Structural Reliability
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Lecture –136
Component Reliability - Time Defined (Part - 15)

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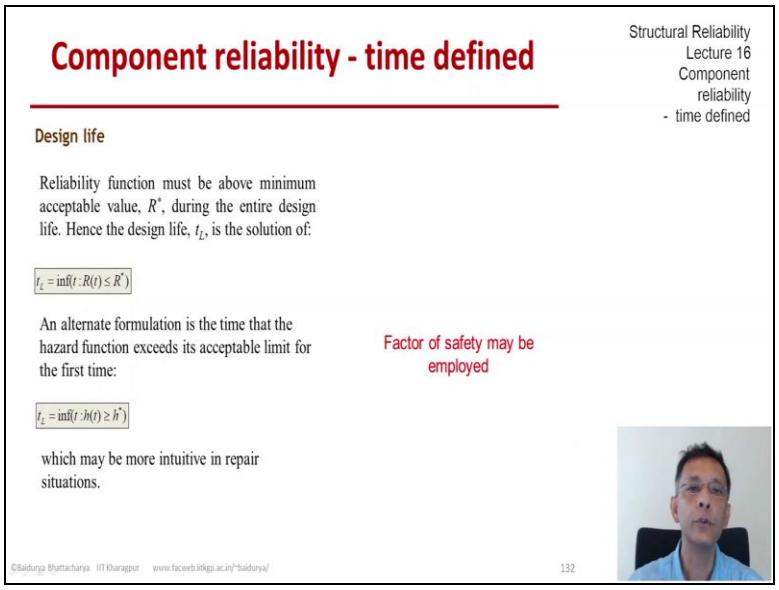

Now how can we use the reliability function or the hazard function in taking decisions regarding the design life of the item in equation? So, we have done one or two examples with this sort of question. So, let us now formalize that. So, we can state that the reliability function must be above the minimum acceptable value R star during the entire service life. So, that would clearly give us the design life.

How we get the minimum acceptable value is obviously a very different question it is a separate question it is a quite a large subject in itself but and we are going to discuss that towards the end of this course. But if we know what R star is then we have a very logical method of coming up with the design life. So, that would be the time at which the reliability first falls r star obviously our function can never go up.

So, we are talking about cases where it can stay constant. So, that is how we define the design

life in terms of acceptable reliability we can took an alternate approach and brings in the hazard function. So, as I have said before the reliability function is kind of an aggregate report on the item performance but the hazard function is more local investigation on how it performs. So, we can specify a maximum acceptable hazard function.

And so as soon as the hazard function exceeds that value that maximum acceptable value we specify that time we identify that time as the design life for acceptable service life. So, we could likewise we can derive the value of h star from various considerations and be able to specify the design life. And this can be more intuitive in certain situations especially when you have an in-service structure and you need to make sure that it never becomes more unsafe than acceptable.

And obviously time to the acceptable design life or service life defined this way you can divide that by a factor of safety and that is the sort of approach that is taken in the so-called safe life approach. So, you could factor it down to an acceptable level.