1.050 Engineering Mechanics

Lecture 13:
Strength models
Strength models for beams (I/II)

1.050 - Content overview

I. Dimensional analysis

1. On monsters, mice and mushrooms

2. Similarity relations: Important engineering tools

Lectures 1-3 Sept.

II. Stresses and strength

2. Stresses and equilibrium

3. Strength models (how to design structures, foundations.. against mechanical failure)

Lectures 4-15 Sept./Oct.

III. Deformation and strain

4. How strain gages work?

5. How to measure deformation in a 3D structure/material?

Lectures 16-19 Oct.

IV. Elasticity

5. Elasticity model – link stresses and deformation

6. Variational methods in elasticity

Lectures 20-31 Nov.

V. How things fail – and how to avoid it

7. Elastic instabilities

8. Plasticity (permanent deformation)

9. Fracture mechanics

Lectures 32-37 Dec.

1.050 — Content overview

I. Dimensional analysis

II. Stresses and strength

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Lecture 8: Beam stress model

Lecture 9: Beam model II and summary

Lecture 10: Strength models: Introduction (1D)

Lecture 11: Mohr circle – strength criteria 3D

Lecture 12: Application – soil mechanics: How to build sandcastles

Lecture 13: Strength criterion in beams (I/II)

Lecture 14: Strength criterion in beams (II/II) – convexity of strength domain

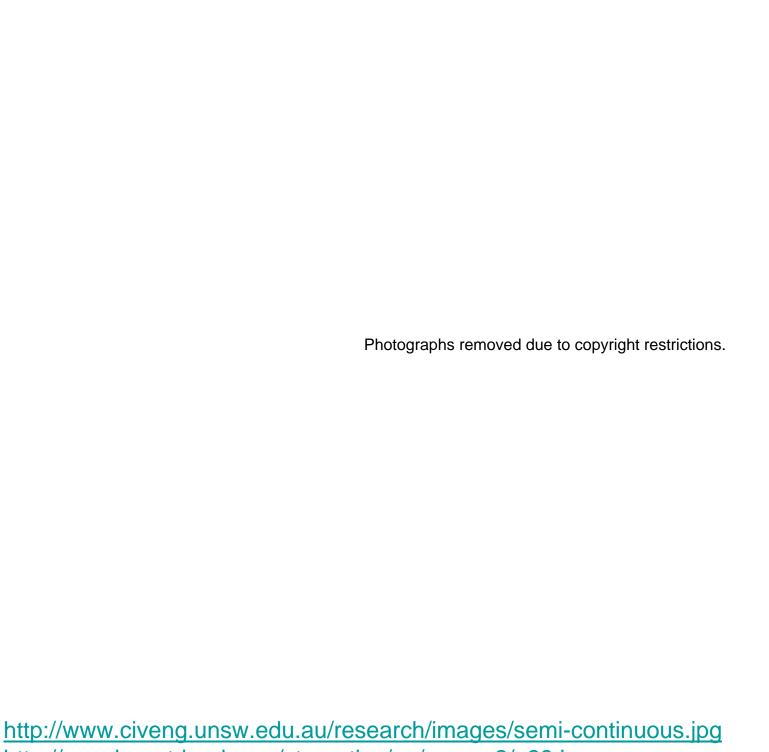
Lecture 15: Closure strength models & review for quiz

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III. Deformation and strain

IV. Elasticity

V. How things fail – and how to avoid it



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