Textile Product Design and Development
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Lecture – 3
Customer Need

In this lecture, we are going to discuss the customer needs. It is important to find out what the customer wants in a product because we must develop a product concept before manufacturing it. So, we always start with the product concept.

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What is meant by product concept? A product concept is the indication of the form, function, features, and specifications of a product. All these aspects are combined to make a product concept. Once the concept is finalized, the product will be manufactured.

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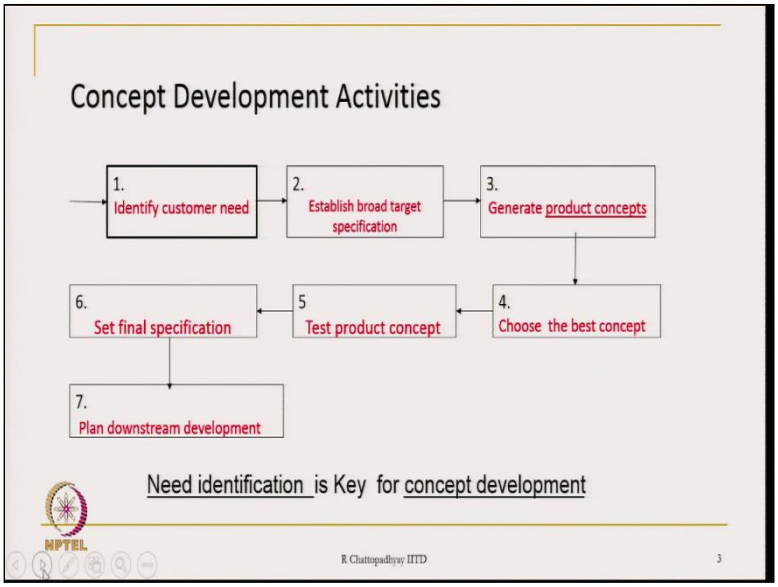

A set of activities must be followed to develop the right concept. The first step is the identification of customer needs, followed by establishing broad target specifications, which is the second step. The third step is to generate product concepts, which means that once the broad specification is ready for the product, we can start thinking about the different concepts and generate multiple concepts. Each member of the team can create their own concept. If there are three or four team members in a team, we get three or four different concepts. After generating these concepts, the next step is to choose the best one from the proposed concepts. We cannot work on all four concepts together, so we need to finally choose one single concept. We will discuss how to decide which concept is the best. Through brainstorming exercises, a design team finally arrives at choosing the right concept.

Once a particular concept is chosen, the design parameters are fixed and finalized. The next step is to test the product concept, which involves creating a model or prototype and testing it in laboratory conditions. Based on these results, we may need to go for small modifications of the concept or specifications. Finally, specifications for the product will be decided. Initially, a prototype is created and tested in a laboratory setup to evaluate its performance. Depending upon the results, modifications might be made to either product concepts or specifications if required. After that, the final specifications are set, and they are locked. The finalized design and specifications will go to the next stage of downstream development. These are the various steps of concept development. It all begins with the need for identification, which is the key to concept development.

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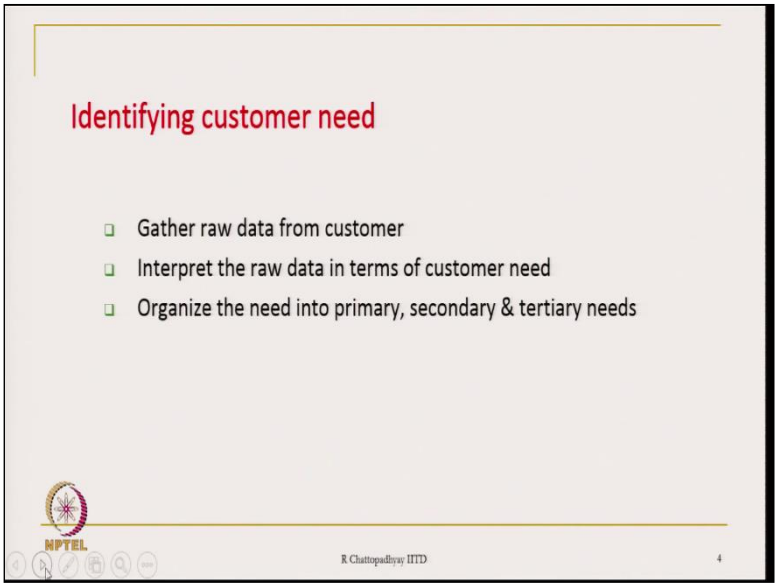

How do we identify the customer's needs? what procedure should we follow to find out what exactly the customer wants? We design a product for the market where customers are. We need to offer something that meets their needs. If we create a product that customers do not want, it will not sell in the market. Any commercial enterprise will not really venture out to develop a product that customers might not accept. Hence, we must offer something that the customers want. For this, the first step is to gather raw data from the customers and interpret the raw data to understand their needs. Customers are usually not technical experts; they express their needs in their own terms. It is the job of the design team to transform this language of the customer into a product need.

