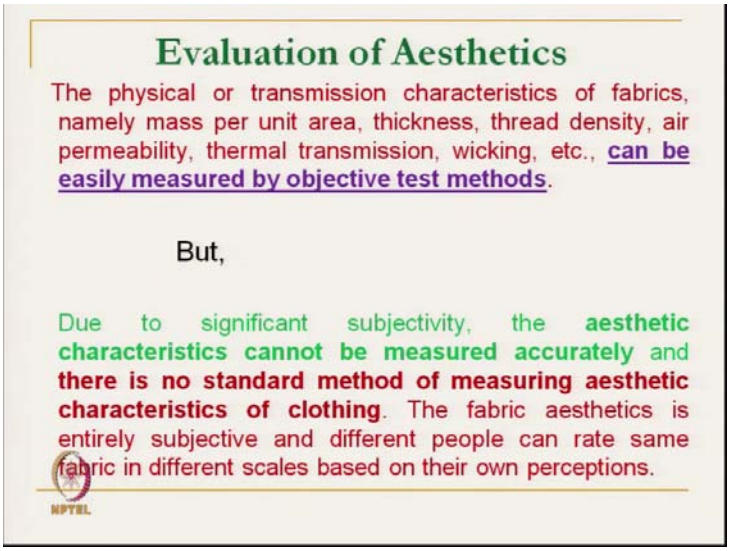

Basically it is very easy to measure the physical characteristics, anyway like mass of the

fabric, there are standard methods of measurement, like air permeability, thermal transmission, so thickness; we can measure very easily by objective method. But it is very difficult to measure the clothing aesthetics because it is totally subjective in nature. Due to its significant subjectivity, the aesthetic characteristics cannot be measured accurately and there is no standard method of measurement of aesthetics of clothing.

So, the fabric aesthetics is entirely subjective and different people will actually evaluate or rate based on his own perception. I may judge fabric; it is aesthetically beautiful, but some other person will actually judge depending on his personal perception. So, that we have also discussed earlier, it is the wearer attitude towards the clothing, that based on his own perception, he judge the clothing.

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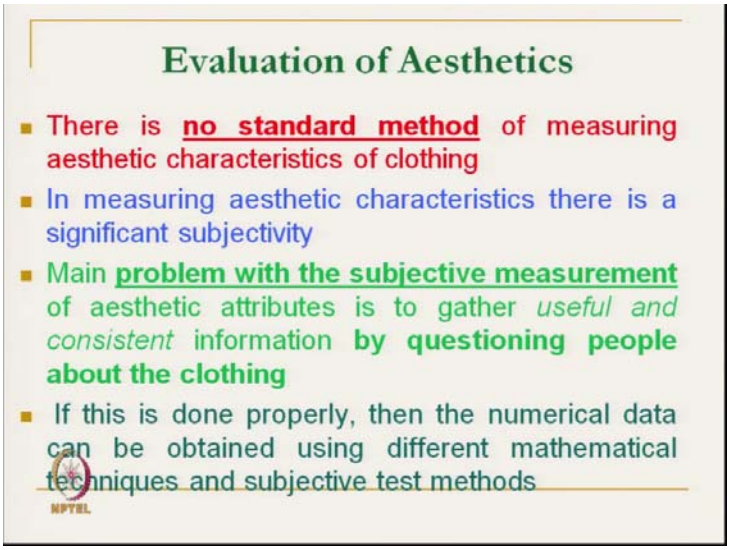

So, there is no standard method of measurement of clothing aesthetics, either we can go for subjective measurement or we have to go for objective measurement, The subjective measure; we can measure it subjectivity but total subjectivity is there. Like colour; colour of clothing, if we try to measure, I may like a particular colour. I can give, it very high rating, but the same colour may be or may not be liked by others. So, it is due to subjectivity, it is very difficult to measure the aesthetics. So, the main problem is subjectivity, so that we can use by proper questioning of the clothing.

If questioning is done properly then numerical data can be for different type of rating scale. From the subjective rating we can use the different statistical technique to get the

value actual value.

