1.050 Engineering Mechanics

Lecture 7:

Application: Hoover Dam and Soil Mechanics

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

    Lecture 4: Newton's laws, fall of the WTC towers
    Lecture 5: Stress vector and stress tensor
    Lecture 6: Hydrostatic problem   ⟵ Applications
    Lecture 7: Soil mechanics / geostatics problem
    Lecture 8: Beam stress model
    Lecture 9: Beam model II and summary
    Lecture 10: Strength models
    …

III. Deformation and strain

IV. Elasticity

V. How things fail – and how to avoid it

Content lecture 7

1. **Application I: Hoover Dam (hydrostatic problem) – finishing**

2. **Application II: Soil mechanics / foundation**