The next step is to organize the needs into primary, secondary, and tertiary needs. There can be many different needs, and there may be secondary or tertiary needs. It is also important to establish the relative importance of needs because this will give the designer some flexibility in the design. It might happen that it is not possible to meet all the needs due to constraints such as production limitations, raw material availability, or cost. Therefore, we need to determine which needs are essential to fulfil and which can be postponed. For this purpose, we must understand the relative importance of these needs.

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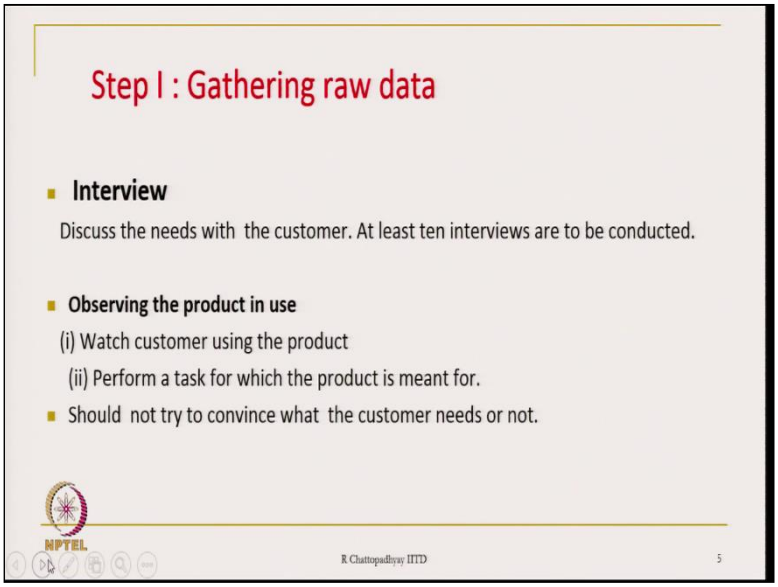

The first step was gathering raw data from the customers. One of the methods to get this is through interviews. This involves reaching out to the customers and discussing their needs with them. To get a good understanding of their needs, at least 10 interviews are to be conducted. Everyone may not agree to the interview; people may refuse. To get a clear idea of various needs, you should interview at least 10 customers and gather their feedback. Another method is to observe the product in use, which means visiting the places where the product is in use and observing how the user interacts with it. With this, one can identify any issues or customer needs.

For example, if we are designing a uniform for firefighters, we can interview them to learn about the positive and negative attributes of their current uniform. Additionally, we can ask them to perform specific tasks while wearing the uniform and observe how it performs in real-life conditions. This observation helps in gathering information. We can take photographs or video recordings of the activities and then analyze these recordings later to see how uniforms stretch while performing various activities. This information is valuable for designing a better uniform. In some cases, it might also be useful for a design team member to perform the tasks to gain a better understanding of the product requirements.

To gain personal experience with the product, a designer might use the product themselves and perform relevant activities to understand its utility and its effectiveness. Another guideline is that during the interview, it is important not to influence the customer's

response or suggest their need. We should keep in mind that interactions are usually verbal or in the form of a question-answer session. We can design a question sheet for customers to fill out or conduct verbal interviews to understand their needs.

