Engineering Tripos Part IIA Project, GD2: Structural Modelling, 2025-26

Leader

Dr R Foster [1]

Timing and Structure

Group. Second two weeks of project period in Easter Term. NOTE: this can only be taken in combination with GD1 or a language project.

Prerequisites

3D3 and 3D4 strongly recommended

Aims

The aims of the course are to:

- learn about the design of timber structures
- learn about the design of efficient long span structures
- gain fluency in structural modelling with parametric design tools and analysis software, such as Rhino/Grasshopper and Oasys

Content

This project places central focus on design, as may be undertaken in a consultant structural engineering practice. Students will work together in small teams to design some innovative timber structures to satisy a challenging design brief.

FORMAT

A combination of talks and interactive design studios, with self-paced learning of background theory and of applicable computational techniques.

ACTIVITIES

The project will be supported by external speakers who are international experts in their fields.

The project will have a client brief requiring the design of challenging timber structures. Some elements of the required design response may be modest, allowing full technical design. Other elements may be more architecturally adventurous, with an emphasis on the generation of plausible concept and scheme level designs.

Guidance will be provided by world-leading experts. These are still being finalised. In previous years these have included Bill Baker, Ian Liddell and Andrew Lawrence. Bill is the Structural Partner at Skidmore Owings and Merrill in Chicago. Bill has been responsible for the design of many of the world's most iconic buildings, including the 824m Burj Khalifa in Dubai, the world's tallest. Ian was formerly the chief structural designer at Buro Happold in Bath, and is one of the world's leading designers of tension stuctures. In particular, Ian was the structural designer of the London Millennium Dome (now the O2 Arena). Andrew is a leading designer at Arup in London and was the structural designer of the spectacular Metz Pompidou roof.

Mini-lectures will be given by the external experts and by the course leader to explain how to approach the design of structures of various relevant typologies. Simplified analytical theory will be presented which will allow plausible initial design calculations to be made. Students will be introduced to modern parametric design software such as Rhino/Grasshopper in which design parameters can be explored and developed.

Students will work in small teams to develop their designs.The final output will be a design report, including drawings and calculations as appropriate, to communicate the structural design. Computational and physical models supporting the design may also be submitted.

It is also intended that, as in previous years, students will go on a day trip to London to look at real structures. Students will travel in small groups. Train and underground tickets will be provided. The trip will be on a day, possibly a weekend day, that suits the group, and which does not clash with any of the minilectures.

Coursework

Coursework
Buildings of London booklet Preliminary concept/scheme design report Final report, presentation and models

Examination Guidelines

Please refer to Form & conduct of the examinations [2].

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Links
[1] mailto:rmf41@cam.ac.uk
[2] https://teaching.eng.cam.ac.uk/content/form-conduct-examinations