

## Trip Report

### 2012 PEO Education Outreach Conference

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**Location:** PEO Head Office 101-40 Sheppard Ave W, Toronto ON

**Dates:** April 13 & 14, 2012

The following is a record of my trip to the 2012 PEO education outreach conference held at the PEO headquarters in Toronto on April 13&14, 2012. I've tried to capture the important details and discussions of the conference, in particular any information that I feel is particularly relevant to the Peterborough PEO chapter. Electronic versions of all of the slides presented at the conference are supposed to be made available to attendees, but as of the time of this writing I haven't received anything. Once received, I will pass them on to the chapter chair.

The overall theme of the conference was "education outreach". That is, what can/should the PEO be doing to promote the engineering profession among students to ensure a steady stream of top talent entering the profession in the future.

#### **Friday, April 13**

Friday evening consisted of a tour of the new PEO headquarters building and a social/dinner to get to know the other conference attendees. After dinner there was a team building event that took the form of an impromptu engineering challenge – similar to the type of event that our chapter puts on each year during national engineering month. The challenge was to use a variety of materials to build a 'vehicle' that could transport a penny the furthest. A copy of the complete outline of the event is attached with this report – as well as ideas for many other impromptu challenge events. This event may be worthwhile considering for next year's engineering challenge as it involved minimal materials, but allowed for lots of creativity and different approaches to solving the problem.

## Saturday, April 14

The conference was attended by approximately 55 people, including representatives from the various chapters around the province, PEO head office staff involved in education outreach, and several members of the PEO executive committee – including PEO president David Adams.

The morning started with some general introductions, including an address by Bruce McCowan that outlined some on-going issues surrounding the PEO and education outreach.

- The PEO council is currently reviewing the role of many of the PEO's functions, including education outreach. There has been talk about changing or even eliminating the PEO's role in this.
- If the PEO is about serving & safeguarding the public interest, as part of that, doesn't the PEO need to ensure that there is a steady stream of engineering talent in the province?
- Should the PEO only deal with licencing issues and discipline? Or should they also be involved with ensuring we have the "completely acquainted" Engineer (i.e. someone who is truly an expert in their field).

The next speakers presented a series of links to websites that could be used to help interest students of various ages in engineering. A list of all links can be found in Appendix A. The links were sorted by target age group (primary vs. high school) and includes games, videos and other material designed to appeal to the different groups.

Then there was a 'trade show' session, where chapters from around the province presented different events that they had held either as part of National Engineering Month events or events held directly in schools. Around half of the teams presented variations on the classic popsicle bridge building competition. One group presented an event where the students had to assemble a small gearbox and generator from a kit, and then build a wind turbine blade assembly to mount on it. The blade assemblies were tested with a fan to determine how much power was generated. This was very similar to the NEM event held in Peterborough the past 2 years. The main difference was that this event targeted a younger group of students – grade 5&6 students as opposed to grades 11&12 for the Peterborough event. This was a common theme throughout the day, that we should be considering targeting education outreach activities at students before they reach high school, since once they are in the upper grades it may be 'too late' for them to choose a to pursue Engineering in post-secondary education due to the course selection they've already made in high school.

Some chapters talked about the events that they've done directly in-schools. There was a presentation of an 'energy science kit' which is a kit available to teachers via the national science and technology museum in Ottawa on a monthly rental basis that provides a large array of materials for in-class demonstrations (build a basic DC motor, electro-magnet, solar cell, small wind generator, basic circuits, etc.). Another chapter has put on "PA Day Camps". They setup a day of activity stations in the school

on a PA day that the students can sign up for, and the students spend the day rotating through different science and engineering related activities.

After the trade show, it was mentioned that the PEO education outreach committee has a budget for special project for ideas that are new and creative. Funding application is available on the PEO website. This is not meant for annual events, just for new special projects that the chapters may be working on.

Before lunch there was a talk given by Ken McMartin, former PEO president (2003-2004) and Engineers Canada (2006-2007) president. He talked about issues relating to raising the profile of the profession, like how we need to be more active in educating people about engineering and what engineers do, since we don't have the media to do that for us like professions like law and medicine (he gave examples of the many shows on prime-time TV that glorify those). He presented data that indicated a predicted shortage of engineers in the province in the coming years. He mentioned that Engineers Canada is actively looking to recruit & retain women and indigenous people into engineering.

There was some discussion around a '2-pronged' approach to education outreach. First step would be to reach out to kids in grades 6-8, to try to get them interested in science and engineering before they make their course selection in high school. The second would be to target students towards the end of high school as they are preparing to enter post-secondary education.

After lunch there was a talk by Sal Alajek from Engineers Without Borders. He gave a very interesting talk about making sure that we properly communicate the message of what engineering is and what engineers do. He mentioned studies that have shown that messages like "Engineers connect science to the real world" are the least appealing to many students. Messages like "Engineers make a difference" are much more well received. He talked about how when presenting what Engineers do, we need to make an effort to relate the activities to social benefits in the real world. Most people want to feel like they are helping people, not just solving abstract problems for the sake of solving them. An example was a typical popsicle stick bridge building event. To get the students more engaged, instead of just telling them to build the strongest bridge possible, try to connect the function of the bridge to solving a problem in the real world. Like have a map of the city and talk about how the bridge allows people & families to get together quicker, or how a properly placed bridge can shorten an ambulance route and help save lives.