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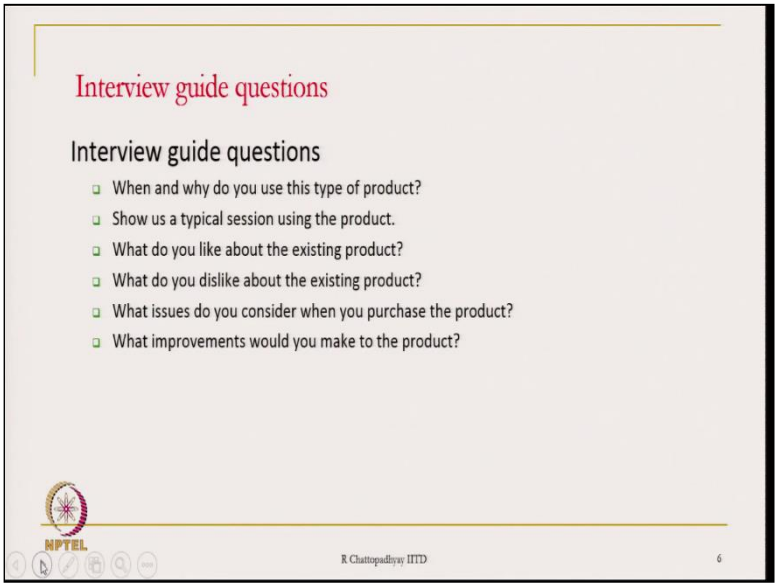

While conducting an interview session, the following questions can be asked of the customers, depending on the nature of the product. When and why do you use this type of product? Can you show us a typical session using the product? Next is, what do you like about the existing product? what do you dislike about the existing product, and what issues do you consider when you purchase the product? What factors influenced your choice when deciding to pick a particular product? Was it the cost, colour, the feel of the product, or something else?

If you had options from different companies like '*A*', '*B*', and '*C*', what made you choose a product from a specific company or brand? This question helps us understand the key drivers behind the purchasing decision. The other questions could be: what improvements would you make to the product? If you had the freedom to make changes, what improvements in the product would you suggest? These are some of the typical questions that can be posed to the customer.

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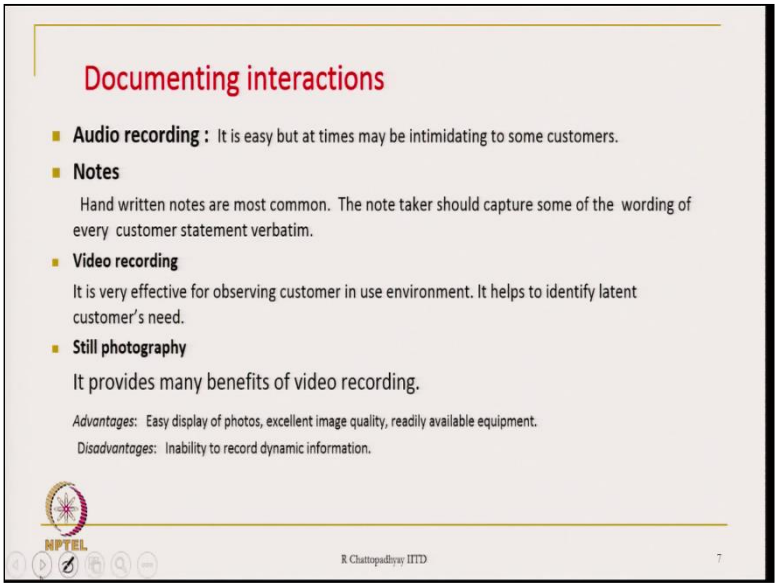

Documentation of the interactions: One way of executing the process is through audio recording. With today's technology, you can easily record conversations using a mobile phone. However, keep in mind that some customers might find recording intimidating or uncomfortable. We must assess which customers are comfortable with recording their conversations and be mindful that some people may not like it. Always respect their preferences before recording. Another method is taking notes. Handwritten notes are commonly used during conversations, where a colleague can note down the customer's responses.

Another way is video recording. The entire session can be video recorded if that is permitted. Because that will be very effective for observing the customer in the user environment, and it helps to identify the latent customer's need. Another method is photography. These are the ways we can document the interaction sessions. Any of these methods, such as still photography, audio recording, video recording, or handwritten notes, are based on what works best for your situation and the preferences of your customers.

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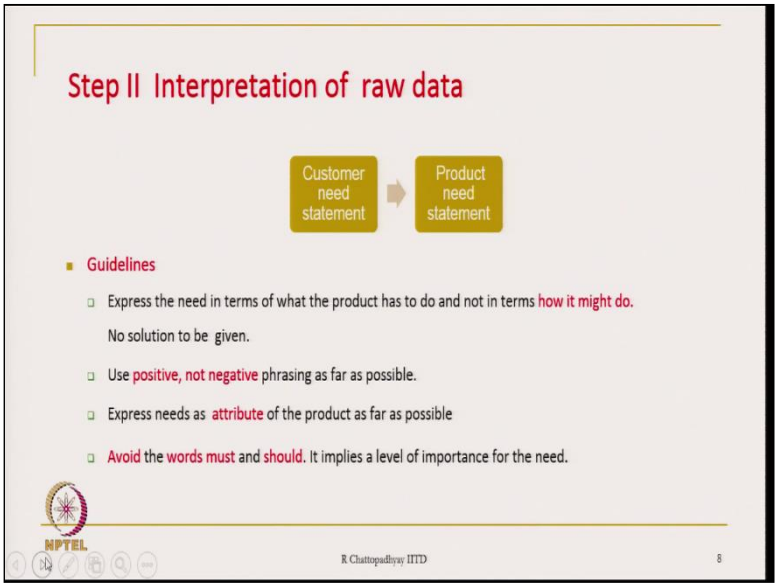

