



# Guelph Engineering Society



Report on OEC 2010 at Waterloo  
January 29-31, 2010.

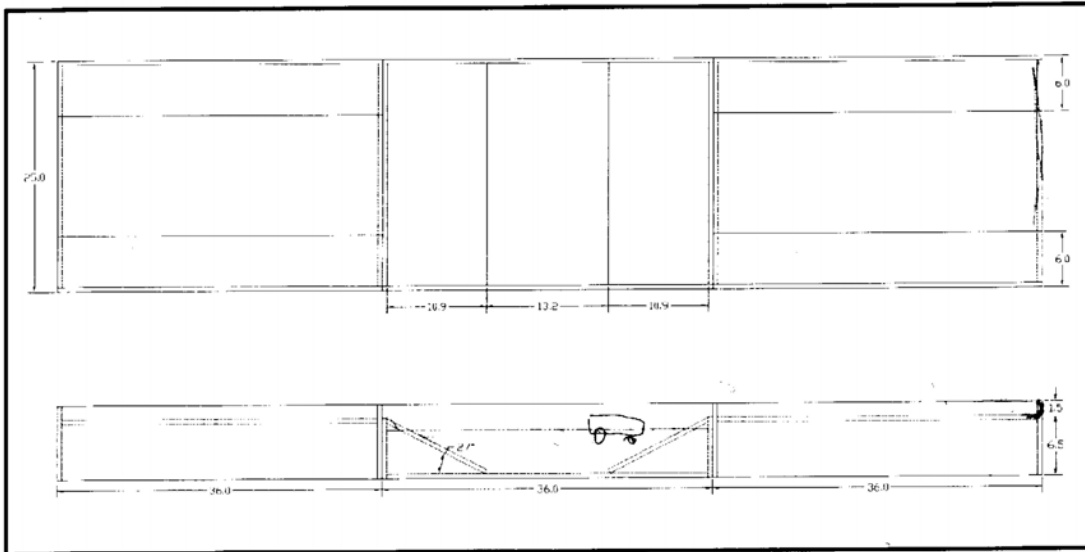
Prepared By: Trishan Gunness, Jordan Cellucci, Khanh Tran, Oshara Narangoda.

## **1. Outline of the Competition**

*Our team competed in the Junior Design Category at OEC 2010 in Waterloo. This year's Junior Design Theme was titled "Redefining Engineering in Industry as a Result of Demand Based on Business and Economics". The details of the competition were outlined and instructions were given as to what methods could and could not be applied. At 8am all teams were given the problem statement. Each team was given 4 hours to design, build and submit their project and presentation material. If a team had a question about the project, a written answer would be provided to all teams, not just the team that posed the question. There were limits imposed on all teams relating to the test area, shop and buy table. Some of these limitations included: Teams were to book time to see the test area; only two members per team in the shop at one time; only one member per team at the buy table at one time. Evaluation was based on Design & Performance, Team Work, Presentation, and Originality. Teams who behaved unprofessionally were deducted points.*

## **2. This Year's Task & How the Team Approached It**

*The Objective was to build a vehicle capable of crossing both land and water sections of a designated course. The vehicle was required to transport logs from one end of the course to the other without dropping any along the way. Bonus points were awarded if the vehicle was able to unload the logs in the finish zone. Only materials from the buy zone could be used for construction, and the total cost of supplies could not exceed \$6000 (or points were deducted). Each team was given basic tools, and given time in a separate shop that contained additional tools. The Testing Zone was limited and the area had to be booked for testing. Limited quantities of supplies were available at the shop, so it was important to buy wisely. The course is seen below:*



*Our team approached this problem using the design process we were taught in ENGG2100 – Eng Design II. We began by coming up with preliminary design ideas that met the constraints of the problem. Concepts were eliminated based on the aspects of their design that made them undesirable, including: high cost of materials, inadequate time to complete the design, or not having the necessary materials available. The concept we chose was a sled design, it functioned by shooting a grappling hook from one end of the course to the other using a launching device built by our team. Once the hook grabbed the other side of the course, then the motor would winch the sled across it. This design was unique, as many of the other teams chose a wheeled-vehicle design. The design was unaffected by friction and floatation issues that could have hindered a wheeled design.*

### **3. Evaluation of Performance**

#### **i) Conference Organizers**

*The conference was a complete success. Every event was well-organized and every detail regarding the competition was explicitly outlined. There were various formal events that allowed competitors to network with peers from other schools as well as meet different members of industry. The banquet was an excellent opportunity to hear from some very enthusiastic and intelligent speakers.*

*There are a couple of things that could've been changed to improve the overall process of the competition. The biggest weakness was the setup of the buy zone. The lack of materials gave only the team with the quickest idea full access to all materials,*

*leaving the teams who spent more time deciding on ideas to work with whatever supplies were remaining. Another weakness was the scheduling. The competing event schedule gave no time to see any displays or demos from other teams, which would have been very interesting. One disappointment was that there was no representation from UoG in the innovative design or social awareness category.*

### **Team**

- *Improvements would be to build a better grappling hook and electrical system. The down fall of the design was not being able to launch the hook the full distance over to the other side to grab on. A larger hook with sharper grips and on a rope that was thinner/looser would have travelled better. The motor torque also needed to be toned down. Given more time it would've been possible to rig the only available battery holder from an 8AA holder to a 2AA holder. As well could have done a trigger system that required no user, a "set and go" system.*
- *Our group dynamic was great. Conflicts were limited throughout the event. Each member was able to voice their idea and work was divided equally. There was stress during the last moment of the design but this was to be expected given the situation of limited time. There were no attacks or conflicts with each other.*
- *Time management was the biggest issue that came up. Planning and brainstorming took too long and limited the build stage. Because planning took so long materials weren't readily available at the buy zone and our team needed to consider different materials to make substitutions for unavailable materials. These conflicts left no time for testing.*
- *Tips for the next Junior Designers: outline your design strategies in advance. You're unaware of the problem but you can still plan how you are going to tackle the problem and divide your time over the complete 4 hours. Set target points and be strict with them. For example, after X minutes have a design to start building. After X+Y minutes should be done building. And after X+Y+Z minutes should be done testing and working on your presentation, this will limit some of the stress you will experience. As for the design, consider all the forces at play within the system. Only two of sixteen vehicles made it across the course, so think simple and effectively. Friction, traction, torque, and buoyancy were the major*

*reasons teams didn't make it across the course. Don't forget to have fun!*