Ben Raper  
Coop Job Summary, term 1  
12/18/08

General Electric, Transportation

Co-op Work Assignment:

General Electric, Transportation Division, manufactures a variety of heavy equipment including locomotives for North American and several overseas clients as well as motors for mining vehicles, drilling motors, commercial diesel engines and generators for wind turbines. It is based in Erie, PA where its main manufacturing facility is located. I was assigned to work in Building 5, Heavy Fabrication at the Erie plant in the role of a subordinate to the building Lean Leader, Bruce Beaufort. LEAN is a manufacturing theory developed by Toyota, which differs drastically from the standard American model of manufacturing. LEAN is exemplified by low inventory levels, a strong focus on quality and flow, and the plant is organized into product villages (all the equipment used for one product in one place). The American system generally uses high inventory levels to ensure enough parts are available, batch production, and the plant is organized into process villages (all the equipment of one type in a separate area). The GE plant is currently making a transition from the American system to LEAN, and my job was to facilitate this transition. I worked in the heavy fabrication building, which handled all steel over ¼" in thickness. It also was where the platforms for the locomotives were assembled.

I had three main projects to work on, the radiator fan line, supermarkets in the platform area, and material management in the endframe area. For the radiator fan, the line needed to be reorganized, mostly to make the shift from process villages to product villages. Instead of the fan having to travel from the welding village to the machining village, etc., it would only have to travel within the radiator fan village. This would help to reduce supply problems with fans. For the supermarkets in the platform area, we were working to change how material was handled. There were about 400 different parts that went into the platform and it was difficult to keep track of what was running low. We were going to make quantities visually identifiable and give parts specific addresses to ensure that we always knew how much of each part we had by looking in one spot. This would help with supply and reordering parts to ensure we kept a level inventory. For the endframe area, I was working to develop standard work guidelines to improve linearity and also help with part reorganization, much like the platform supermarkets, but with far fewer parts.

Halfway through my workterm, about the time the DOW went from 11,000 to 7,500, I was reassigned to Building 10, locomotive final assembly as a general assistant and helper. Here I worked on the build sequence and standard work as well as any other small tasks that needed to be done.

My training was mostly in a hands-on approach by observing and receiving instruction from other employees. I also read three books on LEAN theory and attended weekly workshops. My supervisor was Bruce Beaufort. Bruce was a mechanical engineer by training who had started at GE Transportation 20 years ago as a cab engineer. He
became the head of cab engineering and moved on to be the business leader for building 5, heavy fabrication. He then moved on to be COE leader of Building 10, locomotive final assembly (sort of like a vice-president of manufacturing), and then became the Building 5 LEAN leader when COE leader became too stressful.

**Assessment of Learning and Development:**

In general, my work term acted as a very good compliment to my engineering curriculum. I worked mostly with manufacturing, which offered another point of view on design of engineered products. Oftentimes, there was a lack of communication between the engineering department and the manufacturing team. This would lead to many revisions of designs and the subsequent waste involved was a severe drag on productivity. I also had to deal with differences in opinion between the workers and the management, as many of my tasks involved dealing with both. I needed to figure out ways to make both of them happier, which was very challenging sometimes.

One thing I’ve definitely taken away from this experience is how much of a difference a motivated workforce can make. While the GE workforce is motivated, it is not motivated to change. While I don’t have any answers to the big problems between management and labor, this experience really opened my eyes to some of the issues that arise when management and labor work against each other instead of with each other.

Personally, I think that I’ve learned a lot about working with other people. One thing that Bruce in particular has taught me is that asking the opinion of the workers is incredibly important. Getting them vested in your decisions makes them feel respected and they will work with you instead of against you. I’ve also learned how much people value quick work and going the extra mile. In school, I’ll often just do a satisfactory job to get by because it’s just me that it affects, but when other people are depending on your actions and you put in a little more effort and do things quickly, you go from being “Bruce’s intern” to someone they will come back to when they have another important job.

The biggest regret I have for this work term is that I was reassigned and I was not able to complete my objectives that we laid out at the beginning of the term. This isn’t my fault and it’s not something I’d necessarily do differently, but it is a regret. Hopefully, I will able to finish those tasks up next summer.

**Life Out-side of Co-op:**

As far as housing is concerned, I’d recommend calling instead of emailing. Also, call up real estate agents because they will also often have options that might not be online. When you move into your house/apartment, make sure you made arrangements for internet/cable/electricity well beforehand, especially if it is a college area, or don’t be upset if you have to wait a month. I would strongly suggest a car in a smaller town as you don’t want going to the grocery store to be a chore and you’ll be thankful for the extra couple of minutes of sleep a car will allow you in the morning. Erie was not exactly an exciting city so make sure you’ve got something to occupy yourself with.
Evaluation:

This job was a great experience because of the manufacturing knowledge and hands on experience I gained. It was easy to feel as though you were making a difference and people were thankful for anything you did for them. I feel like I got some good experience in a managerial position and I think it could be a lot of fun if you find the right company. I got to get to see many different parts of the plant and I spent a lot of time on the shop floor, which was when I felt we were doing the most good. Bruce was a fantastic mentor who gave me plenty of responsibility but was always there to answer questions and help me out when I needed it.