The next step, which is most important, is an interpretation of raw data. As mentioned earlier, customers are not technical experts, while the design team comprises qualified designers. The design team needs to translate the customer's needs statement into the product needs statement. This is a very interesting and important work to be accomplished. The key guideline is to express the needs in terms of the numerical value of the expected properties. Statement solutions should not be included and should be left to the designer. The product needs statement should use positive phrasing rather than negative phrasing wherever possible.

When framing the sentence, words like "no" or "not" must be avoided. Instead, the needs are expressed as attributes of the product. Additionally, avoid using words like "must" and "should," as it implies the level of importance of the need. If it is not possible to avoid it in some cases, we use it when necessary.

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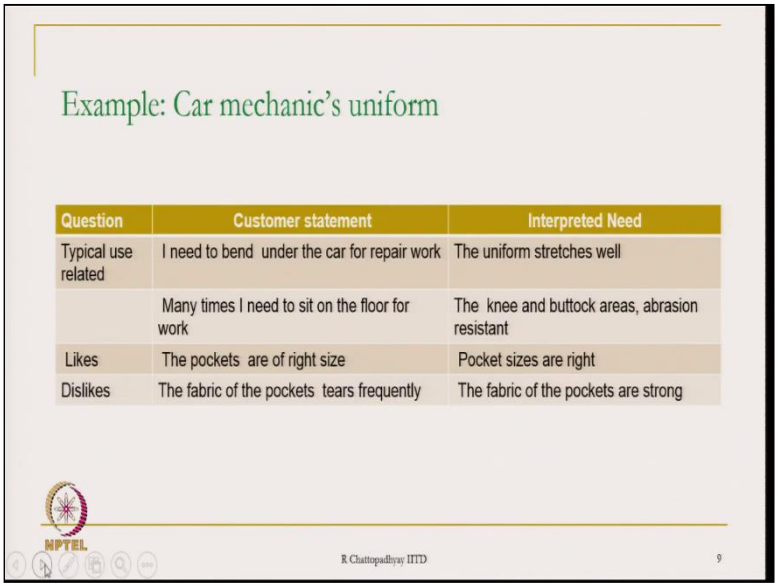

For example, a designer develops a car mechanics uniform. We are all aware of the working environment of a car mechanic. In this case, what type of question should be posed to the customer? In this example, the typical statement the customer gives is "I need to bend under the car for repair work", indicating that in wearing condition, he has to bend often. Hence, the interpretation of the need would be that because of this posture, the uniform should stretch well. The uniform should have stretching capability because the person has to bend frequently. It is not like a person is sitting on a chair and writing. Every profession has a specific activity, and depending upon the nature of the activity, the uniform should be designed accordingly.

For example, a doctor's activity is different from a mechanic and a person working in a mine. Different people in different professions engage in various activities. For example, another statement is, "Many times, I need to sit on the floor for repair work". Hence, the interpreted need would be for the knee, and the buttock areas of the garment should be abrasion resistant. When a mechanic sits on a floor or crouches during work, the areas of the uniform that contact rough surfaces, like the knees and buttocks, should be abrasion resistant to prevent wear and tear.

If the mechanic mentions that "the pockets are of the right size", indicating that the current pocket design meets his needs. So, based on his feedback, we should interpret the need as "pocket sizes are right", and if he mentions that "the fabric of the pockets frequently tears", it indicates a problem. He often uses the pockets to carry small, metallic tools like

screwdrivers that he needs for his work and, therefore, the fabric tears. So, the interpreted need would be that "the fabrics of the pocket are strong". In this way, the need for the product is stated based on the statements made by the customers. There can be many statements from customers, and they should be translated into specific product needs.