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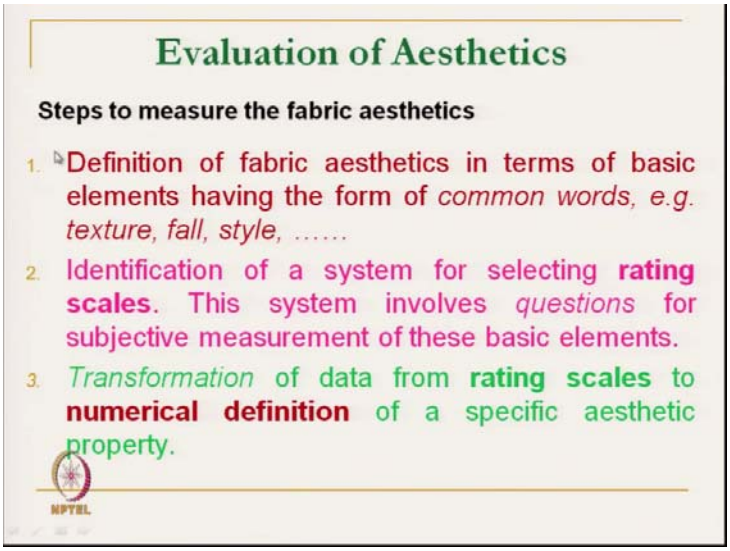

Now, the steps are such that we have to get some subjective rating by common words like texture, fall, and style. So, we can use here the rating scale then we have to transform this rating scale to numerical definition of specific aesthetic property.

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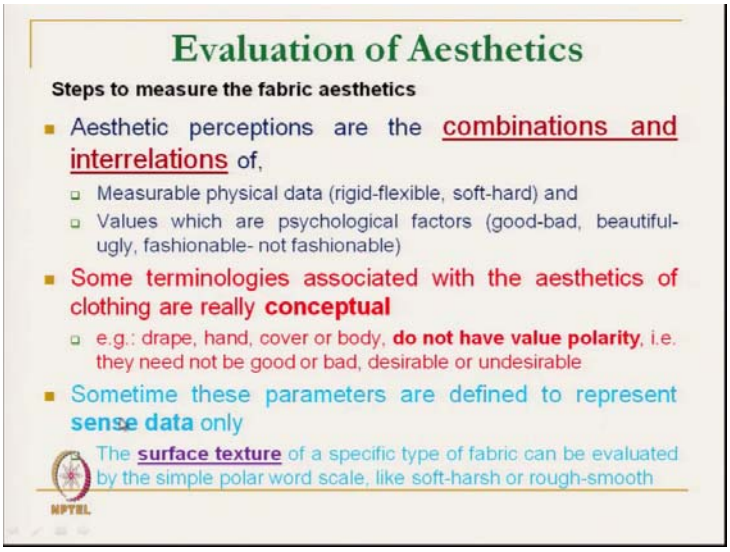

The aesthetic perceptions are the combinations of and interrelationship between measurable physical data; it is a like rigid, flexible, soft. Then values which are psychological values. So, this good or bad, that is beautiful or ugly. So, these are the

interrelationship between this and combination of this data.

Now, some terminologies associated with aesthetic of clothing are conceptual. So, we cannot get the value drape, hand, these are conceptual, the drape of fabric is good. So, this may not be good or bad, it may not have a particular value like higher drape, whether higher drape is good or lower drape is good, that we do not know, that depends on the application.

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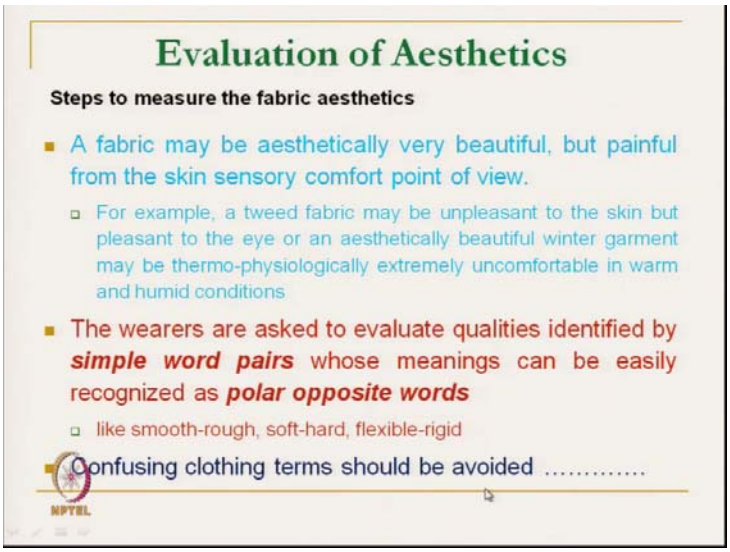

Fabric may be aesthetically very nice, look wise it is very nice but if its surface texture is rough then we may not feel comfortable at least for a particular environmental condition. Like example is tweed coat, it is aesthetically, very pleasant, very nice clothing, it is used for winter garment. But the same clothing in warm condition, it will uncomfortable. So, that tactile sensation is also very important, one of the very important part.

