EN 211: Mechanics of Materials

Manaswita Bose

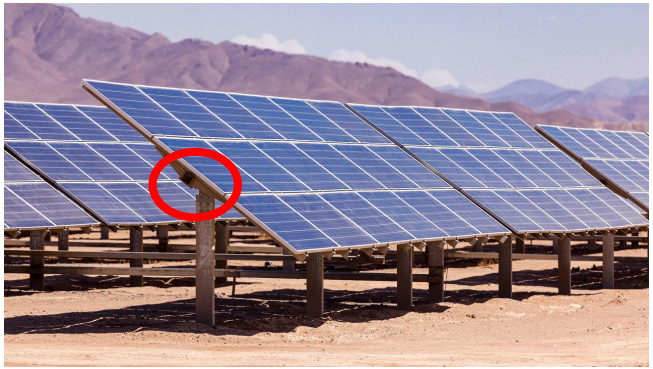
Overview

Goal

To develop an understanding of the basics of the structural design concept

Overview

Why us?



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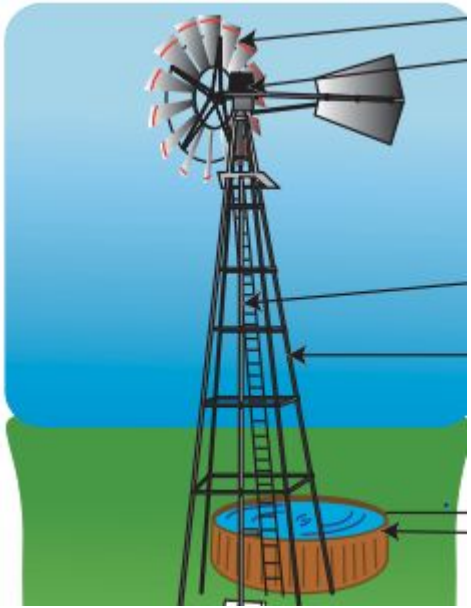

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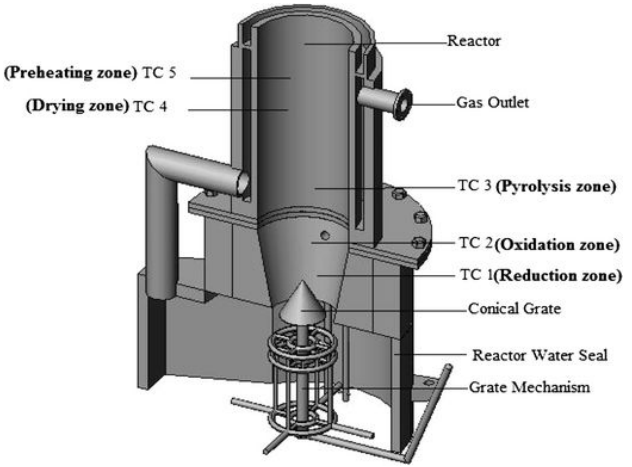

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Last accessed on 13 August 2020

Overview

Learning Objective:

To learn basic concepts to be able:

- To analyse and
- To design load bearing structures and machine (parts)

Overview

Specific Objective:

To develop the ability:

- To analyze a problem in logical manner
- To apply fundamental rules to solve a problem

Learning through problem solving

Course Content

- Background: Statics (Day 1 & 2)
- Distributed load, centroids (Day 3)
- Tutorial, Quiz (Day 4)
- Axial load, normal, shearning, and bending stress, shear stress on oblique plane,Shear Stress on general loading (Day 5)
- Tutorial, Quiz (Day 6)
- Stress-Strain relationship, Hooke’s Law, Statically indeterminate problems (Day 7)
- Tutorial, Quiz (Day 8)
- Thermal Stress, Poisson Ratio, Generalized Hooke’s Law, Dialation (Day 9)
- Tutorial, Quiz (Day 10)

Course Content

- Shearing strain, deformation under axial loading, St. Venant's principle, stress concentration (Day 11)
- Tutorial, Quiz (Day 12)
- Plastic deformation, Residual stress (Day 13)
- Tutorial, Quiz (Day 14)
- Introduction to Torsion, formula, angle of twist (Day 15)
- Tutorial, Quiz (Day 16)
- Bending (Day 17)
- Tutorial, Quiz (Day 18)
- Shear (Day 19)
- Tutorial, Quiz (Day 20)

Course Content

- Shear Force and Bending Moment Diagram(Day 21)
- Tutorial, Quiz (Day 22)
- Energy Method (Day 23)
- Tutorial, Quiz (Day 24)
- Transformation of stress and strain (Day 25)
- Tutorial, Quiz (Day 26)
- Principal stress and strain (Day 27)
- Tutorial, Quiz (Day 28)

Text Book

- Mechanics of Materials by F. P. Beer, E. R Johnston (Jr), J T DeWolf, and D F Mazurek, Sixth/Seventh Edition, McGraw-Hill

- Vector Mechanics for Engineers (Statics) by F. P. Beer, E. R Johnston (Jr), D F Mazurek, and E. R. Eisenberg, McGraw-Hill

Evaluation

- Low weight weekly quiz on Moodle platform
- Every Thursday - 17:30 - 18:00 pm, starting on 27.8.2020
- Personalized question paper; upload the worksheet on Moodle by 18:05
- Quiz - 50%, End-sem - 50% (Tentative)

Team

Teacher: Manaswita Bose (manaswita.bose@ese.iitb.ac.in)

Teaching Assistants: Alok Tiwari and Sourav Ganguli

Media

Moodle integrated with BigBlueButton (BBB) - EN211 Virtual Class Room

Slot

Mon, Thu: 5:30 - 18:55

Questions?