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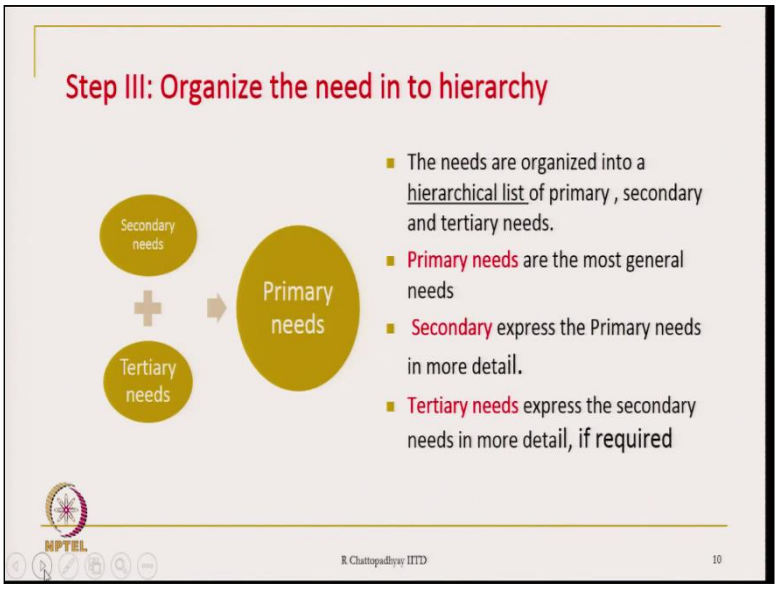

The next part is to organize the needs into a hierarchy. Primary needs are the broad: essential requirements are described in simple terms. Secondary needs express the primary needs in more specific detail. Primary needs are broad needs, whereas secondary needs express the primary needs in more detail. Tertiary needs are further narrowed down in detail, focusing on specific elements of secondary needs. Although secondary and tertiary needs provide more detailed insights, they are not necessarily less important than primary needs.

The categorization into primary, secondary, and tertiary needs is not based on importance. Primary needs represent broad, general requirements. When these broad needs are expanded, they become secondary needs. If further detail is required, those secondary needs can be expanded into tertiary needs.

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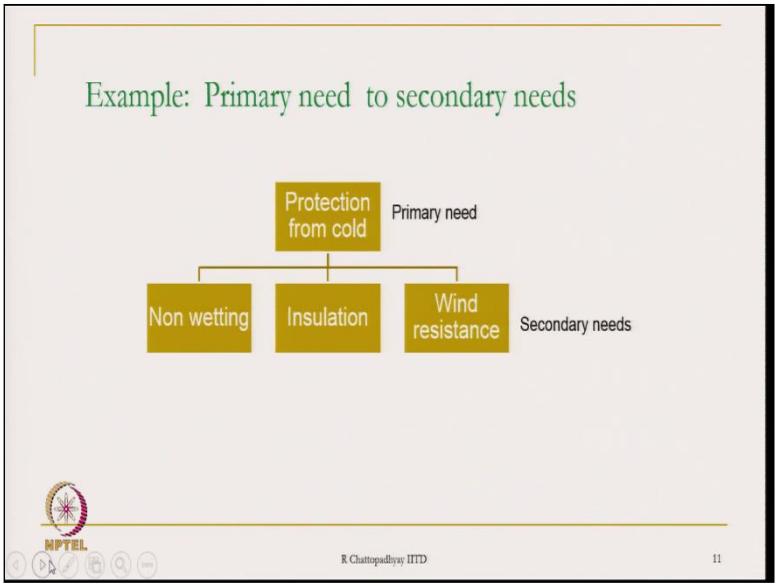

In this example, the primary need of a customer is "protection from cold", which is the requirement of a winter jacket. The secondary need could be non-wetting. Because if the jacket is wet, the insulation values reduce, so heat conductivity increases. The jacket needs to have adequate insulation. The jacket should also be designed to prevent wind from penetrating the fabric, i.e., it should be wind resistant. So, the detailing of the primary needs are non-wetting, insulation, and wind resistance.

