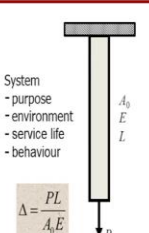


Structural Reliability
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Lecture –252
Target Reliabilities and General Conclusions (Part - 05)

(Refer Slide Time: 00:27)

Recap: The course in one slide



System
 - purpose
 - environment
 - service life
 - behaviour

$$\Delta = \frac{PL}{A_v E}$$

Displacement limit state:
 $\{\text{Failure}\} = PL / A_v E > \Delta_{\max}$


$$P_f = P[PL / A_v E > \Delta_{\max}]$$

- Want to build or assess the system
 - System properties (A, E, L)
 - Input (P)
 - Response (Δ)
 - System (I/O) model: $\Delta = f(P; A, E, \dots)$
 - System capacity: Δ_{\max} (one sided), or $[\Delta^*, \Delta^*]$ (two sided)
- Failure
 - Response exceeds capacity
 - Multiple performance requirements?
- Presence of uncertainties
 - input, properties
 - inaccurate models
 - missed/unknown modes of failure
 - Non-zero probability of failure
- Compute probability of failure
 - Is it acceptably low? If not, redesign?
 - (What is acceptable?)
 - Is the solution economical?
- Can I standardize this process?

Structural Reliability
 Lecture 36
 Target reliabilities
 and general
 conclusions

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With this we have reached the end of our course I hope you enjoyed it as much as I did teaching. This is our course in one slide that we have kept coming back to. So, now we; are going to see how far we have covered whether we covered everything that we wanted to and let's walk backwards. So the last thing that we did was what is acceptable. So what is an acceptable failure probability what are target reliabilities and why we needed that because the failure probability must be acceptably low if not we have to redesign?

So, that is why before that we introduced design standards design codes and obviously the idea of economy was implicit in all of that we before that we spent a good amount of time in learning how to compute probabilities of failure in for various components systems and so on. And to do that we needed to define failures we spent a good amount of time doing that limit states capacity demand and so on and so forth.

We looked at presence of uncertainties in terms of random variables in terms of random processes and so on. And then we also looked at some of the time dependent aspects so I am happy to see that we were able to cover most of the things that we set out to do and as I said it was really a great learning process for me and I hope you enjoyed it as well.

(Refer Slide Time: 02:41)

The slide is titled "Acknowledgements" in red text at the top center. In the top right corner, it says "Structural Reliability Lecture 36 Target reliabilities and general conclusions". The slide lists the following:

- Teaching assistants:
 - Sourangshu Ghosh
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A small video inset in the bottom right corner shows a man with glasses and a blue shirt. The number "61" is visible in the bottom right corner of the slide.

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