The wearers are asked to evaluate the qualities identified by the simple polar word, just it is a smooth or rough, soft or hard, flexible or rigid. So, this subjective polar words that he has to evaluate. One thing you should be very careful, we have to actually avoid any confusing word, confusing term.

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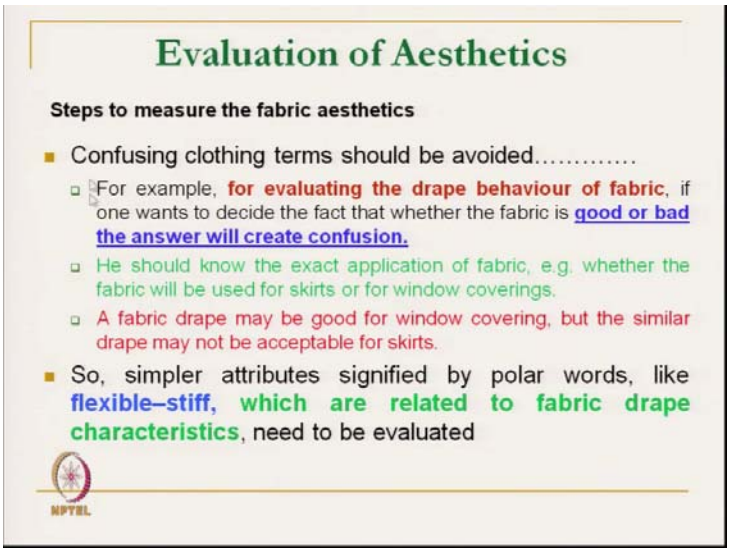

Like confusing term is for example, for evaluating drape of a fabric, if one wants to decide the fabric whether it is a good or bad. So, if we give the polar term like good or bad, and we have asked the wearer to evaluate or person to evaluate drape as good or bad, sometime it creates confusion, because drape cannot be good or bad. Although it is a visual appearance to give a fabric a good or bad rating in terms of drape, we should first know the application.

Like for a skirt, a fabric for which drape may be good but the same fabric if you use for curtain maybe bad. So, this type of confusing term we have to avoid or, say like if we want to have drape, if we want to know the drape characters for so, simpler terms we have to use polar term we can use to have the drape. So, we do not use the good or bad, we have to use whether fabric is a soft, stiff or flexible.

So, designing the parameter, attributes; it is very important, which are related to fabric. So, flexible or stiff is a related to drape characteristics. So, for evaluating the drape we should not use good or bad rather we should use flexible or stiff.

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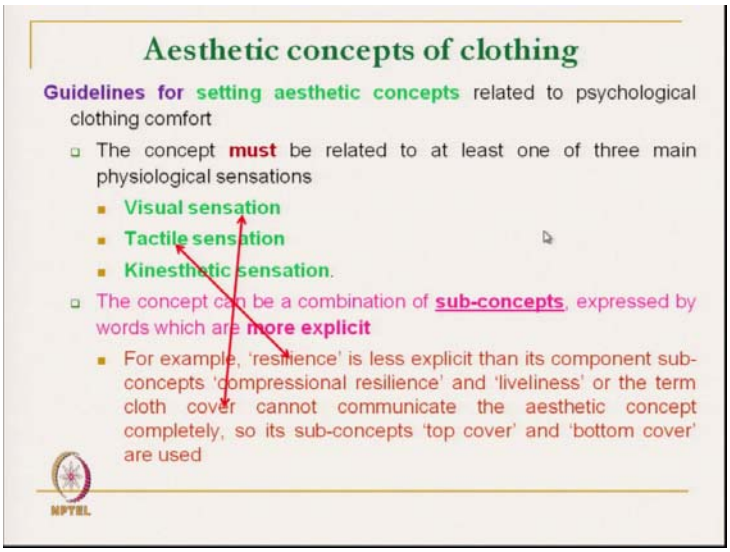

So, these are the basic guidelines; to set the aesthetic concept it must contain one of the 3 physiological sensations. One is visual sensation, tactile sensation and kinaesthetic sensation. The concept can be a combination of sub concepts also expressed by the word which are most explicit.