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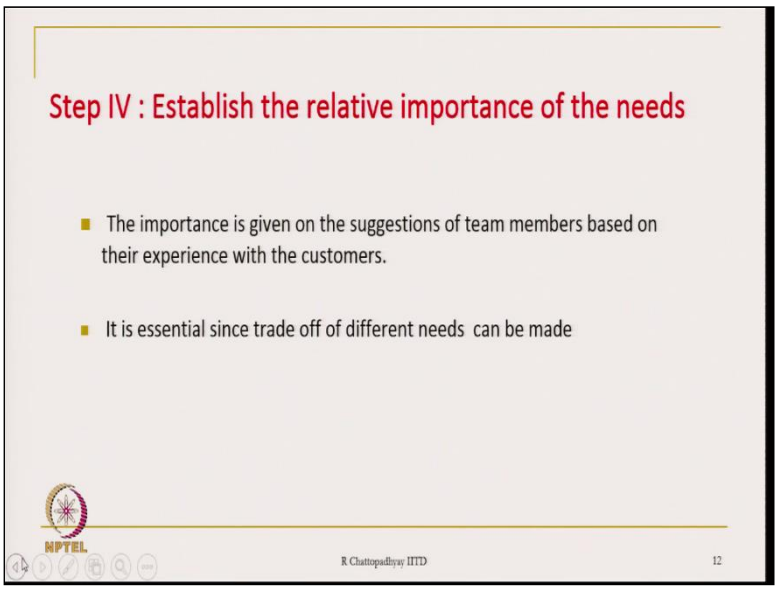

Establishing the relative importance of the needs is a crucial step in product development. This helps prioritize which needs must be addressed first and which can be given less focus. It is based on the suggestions of marketing team members based on the customer

feedback because they are always in touch with the customers. When there are many needs, numerical values are assigned to quantify the importance of the need to be fulfilled first. All the needs cannot be fulfilled to the extent of the customer wish. We may go for a trade-off of different needs, keeping the cost in consideration. The purchasing power of the customers also must be taken into consideration. Customers may like something, and if those features are included in the product, then the product price increases. Therefore, trade-offs are required in many situations.

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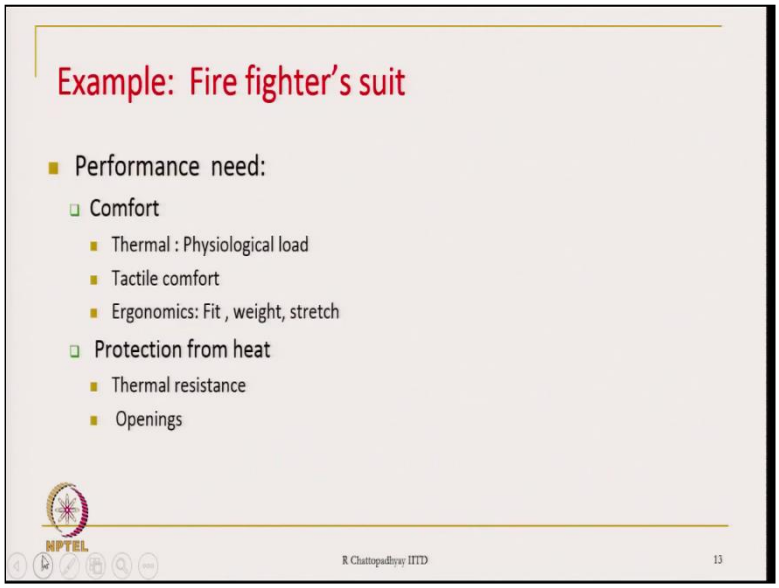

In an example of the performance needs of a firefighter suit: comfort is the primary need, and the secondary needs are thermal-related physiological load and tactile comfort, i.e., feeling about the product with the skin. Tactile comfort is related to the sensation we get when we touch a product because most textile products remain in contact with the human body. Therefore, tactile comfort is also most important. The other is the ergonomics part, which is also a part of comfort.

The fit, weight, stretch, and bulkiness attributes of the fabric are part of ergonomics. If the product fit is not well, or the weight is too heavy or bulky, the person may not feel comfortable. All these aspects are secondary, and the primary need is comfort. Similarly, another primary need is protection from heat. The secondary need is thermal resistance and the openings in the garment. A firefighter suit is not a single fabric; it is a product of a multilayer ensemble. Therefore, the openings are also important because heat may easily pass to the human body from the environment.

