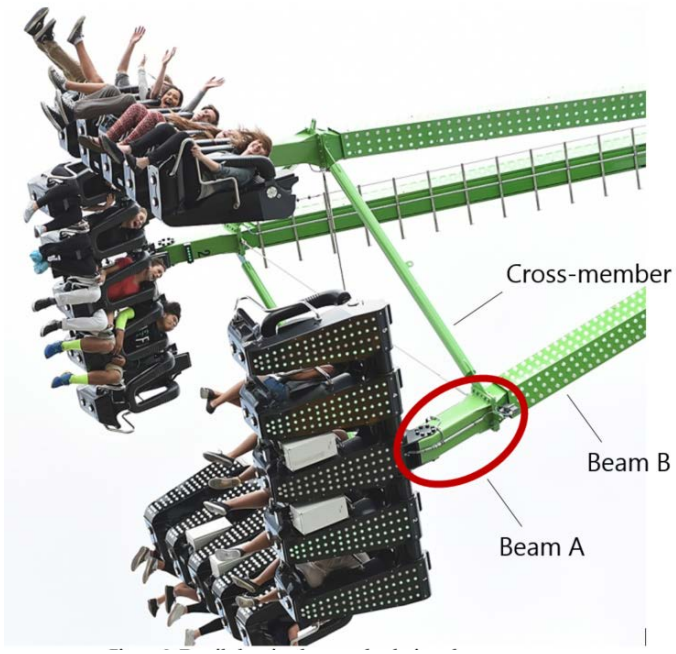
MECH 326 Assignment Example (Abridged)

Scenario

With your newfound expertise in fracture mechanics, your team has been approached to assist with the preliminary redesign of a particular amusement park ride.[1] The ride is identical to "The Beast" at Playland at the PNE (see figure to the right). Up to 20 riders sit in chairs at the end of a long swinging and spinning pendulum.

The client is looking to change the aesthetic of the design by replacing Beam A (see lower figure) with the most slender beam possible. Your task is to recommend the beam cross-section and material that still achieves a safety factor of at least 10. The client is worried about the potential for fracture, so they like to know what type and size of crack they need to be able to identify in their visual inspections



The client indicates this is part of a larger feasibility study to look the viability of a redesign of the ride, but they do not have much in the way of specifications or details for you. They mention you should take a look at the videos of this ride online; otherwise, you have not been given a lot to work from in this project. They expect you to make and justify assumptions and approximations as you feel are appropriate.

Deliverable

Prepare a brief two-part report for the client to outline your work and your recommendation. Include a body suitable for a general engineering audience, and an appendix suitable for an expert audience. The body should not exceed three pages and should be suitable for engineers familiar with the basic concepts of mechanics of materials, but not necessarily the details found in MECH 326. Your appendix should provide sufficient analysis to support your design. Through peerScholar, you will assess other teams' designs and they will assess yours.

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[1] Disclaimer: As much as I believe in all of you and know you will make great engineers, and as much as I'm doing my best to help you to learn fracture mechanics, if someone approaches you and asks you to design an amusement park ride, please say no for now – leave it to the experts!