For example, resilience, if we want to know the resilience as far as the aesthetic concept is concerned, resilience we should know; what type of resilience, resilience means basically after deformation, it should comeback. So, whether it is a compressional resilience or it is a bending resilience that we should actually very carefully design. Otherwise the measurement will not be perfect.

Like, tactile sensation, if you want to measure whether should we go for compressional resilience. So, its resilience is directly related with the tactile sensation. So, one of the 3 physiological sensation should be there for aesthetic compound. We will see that somewhere it will be related with this. Similarly, the cloth cover is a visual sensation whether fabric looks at full or it is an open structure so that gives a visual sensation. So, one of the 3 this type of sensation should be there.

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Now, we will discuss how to measure this aesthetic concepts objectively so that we can get a particular value or measurement. Now, most commonly used aesthetic concepts are cover of the fabric, drape of the fabric, body of the fabric, style of the fabric, surface texture and resilience. So, all these 7 aspects, we will try to see, how to convert these aesthetic aspect, psychological aspect to objectively measure parameters.

So, we will see one by one, how cover can be measured objectively, drape can be measured. So, we will discuss. First we will start with the cover.

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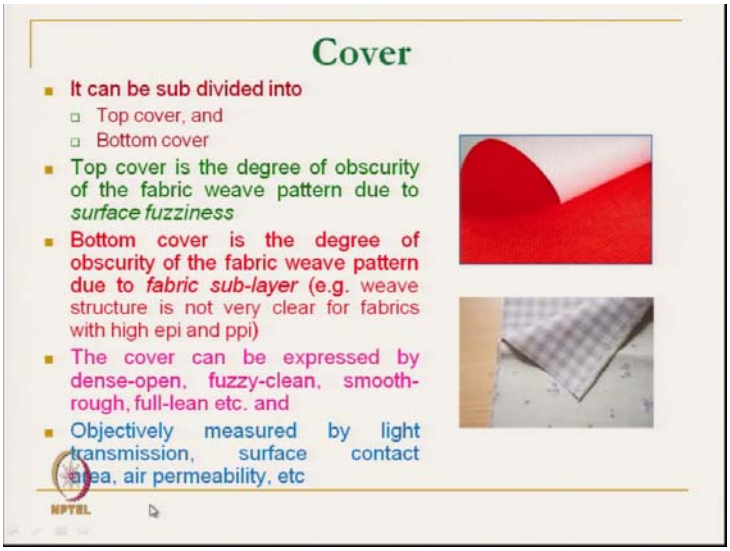

What is cover? Cover, we can subdivide into two terms, one is top cover and bottom cover. What is top cover? If we take a cloth, so how surface fibres, surface yarns are actually covering the total area that is called top cover, and bottom cover is actual presence of the yarn at bottom of the surface.

Now, one example, I will give you, like we can get one fabric with very open structure cotton fabric, that means, it does not have any bottom and top cover, it is a simple cover. Now, open structure fabric, but after that we start brushing, what will happen? Loose fibres will start covering the total structure, we will not be able to see the structure at all that means top cover of fabric is good. If you see the backside which is not actually brushed, it is open structure, the bottom cover is open.

Similarly, there are different types of velvet; velvet if you see the top cover, top cover velvet is very nice, very aesthetically nice. Bottom cover we do not bother, bottom may be anything. So, that is how it is a basically cover; top cover is the degree of obscurity of the fabric weave pattern due to surface fuzziness. Whatever the fabric weave pattern, it is covering the fuzzy fibres or loose fibres are covering, it is called top cover and the bottom cover is the degree of obscurity of the fabric weave pattern, due to the sub layer due to the presence of yarn. Like weave structure is not very clear for the fabric with high EPI, PPI. If you have higher EPI, PPI that means, you will get the very good bottom cover.

And so how to measure objectively cover, these are subjective, it is a aesthetic aspects, now we can have a fabric top cover it is a good it is a complete but it is a very difficult to express. But objectively how can you measure? The cover can be expressed by dense-open, fuzzy-clean, smooth-rough, full-lean. These are the subjective term,

Now, can we measure this cover objective by the help of instrument? Yes, if we measure the light transmission, we will get the idea of the cover, how much light it is allowing to pass. By air permeability, if two fabrics are there, one's air permeability is high, higher air permeability means its cover is good indirectly. Like surface contact, if we measure contact area we can get the idea of the cover. So, objectively we can measure this psychological or aesthetic parameter; these are the subjective measurement and that we are converting the cover to actually objective measurements.

