Engineering Tripos Part IIA Project, GD1: Sustainable Offsite Construction, 2024-25

Leader

Dr B Sheil [1]

Timing and Structure

The second two weeks of the project period in Easter Term. NOTE: this can only be taken in combination with GD2 or a language project.

Prerequisites

Part IIA Surveying Engineering Area Activity required; 4D16 strongly recommended

Aims

The aims of the course are to:

- introduce the principles of project planning and project management
- familiarise students with both common and modern techniques used in construction practice
- introduce students to both existing and new construction technologies
- familiarise students with the importance of scheduling, teamwork and financial control
- emphasise the importance of health and safety
- emphasise the important link between practical aspects on site and engineering theory
- enable networking between students and industry collaborators

Content

This project involves the construction of a scaled-down version of a real-world structure, in this case a bridge, in West Cambridge. Each student will be in a team of up to 25 students, working with a contractor (Laing O'Rourke Plc.) and a consultant (Ramboll). The project is designed to provide students with a practical introduction to existing construction techniques commonly used in practice as well as the latest cutting -edge digital technologies. Because of the requirement for a two-week block of time, students may only take GD1 Sustainable Offsite Construction with GD2 Structural Modelling. The Sustainable Offsite Construction module is a fantastic opportunity for civils students to learn important skills using a hands-on realistic construction project exercise. It is also the case that, while the credit available for the project is the same as for all of the others, the overall time commitment is slightly greater - buts its popularity with previous cohorts indicates that it is well worth the opportunity.

Students will be tasked with building a 10 m bridge at an ‘onsite location’. For the coming academic year, this will be over a small creek at the West Cambridge site. The 2023-24 bridge will be based on Laing O’Rourke’s state-of-the-art modular ‘Digital Bridges’ using reusable construction elements donated by Laing O’Rourke. The bridge will be modular such that the students will first need to assemble the various components ‘offsite’ (in this case, the civil engineering structures laboratory, also in West Cambridge). The various assembled components will then be transported to ‘site’ using suitable lifting/transport machinery for final onsite assembly. A full 3D digital model will also be developed to enable high-quality as-built surveys and to deploy the latest technologies as a demonstrator of the ‘future of construction’. Therefore, structural designs and drawings will be provided to the students in advance and many parts will be pre-fabricated.

Students will choose, or be allocated, a role within the team. The team members then have to work together to decide how the structure is to be assembled and transported to site. The students will also need to plan in advance how the structure can be disassembled. Engineers from Laing O'Rourke and Ramboll will assist but it will be the responsibility of the students to produce a sustainable, safe, and economic scheme, and then to put it into action. The marking will be on an individual basis, based on an interim 'Client' interview, individual report and a final presentation. These marks will be awarded by CUED staff but will take account of information from the Consultant and the Contractor.

Coursework

Coursework	Due date	Marks
Interim client interview	TBC	20
Final individual report	TBC	30
Final presentation	TBC	30

Examination Guidelines

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

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Links
[1] mailto:bbs24@cam.ac.uk
[2] https://teaching.eng.cam.ac.uk/content/form-conduct-examinations