Gonville & Caius Engineering Challenge 2020

Engineering is about solving problems: about designing processes and making products that can make a real difference to individuals and society. Engineers require a strong academic knowledge, but engineering is more than just mathematics or science. It’s the ability to analyse a problem and find a solution in a practical and cost-effective way.

The task for this year’s Gonville & Caius Engineering Challenge for Year 12 students is to devise a sustainable long-term strategy for transport to and from international shipping ports bringing freight into and out of the UK. An effective strategy should maximize efficiency and minimize environmental impact.

The Port of Felixstowe in Suffolk is the largest container port in the UK. A large number of container ships are processed, and the freight needs to be transported across the UK. Currently, containers are put onto trucks and driven around the UK. This is likely to be the cheapest option, but also likely to be environmentally damaging in terms of air pollution and carbon emissions. An alternative could be to build a freight rail link to a distribution facility somewhere in the UK.

You are a senior civil servant in the Department of Transport. Evaluate the efficiency and environmental impact of trucking to and from Felixstowe versus the rail option. Should a rail link be built? For the rail option, some aspects to consider would be:

- What capacity and how many trains would be required?
- What are the power requirements for the trains?
- What would be the optimal location for a distribution facility?
- What would be the prospects for future expansion of capacity?

Similar considerations can be given to the trucking option. The challenge is to compare the two options to produce a balanced and reasoned argument for your recommendation.

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<th>Your Challenge entry should include two parts:</th>
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<td>(1) The developed design as a high-level presentation to a government minister. This could be a text document or a PowerPoint presentation. It should succinctly convey the important aspects of your recommendation.</td>
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<td>(2) Explanatory notes detailing the decisions you have made and crucially why you made them. This can be as long as you wish and should contain calculations to justify your thinking where appropriate.</td>
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Please submit your entry in electronic form (preferably PDF) to schoolsprizes@cai.cam.ac.uk. Entries should arrive by Fri 5th June 2020. Please do not put your name or your school’s name on your entry, but instead complete a cover sheet. The completed cover sheet must be sent with your submission. All entrants will be notified with the results of the competition by early September.