Now coming to the drape; drape is a subjective, although drape coefficient can be

measured or drape coefficient is already established objective measurement.

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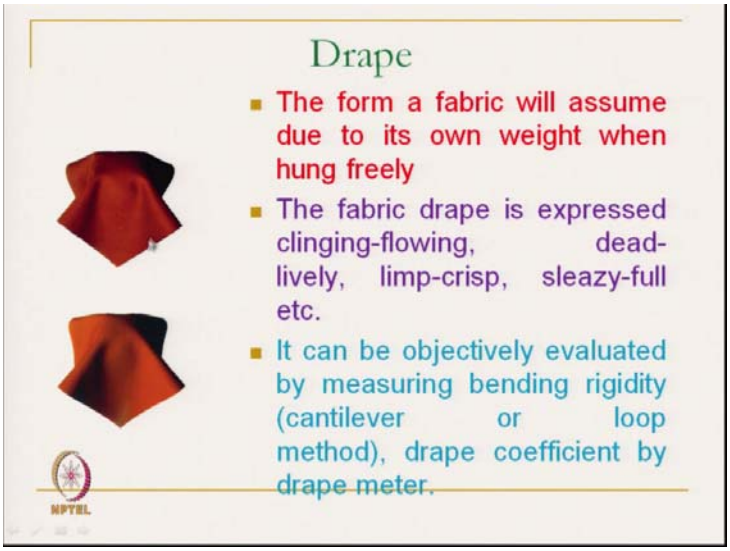

Now, what is drape? Drape is the fall of clothing, it is basically form, a fabric will assume due to its own mass when it is hanging freely. It may be pleasant, it is may be nice drape.

So, drape, subjectively can be expressed as clinging or flowing. It is way fabric is flowing. Dead or live; it is live, it nicely drapes or it is very stiff, it is dead that way can be expressed. Crisp or limp; fabric is very crispy or it limps. So, there are different term, but these are all subjective term. It is very difficult to evaluate them. Although we can judge using some rating scale.

But, can we measure the drape objectively? Yes, it can be objectively evaluated by measuring bending rigidity. We can measure bending rigidity to evaluate whether it is a clinging or flowing by cantilever or loop method. If we measure the bending rigidity we will get, or drape coefficient by drape meter. So, that way we can get the drape value, objectively we can measure the drape. Fabric, if it is stiff one so it will give high rigidity.

So, what is the cantilever method? Cantilever very hardly stiffness tester, we can measure, use the Shirley stiffness tester and even loop, hard loop, different types of loop method we can use.

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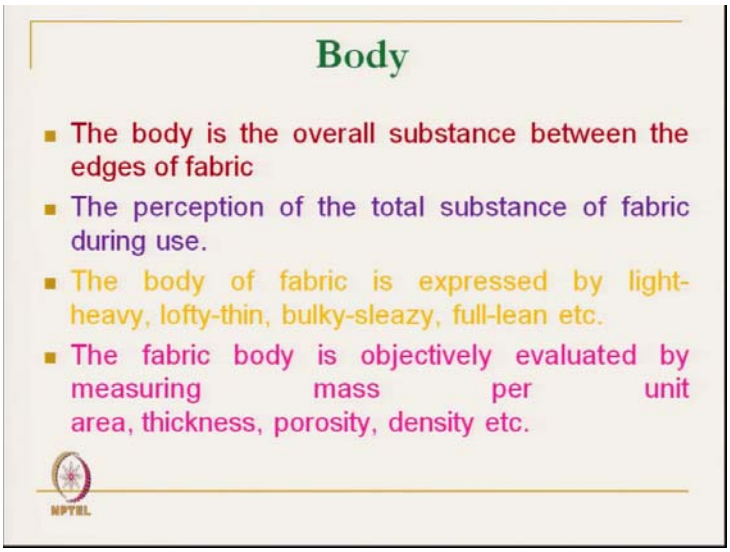

Next one is the body, what is body of the clothing? The body is the overall substance of the clothing of the fabric between two cell edges, what is the total substance of the clothing. So, thus clothing, its body is a very nice. So, the perception of total substance of fabric during use. So, body wise we can say, the body of the fabric expressed by light or heavy; the fabric is light it is a body, what it is a heavy. Lofty or thin; this is the body the material content it is a body. Bulky or sleazy that, it is a body of the clothing. Full or lean, these are the subjective aesthetic term used.