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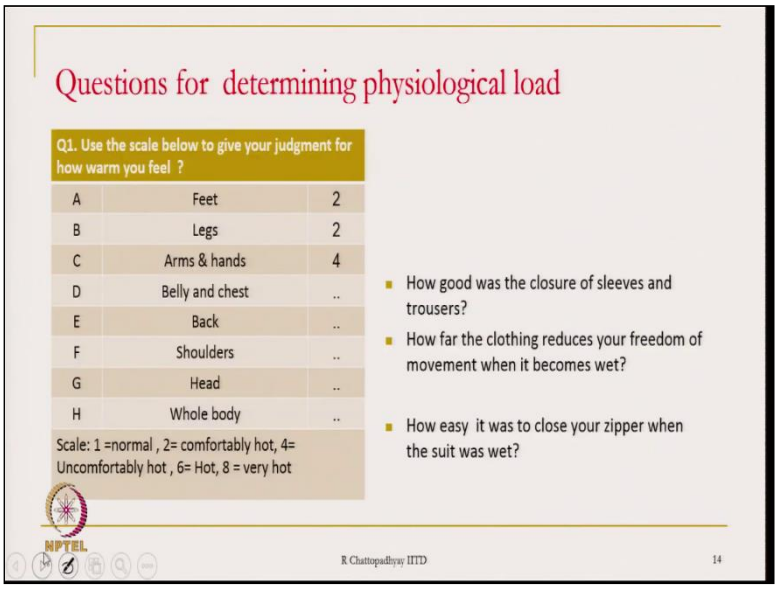

Another example question for determining the physiological load. Question: Use the scale below to judge how warm you feel. In a firefighter suit, the level of discomfort felt after wearing the temperature sensation at different parts of the body, whether it is suffocation or not; all these aspects are considered. For example, when we write questions about how much sensation gets from the point of view of heat at different body parts. Here, scale one means normal; two means comfortably hot; four means uncomfortably hot; six means hot, and eight means very hot.

Different parts of the human body, such as feet, legs and arms and their values are quoted on the right-hand side. These are the arbitrary values given in the table. While carrying out the need analysis, these questions are asked, and the performance of the existing garment can be found. Questions also can be, “How sweaty do you find your palms or feet?”. This is because there is a lot of thermal load and people may start sweating. After some time, sweat accumulates inside the body. The sweat liquid wets the garment and reduces the insulation. Besides this, the wetness sensation also causes discomfort to the wearer.

If the garment is wet and it is in contact with the skin gives a kind of sensation of discomfort. It is because internal sweating causes the garments to stick to the skin, which causes discomfort. So, tactile comfort is also very crucial.

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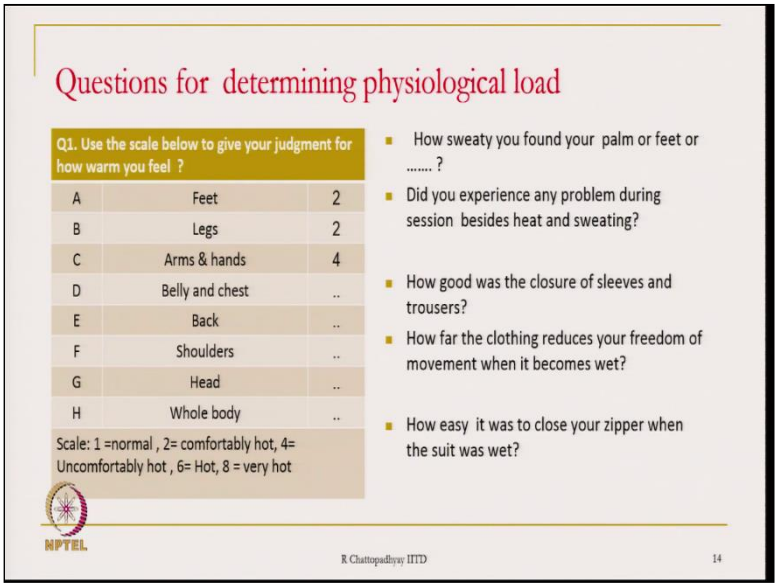

Typical questions could be to use the scale below to give your judgment of how warm you feel. There is an arbitrary scale that starts from one to eight or ten. It represents one, which means normal; two, which means comfortably hot; and at most, eight, which means very hot. The person may be asked to rate the feeling of hotness at the feet, legs, arms, back, or shoulders on a scale of one to ten, and data will be collected. These data are analysed to determine whether any deficiency exists from the thermal insulation point of view.

The other questions could be: how sweaty did you find your palm? Did you experience any problems during the session besides heat and sweating? i.e., in terms of body movement, whether there was difficulty in running, bending, twisting, or jumping because a firefighter is going to do all sorts of body postures. This is related to how clothing reduces the freedom of movement while working in very tense situations with a lot of stress in such conditions or situations where the person is working. Therefore, freedom of movement is very important, and clothing should not create difficulty in terms of movement.

