Statics, dynamics, and bungee jumping

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Wintec

February 11, 2016
Engineering Mechanics Project

- Worth 20% of total marks
- Associated learning outcomes
  1. Understand and analyse basic theory and principles of forces in mechanics and their relationship to engineering applications
  2. Analyse motion, forces and motion, work and energy problems and their relationship to engineering applications
- Traditional labs and lab report in the past
- Goal was to replace with a student-centred project
Students brainstormed project ideas

**Mechanics Project Ideas**

Post up some ideas of what you would like to build for the project. A crane? A bridge?

**Learning outcomes of project**

You will need to build something that demonstrates that you are able to:

1. Understand and analyse basic theory and principles of forces in mechanics and their relationship to engineering applications
2. Analyse motion, forces and motion, work and energy problems and their relationship to engineering applications

**Project details so far**

1. You will work in groups
2. You will demonstrate your project to the class in some form
3. You will submit an individual report
4. It is worth 20% of the total marks for this module

- Ballista - Large Scale Glider - Truss Bridge (to hold human weight)
- ramp
- Building with a free hanging deck
- Suspension Bridge
- Tunnel
- Arch way
- Crane
- Guillotine for cigars
- Rotating Table
- Like a crane
- A building with a free hanging deck
- Fountain
- Windmill
- Table
- Turn table
- Eiffel tower
- Rocking chair
- Bungee jumps platforms
- Catapult
- Planes
- Hot air balloon
- Draw bridge
- Car
- Tip trailer
- Bridge
- Crane
- Ferris wheel
- Monuments
- Potato masher tool
- Tower
- Window cleaning platform
- Swing bridge
- Lift
- Wrecking ball
- Clock
Project format

- Group size 3-4
- 1-2 hours per week in class
- Group presentation (25%) and individual report (75%)
- Some tower specifications
  1. Minimum platform height 500 mm
  2. Minimum cantilever platform length 150 mm
- Performance criteria for competition

\[ \text{Tower Performance} = \frac{\text{Bungee jumper mass} \times \text{Platform height}}{\text{Tower mass}} \]
Activities to achieve outcomes

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Project outcomes

- **Student feedback**
  - Generally positive
  - A couple of minor issues with group dynamics
  - Introduce earlier so more time to design
  - Everyone hated the PVA glue

- Good engagement - much better than for traditional labs

- Unintended learning outcome: adoration of tutor