So, these aesthetic terms are to express, but to quantify, we have to use the objective technique. So, objectively we can measure this body of the clothing by evaluating the mass per unit area. If we measure the mass per unit area then we know the quantity of the material, it is a light or heavy, we can measure the mass per unit area or we can measure the thickness, whether it is a bulky, thickness measurement or porosity measurement. So, if it is open structure or body of the fabric t is not very complete, it is not compact. So, porosity or density you can get. So, this subjective terms we can convert, we can measure in objective way, these are the measurable quantity.

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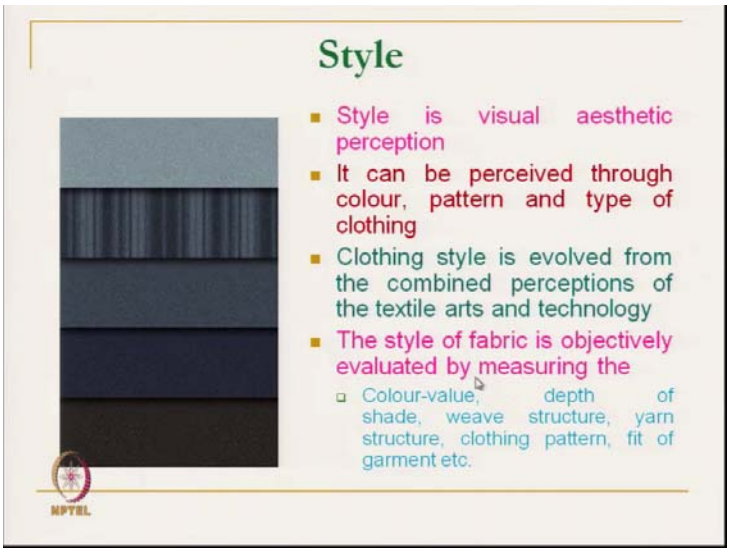

Next is the style of clothing. So, what is that? So, this style is very nice, this is totally subjective, aesthetically, aesthetic perception, this is actually totally visual aesthetics. Now, the style can be perceived through colour, pattern or type of clothing. So, this style of clothing is very nice that means whether it is colour, it is nice or its pattern is nice. So, this colour pattern are type of clothing, whether it is perfectly fit. So, all these things are related to style. So, clothing style is evolved from the combination of combined perceptions of the textile arts and technology. So, this art and technology if you combine then it comes the style. So, this is objectively measured by colour value.

Suppose these two fabric; the style, if we see this one gives the lighter colour, and this is darker. That style wise, if we see it is a lighter, and this is darker, but subjectively we cannot evaluate, we cannot tell, this only gives the lighter shade and darker shade. But objectively if we measure the colour value, what is the depth of the shade then we can compare this style. These two actually reproduce this value, we cannot use subjective value. What is the reference? For that we have to measure the colour value.

If we can give someone this colour value you measure. So, then produce then one can objectively measure. Or, subjectively what we have to do? We have to match the shade if we match the shade then colour value, we can observe. Then depth of the shade, so depth of the shade you can control. So, colour value depth of the shade. Weave structure, now this fabric, the style depends on the weave structure like it is a denim. Denim fabric with

twill structure gives us some aesthetic appeal, but if we change the weave structure like plain denim keeping everything same; colour, same ends per inch, picks per inch everything same, if we simply change the weave structure. What will happen? We will have totally different aesthetics.

So, we can measure the weave structure objectively. So, two fabrics, it gives different aesthetic attributes, but if we see its colour is same, everything is same, but it gives different attributes. So, simply by changing the weave structure, it gives different style, and aesthetic appeal. So, by changing, by knowing the weave structure; so weave structure measurement of weave structure is very important.

One example, like if we want to increase the lustre of the clothing. So, I want to brighter lustrous clothing. So, keeping everything same; yarn colour, if we change say from plain to satin. So, total aesthetic appeal will change, basically its look will change. If we measure the weave structure, it is a measurable quantity, if we measure the weave structure then we can say this fabric with say denim with twill structure gives very good aesthetic appeal.

