AE 737 - Mechanics of Damage Tolerance

Lecture 14

Dr. Nicholas Smith

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Wichita State University, Department of Aerospace Engineering

- 10 Mar - Exam return, Final Project discussion, Project abstract assigned
- 22 Mar - Stress based fatigue, Homework 6 assigned
- 24 Mar - Stress based fatigue
- 29 Mar - Influence of notches on fatigue, Homework 7 assigned, Homework 6 due
- 31 Mar - Strain based fatigue, project abstract due

1. exam

2. final project

EXAM

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- High score: 96 (1 student, 3 had 95)

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- Curve for this exam: Adjusted score = 0.735 (original score) + 30.15
- New average: 89.2, new std dev: 11.6
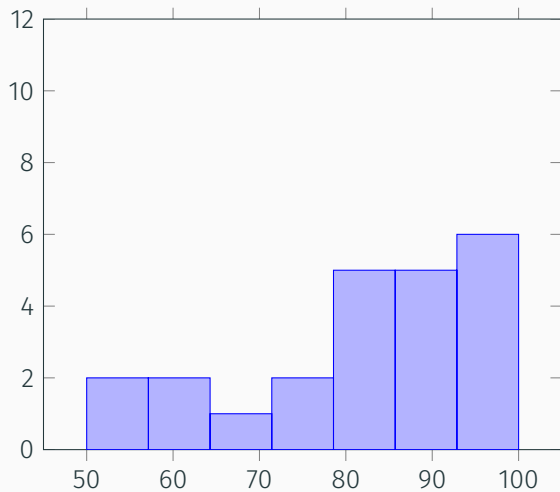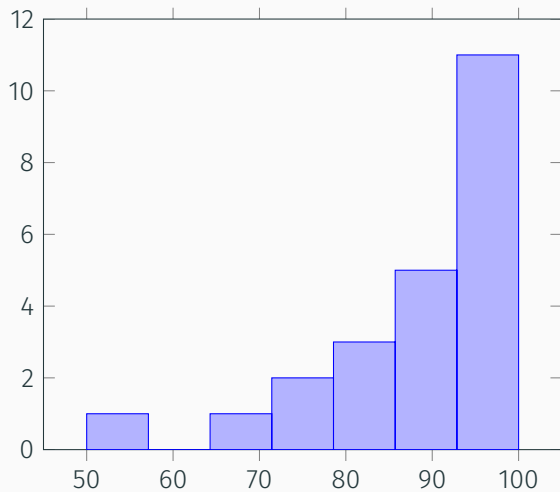
on board

FINAL PROJECT

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GENERAL DESCRIPTION

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- Should demonstrate your understanding of the course as a whole
- Choose any real object
- Needs to undergo some cyclic loading (for fatigue)
- Materials, loads, and any other "given" data can be made up

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- Estimate residual strength (use a "typical" crack length)
- Estimate crack growth and propagation (fatigue)
- Suggest reasonable inspection cycle for safe use
- Suggest an improvement to make part more damage tolerant

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- 20% for damage tolerant improvement

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    - residual strength
    - fatigue (x2, growth and propagation)
    - inspection cycle
- 20% for damage tolerant improvement
- 25% general presentation, organization, and grammar

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- I will give you feedback on how to tweak your proposed idea to better meet project purpose
- Abstract submission should be 1-2 pages
- Briefly describe your chosen part, how it undergoes cyclic loading, what location you intend to consider for the stress intensity factor.
- This is like a proposal: convince me that your idea has what it takes to be a great final project

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- Clearly state your assumptions and justify them (i.e. if you assume plane strain conditions, justify that by showing how thick your part is)

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- Clearly state your assumptions and justify them (i.e. if you assume plane strain conditions, justify that by showing how thick your part is)
- Although will not have experimental or FE analysis specific to your part, use concepts from other data in the text (stiffeners, multiple site damage) in a qualitative manner

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- This will interest them in the rest of your paper