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.
Ben Raper  
Br22, 1847489  
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.
Brandon Seaman
Bms227
Operations Research and Information Engineering
General Electric Transportation
Fall 2009

JOB SUMMARY

A. Co-op Work Assignment:
General Electric Transportation is responsible for manufacturing locomotives, off-highway vehicles, and components for our wind turbines. I worked in the Electricals commodity in Strategic Sourcing, which is composed of electronics, electromechanical and power electrical parts.

The essential role of Strategic Sourcing is to procure parts while considering a number of different factors. The first is to ensure quality and a dependable supply and delivery of the product, otherwise manufacturing cannot ensue. This involves performing thorough research on specific suppliers and the supplier base as a whole to make certain with the least amount of risk that the product will arrive exactly as ordered. Once these factors are considered, pricing is the next priority. In-depth analysis must be done to identify market trends of commodities and respective industries. This, along with the study of relevant cost drivers can provide estimates of the costs for our suppliers. This information is helpful for negotiations, since we will be able to understand what reasonable prices are, and where prices are likely to move in response to analyzed trends. These processes are a continual effort, even with existing suppliers, as this ensures healthy competition for our vendors and guarantees that we satisfy fulfillment, quality and pricing requirements as best as the market can supply it.

A large part of my role was performing commodity research and developing sourcing strategies. One of my major projects involved a comprehensive breakdown of the wire-cable market. I focused on a specific, $7 million segment of our spend. The goal was to organize the data according to different factors, to identify areas of greatest potential savings. An example of this entailed putting parts into buckets based on their functionality, which involved examining drawings to determine the correct description. Some other assessments included the creation of density maps of our spend and quantity for the parts (to visually see the geographic flow of goods) and a ranking system for our supplier base and parts. To finish, I expanded from our company to domestic and international markets, to determine our global footprint. This project gave us a quantitative measure of our activity in the wire-cable market, and kicked off the analysis necessary to approach negotiations.

In another assignment, I performed an analysis of our supplier base and created a scoring mechanism to determine which suppliers could be rationalized. I was responsible for about 160 of our low spend suppliers. I was responsible for gathering data about the
suppliers, such as spend and information about their parts. Then, I evaluated more complex metrics, such as their supplier variance, spend performance based on their relative contribution, the “spend blend” of each part and its distribution amongst suppliers. We determined which are absolutely necessary to keep, such as vendors who are “sole suppliers”, and those that produce parts that several other suppliers have the capability to manufacture. Along the way, we found over a million dollars worth of supplier spend that did not even belong to our commodity. This helped our spend performance and allowed the commodity with the legitimate authority to rationalize to evaluate the supplier.

GE provides a wide variety of training opportunities. There are some mandatory online courses, but most additional training is optional, which is nice because it allows employees to pursue their respective areas of interest. These lessons can be obtained through advertised seminars on the GE campus, online learning tools, and arranging informational interviews to speak with other employees about their experiences.

I did not have an assigned mentor, although I was able to seek guidance from members of my department whenever they were available.

B. Assessment of Learning and Development

There were a few aspects of my educational background that helped me hit the ground running. ORIE 3120, or more formally: Industrial Data and Systems Analysis, was a very beneficial course, because much of my job performed database management through the use of Microsoft Excel and Access. Extensive knowledge in SQL was helpful with such large databases, because effectively pulling data minimized long run times. Also, the content of the resulting data is usually unknown, so the certainty of correct SQL coding is imperative for pulling the proper data. Knowledge of Minitab was critical for obtaining Green Belt Lean Six Sigma Certification. This was a quality improvement program that aims to eliminate variability and waste.

At this point, I have yet to decide on a career path. The industry and specifics of my role are to be determined, but I do see myself performing quantitative analysis in someway. For this reason, I can say that this job has helped significantly. It has allowed me to develop a systematic approach to problems. The scope and desired outcome are important to define before performing time consuming analysis. Often, longer than usual brainstorming can result in a net savings in time when the amount of analysis is mitigated.

My job was transferred to sourcing from engineering before I began my co-op due to the economy, and sourcing mostly manages finances. However, there was able to develop skills applicable to information engineering, such as database management, programming automated processes through macros, and performing in-depth analyses on our commodities and supplier base. I definitely developed myself professionally through
observation and working collaboratively with coworkers. Some of the professional skills that I developed were simple things such as communicating by phone or email and discussing projects with team members.

I believe that my biggest area of personal development resided in my autonomy and independence. My assignments were somewhat undefined, and my boss requested that I provide my opinions on how to define and solve them. Usually, I would take a project in my own direction and check back in for tollgates to verify that the project was being taken in the direction they desired, and also to ask questions about changes or improvements. My supplier rationalization project provided an example of this. How to select the suppliers to exit, and the criterion for determining which to exit and which were the most problematic was very vague, and largely up to me to determine. I did several stages of analysis, and checked back in every week or so to gauge my progress and direction of the project.

If I were to do the same experience again, I might attempt to identify major projects from the very beginning to keep me occupied as side projects when daily assignments ran low. This was a tactic I utilized towards the middle of the co-op, so beginning this earlier could have provided a mutual advantage for both me and GE.

C. Life Outside of Co-op

To find housing, I would first recommend contacting the HR representative to ask what previous co-ops did in the past or for any leads. Our HR director connected me with three other co-op students from Penn State University, so that we could collaboratively search and fulfill minimum occupancies. We were able to find a few potential options through online research, but our success in finding a place live is owed to our local Craigslist.