But if we use denim with say satin, it will give total awkward. On the other hand if we use for bed sheet or for some other application, we normally use satin weave, in place of it, if we use say twill weave in bed sheet, it will give us totally different aesthetic appeal. So, by measuring the weave structure, so we can get the aesthetic appeal of a fabric.

Similarly yarn structure, say if we change the yarn structure little bit, it will give us totally different aesthetic appeal. If we change the yarn twist, what will happen? If we change the yarn twist, it will give us random reflection, light will start diffraction. What will happen? The cloth will look little bit dull, and if we keep on reducing the twist the fibres will be parallel and then it will give the regular reflection and increasing the twist will give irregular reflection.

So, brightness of cloth can be actually controlled by changing the yarn structure. Similarly if we see the compact yarn and normal ring yarn, style wise compact yarn gives better aesthetic appeal. Why? Because compact yarn, we can use lower level of twist. Lower level of twist and also compact yarn got has got less airiness. So, it actually regular light reflection takes place. So, compact yarn gives better aesthetic comfort aesthetic appeal, and on the other hand ring spun yarn gives poor appeal.

Similarly if we use friction spun DREF yarn, it has got random surface yarn or surface fibre which gives irregular reflection and dull look. So, depending on our requirement we can select the clothing; select the yarn structure. So, suppose a particular application where we need dull look, like in denim if it is bright, it may not be aesthetically appealing. We need, in denim, it is a little bit dull look. So, there we can use yarn structure with random fibre arrangement. Even Dref friction spun yarn can be used there.

Clothing patterns is whether it is a plain shade, it is a solid shade or it is a stripe, if it is stripe what is the colour combination, if it is particular colour combination, what is the repeat size, all these things changes there. So, whether it is a broad stripe, whether it is a fine stripe, whether it is a check, so what are the different colour combination in the check, everything gives the different types of aesthetic appeal. Aesthetic appeal this clothing pattern, we can easily actually measure objectively by measuring the weave pattern. Weave pattern means the colour pattern.

How many say it is a red and white colour is there red. If whether it is a stripe or check, if it is stripe say we are using say 10 red, 10 white, it will give a particular type of the appeal. So, if we change the ratio say 2 red 20 white, all together, it will give the totally different aesthetic aspect. But objectively, it is very easy to measure and subjectively we can say it is a good appeal, it is very nice clothing. Then immediately from the subjective rating we can measure the clothing pattern.

Similarly, suppose we want to have check. So, for the check pattern we have to use both warp wise colour pattern and weft path wise colour pattern. And if we change keeping ratio of threads constant, if we simply change the colour, it will give us totally different aesthetic appeal.

Similarly, next is the fit of garment. The particular garment, if we change the size, it will give a totally different aesthetic aspects. In market, we all have experienced. Suppose for me it is say 40 size, it is as per Indian standard it is a 40 size, it is perfect. If I wear say it large size or if I wear extra-large size. So, total aesthetics will change so, total aesthetics will totally change. So, fabric fit, we can a measure by measuring the size. How to measure the garment fit, we will discuss in other segment. This is actually objectively measured.

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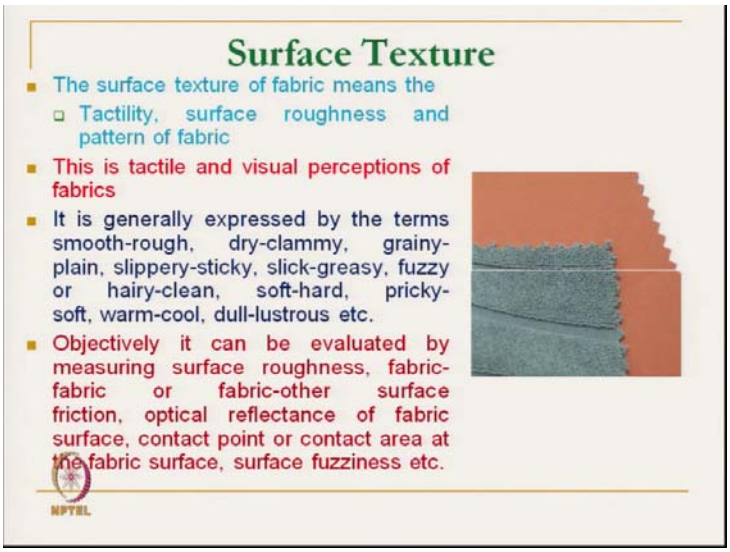

Then surface texture; we simply say texture is very nice, it is a subjective, it is a smooth, it is a harsh, it is a rough. These are the some tactile sensation; it means tactility, surface roughness and pattern of clothing. This is tactile and visual perception of a clothing.