Participants then had to choose 2, 45minute 'break-out' sessions to attend, where a small group discussed a specific issue.

### **Break-Out Session # 1 – How to Increase the Impact of Classroom Visits.**

During this session participants discussed their experiences with direct classroom visits. Most people agreed that there were 2 major challenges. The first was finding suitable volunteers that were able to spend the time during working hours to visit schools. Some suggested retirees. The second problem was getting school and board approval to enter the schools. It was discussed that it was OK to approach teachers or principals to start inquiring about performing classroom visits, but that ultimately due to security concerns that school board approval is ultimately required. It was discussed how it was also important to make sure that the classroom visit ties in with the required curriculum, to “help the teacher do their job” in order to have them a supporter of the visit. There was talk about how in grade 10 the students need to do a “careers” unit, and that may be a good opportunity for a visit, but that it was generally easier to get into the elementary schools. There was also a discussion about EIR’s (Engineers In Residence) doing these visits. Most chapters didn’t have an active EIR, due to the fairly significant commitment required.

### **Break-Out Session # 2 – Implementing a Province-Wide Engineering Challenge.**

During this session participants discussed the possibility of creating a province-wide engineering challenge – basically to further coordinate all of the individual NEM challenges. Some participants expressed interest in making this a ‘tiered’ type of challenge, where the local winners would then proceed on to a provincial championship. There was also the idea discussed that this could instead be done remotely – where each local event would submit their top scores to one overseeing body and teams would then be ranked provincially according to their score (now possible since all teams would be doing the same event). It was fairly clear that there is currently a wide range of challenges and expectations for an event like this from the different chapters. Some chapters charge the students an entry fee, and are trying to push things into a much more structured program (like the FIRST robotics championship) while other (like Peterborough) try to make the event open to everyone and run things on a smaller scale. Some chapters talked about approaching sponsors and asking for \$1000’s each for funding the events. There was also talk about PEO head office taking on a larger role in a province-wide event, and looking for the major corporate sponsorships at that level.

Although an interesting concept, given the wide range of philosophies (and means) for the different chapters across the province about what this event is and how it should be run, I personally doubt that we’ll actually see a coordinated province-wide event in the next couple of years.

The conference then ended with some general wrap-up comments.

Here are a few of my general thoughts on the conference, and items to consider for the Peterborough Chapter.

- Although some good points were made and some good ideas were presented around education outreach, in talking with some people who have attended these conferences in the past I got the feeling that these same topics are discussed year after year after year, and that not much actually changes or gets implemented at the provincial level. It's really up to the local chapters.
- At next year's Peterborough chapter NEM challenge event, we should put more of a focus on connecting the event to solving real world problems. We should also focus more on promoting engineering as a career, and maybe try to have more interaction between the students and the engineers/technicians running the event. We should also spend a little more time focusing on the message we are trying to convey about engineering, and what engineers actually do.
- Some thought should be given to the ages of the students that we invite to the NEM challenge event. Most events target younger students (grades 6-8).
- Starting some in-class events or "PA Day Camps" sounds like another good way to reach out to students, but it would require significant volunteer time and dedication. I'm not sure of the depth of the volunteer pool for the Peterborough chapter, but it may be something worth considering.

## **Appendix A: Available Websites**

### **Websites for Primary Schools**

1. <http://www.princeton.edu/~peek/>
2. <http://www.kidsengineering.com/>
3. <http://luciboo.com>
4. [http://ctworkshop.com/CTWBM/CTW\\_BM/](http://ctworkshop.com/CTWBM/CTW_BM/)
5. <http://http://www.teachengineering.org/>
6. <http://www.tpld.net/SmallPeice/ETF-client.html>
7. <http://eo.ucar.edu/webweather/activities.html>
8. <http://engineeringedu.com/>

### **Web Sites for High Schools**

1. [http://www.peo.on.ca/peo\\_education\\_web/main.html](http://www.peo.on.ca/peo_education_web/main.html)
2. <http://video.google.com/videoplay?docid=1996560773716130827#>
3. <http://www.youtube.com/watch?v=Y0DxmthuvkKU>
4. <http://www.youtube.com/watch?v=9Y5Auwf9nXE&feature=related>
5. <http://www.yourdiscovery.com/video/shows/extreme-engineering/>
6. <http://www.engineeringedu.com>
7. <http://www.kids-science-experiments.com>
8. <http://www.engineergirl.org/CMS/CoolLinks.aspx>
9. <http://www.apeg.bc.ca/students/elementaryhighschool/index.html>
10. <http://www.discoverengineering.org/>
11. <http://www.engineering.com/GamesPuzzles/tabid/82/Default.aspx>

### **ADDITIOINAL WEBSITES**

12. <http://www.nae.edu/Publications/Bridge/16145/16214.aspx>
13. <http://www.geeringup.apsc.ubc.ca/workshops/vancouver/workshops-in-schools/>
14. <http://constructionmanagementdegree.org/blog/2010/100-awesome-engineering-projects-for-kids/>
15. <http://www.engineeringinteract.org/>
16. <http://www.asceville.org/resources.html>
17. <http://www.becpdx.org/nem/default.aspx>
18. <http://www.engineeringedu.com/store>
19. <http://www.nemontario.ca>
20. <http://www.childrensengineering.com>
21. <http://files.asme.org/ASMEORG/Education/PreCollege/TeacherResources/4092.pdf>
22. <http://www.engineerinyou.com>