Internship at Camcraft
John Sherwood - Junior - Mechanical Concentration

About Camcraft
Camcraft is a Christian company specializing in hydraulics and flow components, producing both on and off-highway engine system components. Camcraft produces the most difficult, precision-turned components - parts which require heat-treatment, grinding, bore sizing, hard-turning and super-finishing to achieve precise tolerances and to provide superior performance for customer applications.

Production
The first third of the summer was spent shadowing machine operators in the Production Department. This provided the chance to understand assembly lines and manufacturing processes from a boots-on-the-ground perspective. Operators taught both how CNC machines worked and solutions to common problems such as repairs, gage readjustment, or routine maintenance. After getting acclimated, I was given oversight of certain assembly line robots, and also an automated parts inspection machine. Eventually, I moved on to running several different finishing machines including a bead blaster, a thermal deburring machine, and a ceramic vibration deburrer. The opportunity to work in production was an incredibly insightful experience that provided important lessons – mainly that any design ought to be relatively simple to produce, and also that finished products will not perfectly match the designed dimensions.

Purchasing
The second third of the summer consisted of working in the Purchasing Department and learning basic supply chain management skills. I processed MRO requests and also determined when and how much metal should be purchased in order to keep the machine shop stocked. Just-in-time inventory control was utilized to ensure there was no overstock of raw material – which would take up space in the warehouse. I also was able to visit a few suppliers, including a heat treating facility and a metal recycling plant. Both visits included a tour and allowed for questions about their respective industries. Before the heat treating facility visit I was asked to research about austempering, a type of treatment for a new part being produced. I learned not only business skills, but also grew in my engineering knowledge within this department.

Quality Control
Within the Quality Control Department during the last third of the summer, I primarily worked on troubleshooting a new QC database software package called IQS. Using this system, I performed gage bias and linearity studies and checked the accuracy of the results. In addition, I found several bugs within the FMEA module of the software and notified the company behind IQS of the issues.

Also, I learned how to use several different gages and quality control equipment including ZEISS CMM and Rondcom machinery. The part seen above is required to be perfectly straight – up to 4 microns off. In the picture, one can see that the part has developed a tri-lobe characteristic rather than a perfect circle as a consequence of the grinding operation.

Finally, I conducted an extensive cleanliness study consisting of 30 patch tests to determine which of three types of washing machines cleans the best. This project took several days of working with microscopes and filters to count the size and amount of particles left on parts after a final wash operation.

Photographs courtesy of Camcraft