And generally this surface texture we expressed in terms of some subjective term like smooth, rough, dry, clammy, grainy plain. So, slippery, sticky these are the various terms we use for expressing the surface texture, soft, hard. So, these are the surface texture of the clothing. But this surface texture, we can measure objectively, by objective methods and this is done by surface roughness.

So, by Kawabata evaluations, textile we can measure the surface roughness, how rough is the surface, how smooth is the surface, roughness that we can measure then we will discuss somewhere. And there are other parameters that we can measure. Measuring the surface friction, we can measure the surface roughness. Which will give you as slippery or sticky that can be measured by the surface friction. Surface friction maybe fabric to fabric surface friction or fabric to any other surface, any other like fabric to maybe metal. So, that will give the surface friction, frictional characteristics.

Also we can measure the optical reflectance of a fabric surface. By optical reflectance we can get the idea of the above surface, whether the reflection is a regular reflection or whether it is an irregular reflection. So, that reflectance of a surface, we can measure and objectively that will give us the surface characteristics whether it is a nice, dull or

lustrous. So, dull or lustrous characteristics we can measure by optical reflectance.

And then it comes the contact point, or contact area. So, number of contact point we can also measure with other surface. This contact point will give us different pricky sensation. If the contact point is high number of contact points are there, it sometime gives pricky sensation, or one cool touch. We will discuss in other segment, one cool touch depends on the number of contact points. If the contact point is very high, air contact area then it will give us the cool touch. So, and then the surface fuzzy fibres we can measure the fuzziness of fibre. So, number of fibres present on the surface that we can also measure by some objective technique. So, this will give us the surface fuzzy or airy or clean structure that can be measured by surface fuzziness objectively.

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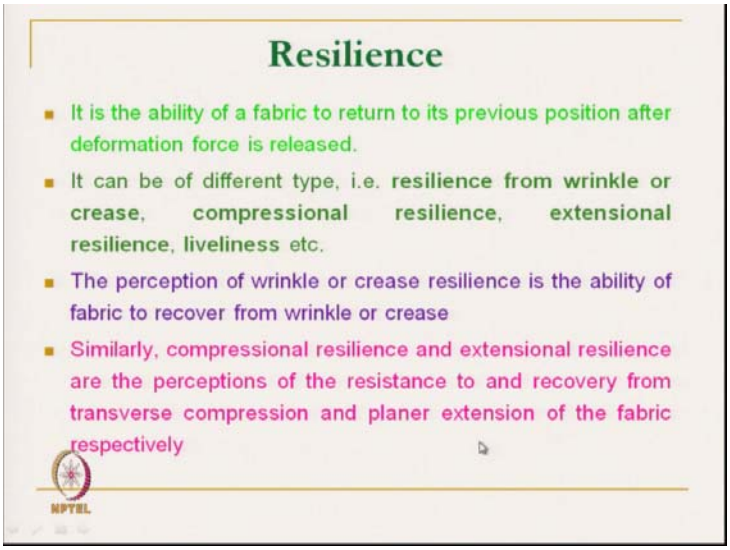

Then, resilience is in terms of how it comes back from deformation. Like wrinkle or crease, the fabric decreases its wrinkles that means, its resilience is poor, and similarly, compressional resilience is poor so it will give total deformation. Extensional resilience, is very important, we feel some fabric after using it, sometime bags, like it is a very common experience, in knee or in some elbow we sometime feel that fabric got actually extended, its bulge out. Resilience extensional resilience is poor, so liveliness, it comes back.

So, all these resilience characteristics gives some aesthetic appeal. So, the perception of wrinkle or crease. Resilience is the ability of fabric to recover from the wrinkle or crease.

So how to measure? So, it can be measured by the wrinkle recovery, crease resilience testing or compressional resilience that we can measure. So, we can get all these resilience related characteristics. So, this can be measured. it is the ability of the fabric to return from the previous position after deformation.

So, thank you. So, we will end this session of psychological comfort. Next we will start the neurophysiological comfort aspects.

Thank you.