On the negative side, my job lacked continuity with the reassignment, which was disappointing because I did not get to see my efforts play out exactly how I had hoped. Workload was pretty varied, sometimes I’d twiddle my thumbs for most of the day and go home at three and other days I’d work until seven and go home and fall asleep. The weather was miserable from November 1st onward, but on the plus side, I learned how to drive in snow/ice.
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Job Summary, term 2

For my second work term, I continued my previous work as a Lean Manufacturing intern with GE transportation in Erie, PA. I was working with the same mentor and in the same general area of the plant as well, so much of my experience was a continuation and further development of the skills I learned the previous fall. My main focus revolved around kaizen on the platform assembly line. I was also heavily involved in the development of standard work for the area and establishing and maintaining visual management in the area. My last area of responsibility was updating and maintaining the sequence to 90 locomotive map that we had developed last fall. Training was provided as needed through seminars and reading, though I had completed almost all of this training last fall. My mentor was the same as last fall, and I have developed a close working relationship with him.

While my assignments do not directly relate back to my education in Mechanical Engineering, the same problem solving skills apply. I’ve even learned new problem solving strategies and tools. Also, I have gotten great experience working in an environment where my ideas are heard and I can act on them if I choose to. I was able to work very closely with the managers of the building that I worked in. In fact, after the experience and training I received last fall, I was even able to help teach and advise them in how to apply lean principles to their manufacturing lines. One of the most exciting things about this job was that everything I did was brand new to everyone in the plant. This was the first time we were trying implement this stuff, which allowed all of us to try out different things, learn from our mistakes, and get better at it. For example, in developing standard work, a new idea for this business, we developed a method that was uniquely our own, then iterated about twelve times before we were satisfied with the result. Being involved in a process like that is very rewarding and I feel like I’ve learned a lot. Also, I mentioned above that I learned new problem solving skills. At Cornell, in MAE 225, we learn to break problems into pieces, figure out a bunch of solutions to the pieces and then assemble the solutions we like best into a solution for the whole problem. In LEAN, we use a technique called Seven Ways, where people develop full solutions to the whole problem, then we present them, talk about what we like about each one, and iterate until we have a good solution. The benefit of this is that when you are forced to think of and develop a solution to the entire problem, you start to get more creative fitting all the pieces together. Then when we share the solutions, your creative solution may be able to help other ideas. Over a few iterations, I found that really creative and unique solutions came out of the 7 ways discussion. The drawback is that if the problem is too complex to think of a whole solution, it may be difficult to execute properly. I also felt like I was very confident in my ideas and abilities this summer as I had already had 18 weeks of experience under my belt.

Outside of work, everything was smooth and easy. GE provided housing, which made life very easy and I had a great roommate. The apartments GE provided had a kitchen, living room, two bedrooms and a bathroom, much like the townhouses back at
Cornell, but only two people per apartment. I had a car, which made things easy (if it was running...). In Erie, you really kind of need a car as the public transportation is essentially non-existent and things aren’t close enough together to walk. GE did a great job organizing social events, trips, and charity events and it was very easy to meet other interns. There were trips to amusement parks, Toronto, Cleveland, and other interesting places, though I didn’t go on any. GE also was involved in several local charities like Hooked On Books, Relay for Life, and Habitat for Humanity.

Overall, this was a great internship experience. I had a very close relationship with my mentor and we felt very comfortable bouncing ideas off of each other. I was also able to get face time with senior management figures, vice presidents and even work closely with some of them. My job responsibilities were fitting and challenging in a way I hadn’t imagined possible. We developed a lot of tools and ideas from scratch, which was a rewarding experience. I also got to work with the union workforce, which opened my eyes to a lot of problems that go on in business that my education had not. I felt as though the people I worked with were respectful and listened to my ideas. The downsides were that I definitely did not get to apply as much of my technical education as I might have hoped, but I feel like I learned a lot of other good stuff regardless. Also I worked long hours, woke up early, and spent a lot of my time down on the shop floor, so I definitely felt tired and was not able to participate socially as much as I might have liked. However, I didn’t mind working long hours because the work I was doing was genuinely fun. All in all, this was a great internship experience and I hope that I’m sure I will be able to apply the things I have learned here both back at school and in my next job.