

Materials Camp - Peoria July 11-15, 2005

| Organizing Committee, Volunteers and Mentors | |
|---|--|
| • Jackie Earle, Caterpillar Inc - Chair | • Scott Wiseman, Caterpillar Inc |
| • Ken Burris, Caterpillar Inc | • Mike Shockley, Caterpillar Inc |
| • Iqbal Shareef, Bradley University | • Tom Majewski, Caterpillar Inc |
| • Eugene Pascual, Caterpillar Inc | • Scott Magner, Caterpillar Inc |
| • Allison Arndt, Caterpillar Inc | • Kate Chen, Caterpillar Inc |
| • Darrell Davis, Caterpillar Inc | • Liz Heatwole, Caterpillar Inc |
| Industry Tours | |
| • Dan Dunaway, Alcast | • Larry Erickson, Illinois Valley Plastics |
| Sponsors | |
| • Bradley University | • Certified Heat Treating Co. |
| • Caterpillar Foundation | • Alcast Company |
| • Tri-City Machine Works | • Bender Foundry Service Inc. |
| • Metamora Industries LLC | • Beck Aluminum Corp. |
| • Central Pattern Company | • Midland Industries, Inc. |



Ken Burris, Jackie Earle, Ron Gayles, Sarah Davis, Andy Crebo, Olivia Smith, Sam Muir, Amanda White, Rorke Pauli, Chuck Hayes, Hashim Amrani, Jim Lewellyn, Ian Zhang, Spencer Brinker, Andrew Gurik, Nick Greenway, Neil Connolly, Iqbal Shareef, Blake Nestor, Allison Arndt, Kaleb Fehr, Eugene Pascual, Mike Shockley, Darrell Davis, Scott Wiseman

The Peoria Chapter was excited to hold it's first Materials Camp, in early July. We began the week with a day of general materials science education at Bradley University. Bradley designed the curriculum to follow a part from design to failure analysis.





The students began with an introduction to Computer Aided Drawing, of a fictitious cast aluminum part...a sky hook. After this, they watched a rapid prototyping machine craft the part from layers of paper. This prototype was used to create the sand mold for the casting process. We all got dirty in the foundry, mixing and pounding sand, and pouring molten aluminum into our mold. Once our part was made, we reviewed various mechanical testing methods. Bradley has a manually operated tensile testing machine, and we picked one of the "he-men" to break the sky hook. The first day ended with a review of failure analysis, and a chance to practice our detective skills on some real parts.

For the next three days, the students were teamed up and worked on a real materials engineering project with professional mentors. One group worked at the Caterpillar Parts facility, studying the properties of fasteners. Another group worked at the Caterpillar Engine facility, diagnosing failures that occurred on a test engine, and proposing a solution. A third group worked at a Caterpillar Machine met lab, studying a failed component, analyzing various steels and heat treatments, and recommending an improved material and process. The fourth group evaluated various roller blade wheel materials, and compared cost and wear resistance.



We also visited three manufacturing plants. Alcast company showed their permanent mold aluminum casting process, used for earthmoving machine and motorcycle parts. Caterpillar's Mapleton Foundry poured huge ladles of molten iron, to make engine blocks. Illinois Valley Plastics showed their plastic injection molding process used to make various automotive parts.



Student Compliments

- This camp was very helpful in showing me what engineering is like. I highly recommend this class.
- Most engineers probably don't get to see or learn about what I did this week until college or even maybe in job training. Now I am ahead of all who have not seen it.
- I really liked my mentor. She knew how to keep the day fun and broke it up with different activities to keep the day from seeming too long.
- What I learned at materials camp will benefit me in the future because I want to be a civil engineer and I need to know what types of materials I need to build certain things.
- I think that there is so much information involved in Materials Engineering that it is amazing at how much I learned and understand in 5 days.

Improvements for Next Year

- Less powerpoint presentations, more hands on experiences as they were very helpful in learning.
- Maybe on the first day we could have done like a warm up activity to get us all more comfortable with eachother.
- We pretty much focused on metals and didn't get to learn about other important materials.

| | Last Name | First Name | School | State |
|----|------------------|-------------------|-----------------------------------|--------------|
| 1 | Brinker | Spencer | Metamora Township High School | IL |
| 2 | Connolly | Neil | Morton Community High School | IL |
| 3 | Gayles | Ron | Richwoods High School | IL |
| 4 | Nestor | Blake | Pontiac Township High School | IL |
| 5 | Crebo | Andy | East Peoria Community High School | IL |
| 6 | Fehr | Kaleb | Roanoke-Benson High School | IL |
| 7 | Zhang | Ian | Dunlap High School | IL |
| 8 | Davis | Sarah | Richwoods High School | IL |
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| 10 | Willi | Melanie | Notre Dame High School | IL |
| 11 | Amrani | Hashim | Dunlap High School | IL |
| 12 | White | Amanda | Richwoods High School | IL |
| 13 | Greenway | Nick | Richwoods High School | IL |
| 14 | Gurik | Andrew | Richwoods High School | IL |
| 15 | Pauli | Rorke | Dunlap High School | IL |
| 16 | Muir | Sam | Dunlap High School | IL |
| 17 | Shareef | Sarah | Richwoods High School | IL |
| 18 | Lewellyn | Jim | Richwoods High School | IL |