In Erie, I would definitely recommend having a car, although it is not entirely necessary if you are living with other students. If properly planned, it would be feasible to coordinate rides to and from work. There are not any affordable modes of public transportation.

I was fortunate to have been placed in contact with three other co-ops for housing. We were able to hang out with one another and connect with people that we may not have met had it not been through a housemate. There were a number of recent graduates in leadership programs that were very social: they hosted parties, organized nights to go out for dinner and to attend nearby concerts.

Upon request, I was placed in a volunteering role for an after school at a local middle school teaching students about nutrition and fitness. Our audience was a target group consisting of low-income students that had college potential, but were having motivational issues that could deter post high school aspirations. We usually prepared a few handouts to initiate conversation on a particular topic, and let it become an open
discussion to hear their perceptions and provide feedback. For the second half of classes, we would prepare healthy, affordable meals in the classroom and teach them why this was so.

There were no organized athletics during my co-op, but I did hear that there was a softball league during the summer.

D. Evaluation

The best features of this job related to the autonomy of the position. My development and contributions were largely up to me, so if I had a particular interest that I wanted to pursue there were very few barriers for doing so. As long as I finished my obligatory responsibilities, it was completely fine if I wanted to shadow an employee of a leadership program, attend a company seminar, set up an information interview with a full-time employee, or expand on a project with the potential to grow.

The worst feature was my best feature. Although I enjoyed the independence, I thought there would be more team meetings and collaboration on group projects. With work done on computers, it is hard to collaborate on the same spreadsheet since the organization of data is constantly changing. However, if we were to delegate tasks of a universal project, then perhaps we could have grouped our individual data into a unifying presentation.
Job Summary 1
Thomas Byuen
tb287
Operations Research Engineering
General Electric Transportation
Summer 09

A. Co-op work Assignment
I was employed under Chris Longstaff who was our Lean Leader for the OHV/Wind Department of GE Transportation. The specific function of Lean within GE is to increase profits by reducing wastes and increasing productivity. By specifically analyzing the flow of each product through its individual processes, it can be used to identify the key areas where work must be done to improve the flow. This general concept can be extended to various uses, even within the office floor setting, known as Transactional Lean. However, I was able to observe its traditional use throughout the factory floor setting, via outline boards to facilitate the location of tools, and Kanban spaces for safe inventory to reduce time wasted when machines break down.

My major projects for the summer can be summarized in three different areas. In my first few weeks here, I was entrusted with the task of gathering preliminary data on the workings of the machine shop. These studies included timing loading/unloading times, processing time, etc. I later compiled this data in Excel into graphs and aesthetically presentable data and reviewed it with my supervisor to locate specific bottleneck areas within the shop. Possible actions to resolve these issues were discussed and the planning is still in the midst of being finalized. The next side/continuing project that I have been involved with is a Sequence 90 board for our OHV/Wind Building. This board was a public display of all the machines in our factory floor and which parts were being worked on at which machine. The flow chart essentially mapped the entire progress of the factory on one white board. This compressed outline allowed for optimal planning by upper management and maintaining steady flow by briefly glancing at this board. My last contribution was at the second to last week of my term, where I was involved in a Lean event for OHV wheel subassemblies. This event gathered a team comprised of management, interns and union workers to determine the optimal way to build subassemblies for our wheels. For a week, we met in the same room and progressed day by day on an approach that we would soon later finalize to be a Kanban approach. This action allowed for a safety stock of inventory, as well as an organized depiction of the quantity of each part needed to complete subassembly of OHV wheels.

Training was provided mostly on the spot for my individual function. However, beyond here, GE has also provided many sessions on professional development, as well as countless opportunities to community service.

Although I did not have an assigned mentor, I approached my supervisor about any questions I had about my work. Otherwise, I generally conversed with my fellow interns or any of the leadership program members stationed here in Erie.

B. Assessment of Learning and Development
The work activities I am involved with now are generally all within the Lean scope. As such, it befits my education background very much, as I am in Operations
Research Engineering, and one of the key functions of my major is to discover optimal ways to run activities, which may range from financial equations to manufacturing operations. As of now, my career interests lay in general management and possibly financial engineering. Although my current work may not exactly be in this field, I am sure that the qualities I have inherited here are very valuable to the career I have in mind, as I have developed both my analytical mind as well as my professional maturity level.

Throughout this term, I have learned the work attitude I must attain to become a fully-fledged employee of the corporate world. I learned to respect the decisions of those of upper management, as well as to learn from their actions, while also coping with the union workers and understanding their position in the rare conflicts that occur.

C. Life Out-side of Co-op

In terms of finding housing, there is a list of options. For me, specifically, there were many listings on craigslist. In addition, a lot of my personal contacts here, both program members and employers, had space in their apartments. However, this was mainly for the fall term. The summer term I spent here, GE generously housed me in a college dormitory.

As for transportation, I would strongly recommend an intern to find out what type of city they will be working in. For me, I was in Erie, PA and a mobile vehicle would definitely have helped me in a number of ways, since my house, my workplace and all the convenient stores were a good distance away from one another. My attempt at biking to my destinations proved to be very tiring and depressing.

D. Evaluation

The best features of this job would have to be the networking opportunities I have achieved. Getting to know different interns from all types of backgrounds, as well as to see the different types of roles involved in a manufacturing floor setting enlightened me in all sorts of aspects. I have gained a better understanding of what corporate life is, and am glad to be a part of it as such young an age.
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Thomas Byuen
th287
Operations Research Engineering
General Electric Transportation
Summer 09

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