The next question is how easy it was to close your zipper when the suit was wet because they use a hose to douse the flame. In the case of firefighting scenarios, water is poured into different parts of the building. Hence, there is a chance that the garment could be wet, and water is a good conductor of heat. These situations must be kept in mind because there are different ways through which the uniform may lose its insulation value. It may get

internally wet or through external ways as well. So, such questions can be raised to find out the performance of the existing uniform.

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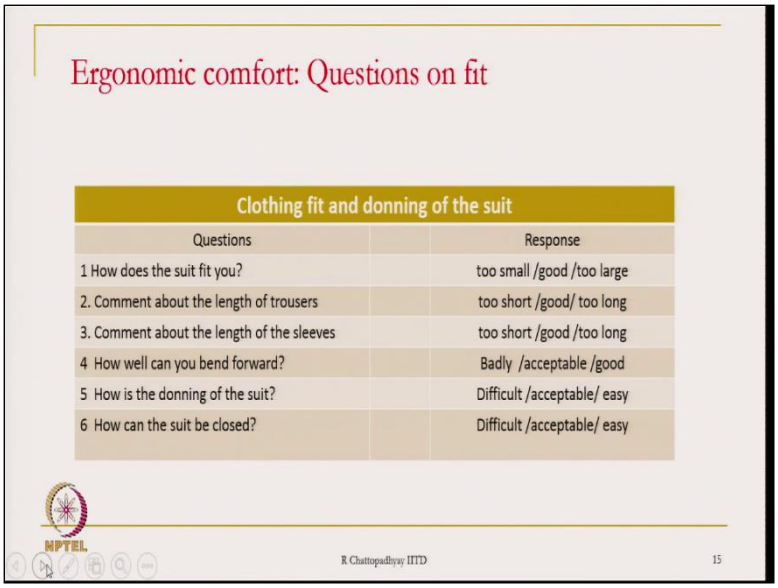

Following are the questions related to fit. As an example, how does the suit fit you? The responses, such as too small/good/too large, are already stated, and the people may be asked to tick their preferences. So, a different set of questions are stated. How well can you bend forward? The response state here is badly/acceptable/good. The person should tick their preferred answer. Similarly, different questions must be designed, and responses of may or may not be should be given. The design team should have the capacity to frame such questions and extract useful information from the customers.

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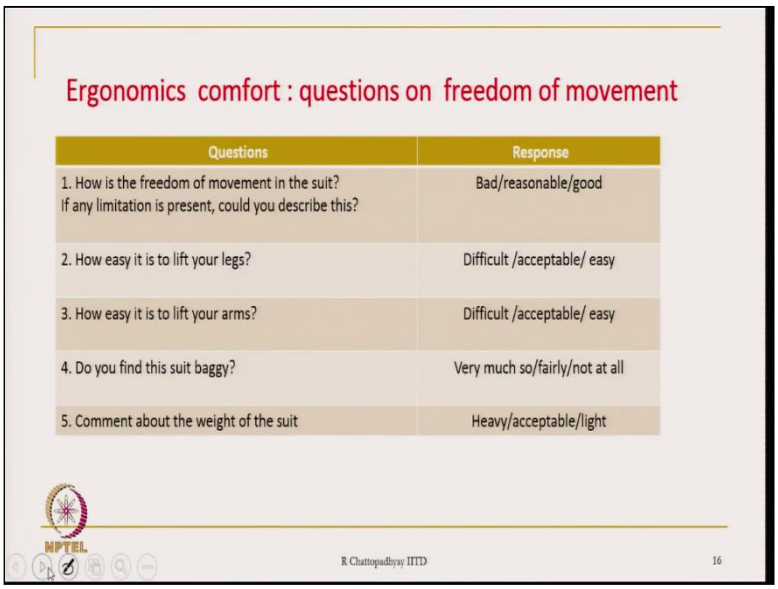

The following are the questions related to ergonomic comfort. How is the freedom of movement in the suit? If any limitation is present, could you describe this? How easy is it to lift your legs? How is it to lift your arms? Do you find the suit too baggy, which means it is difficult to manage or comment on the suit's weight? So, this kind of question can be framed, and either we write the response or ask the customer to fill in the response. The convenient format is chosen. In this session, we learnt about the needs and requirements of the customers.

Once the customer needs statements are fixed, the next step is to convert them into product need statements, followed by the design process. The next step is the specification development. Thank you.