Co-op First Term Job Summary
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I. Introduction

For my first co-op term, I worked at Fairbanks Morse Engine (FME) in Beloit, WI. The company specializes in building both large engines for marine use and engines for nuclear backup generators. Most all of the parts for these engines are manufactured in house, where assembly and final testing are conducted as well. Something I think is really cool about FME is that you can see an engine go from a block of steel to a finished product all in one place. Also, the fact that when engines are tested the building begins to rattle because of how large they are. I found a lab position at FME through an independent search online, so coming to Beloit I originally had no idea what to expect.

II. Co-op Work Assignment

At FME, the position I held was in the Materials/Metallurgy Lab under Shawn Tunks (Lab Supervisor) and Jim Buntjer (Sr. Lab Technician). The lab (which during this semester consisted of the three of us) served as part of the quality department, and was predominantly responsible for both mechanical and chemical testing and analysis of sample parts. My orientation to the job consisted of a formal orientation from both the Human Resources and Safety departments, and then a solid chunk of reading covering everything from what the machines in the lab were used for to proper use and expectations. After that I filled my spare time reading about anything relevant, such as how an engine actually works (which I knew surprisingly little about) and what the differences were between different grades of steel. Despite the amount of reading I had at the beginning, I had already quickly realized that I had a very hands-on job when before noon on my first day I was already being shown how to run a chemical analysis on a sample. On-the-job training is how I learned most of what I did, and I found it to be a wholly effective method.

After I was sufficiently trained on most of the equipment in the lab, my day to day activities consisted of making sure most of the work in the lab was done on time. One of the goals in the lab was to have a three day (or less) turnaround time for testing incoming parts, and having zero overdue jobs at the end of the week. The type of work I carried out consisted of sample preparation, hardness testing, microhardness testing (for small parts), tensile/compression testing, minimal heat treatment of gaskets, chemical analysis, specific gravity testing, microstructure evaluation, and visual examination for material defects. As the materials lab was going through an ISO 17025 accreditation process, my supervisor was often busy with related meetings or paperwork and I took on much of the lab’s daily testing work. At first it was a lot to do, but as I got better at efficiently going through tests I was able to more easily keep up.

In addition to standard testing I was also given a few different projects to work on. One of these was to begin a failure investigation on a series of fractured bolts. For this job I had to first do a lot of reading to learn about failure analysis and different fracture surfaces. After that I did hardness testing on a sample set of bolts to see if there was a correlation between pieces that were out of specification and their respective heat/lot numbers. Finally, I had to characterize the fracture surfaces and determine
how the bolts failed. Most of the other projects I worked on were not difficult, but were very time
dependent. For example, a customer needed a camshaft as soon as possible once, so testing each lobe
in the lab became a priority so it could be shipped out.

Aside from material testing, I also participated in other activities to help maintain the lab. This
mainly consisted of contributing to the plant-wide ‘5S’ culture, which was a system to help keep things
sustained and organized. Each week we would devote an hour to straightening up things in the lab or
cleaning out one of the back rooms where the stuff that ordinarily never sees daylight hides. It’s
amazing what one hour of devoted time can do.

III. Assessment of Learning and Development

The type of work I did at FME aligned almost perfectly with both my educational background
and career interests. Being a Materials Science & Engineering major, I took a class called Mechanical
Properties of Materials (MSE 2610) which gave me a good background understanding of the concepts
that I would be using every day for my co-op. Coming to this job I thought I had a very solid
understanding of materials and what I would be working with, but that thought was very quickly blown
away. In the first few weeks on the job I was able to learn and retain more information than I had
retained from an entire semester of class on the subject (not because the class was lacking or inefficient
in any way, but because being able to learn by actually testing things yourself and seeing the
consequences of those properties was very efficient for me). I look forward to being able to go back next
semester and apply what I learned on the job.

In addition to academic growth, I also learned a lot about professional culture and what it is like
to be in a working environment. Most importantly, I learned that the way in which things are done is not
a fully rigid system. In most cases, if there is something that can be improved, suggestions are always
welcome. As an intern, I was able to point out a few things that should be changed in the lab simply
because I was looking at the situation with a new set of eyes. The fact that these improvements could be
mentioned and something would be quickly done about it made me feel as if I had the opportunity to
really contribute. Also, the fact that there were three people in the lab made making changes a lot
easier.

Another very important thing I learned is that in a professional culture, you have to own your
mistakes. Throughout high school and college (a little less so) it is easy to make up excuses and ignore it
if your mistakes have no consequences. In a professional atmosphere though, you are fully accountable
for your work and if everything doesn’t go quite right, you need to take responsibility (and sometimes
clean up the mess). Coming into the lab, my supervisor told me that during my time here, I was
inevitably going to destroy a sample or mess up a test. While I got lucky and there was a spare for the
sample I accidentally destroyed in a grinder, the concept still held.

IV. Life Outside of Co-op

I got very lucky with finding housing in that Human Resources was able to provide me with
contact info for some people in the area. I was able to find a woman who rented out the top floor of her
house who did not currently have a tenant, and was therefore willing to let me have a four month lease.
If I hadn’t been given her contact info though, finding housing would have been very difficult since
almost no apartment complexes in the area were willing to give a short term lease at a decent rate. I
was also very lucky in that the apartment I got was in a good part of town. The only downside was that my apartment did not have access to laundry, so I went to a laundromat down the road that could be a little sketchy at night. As far as transportation goes, I would recommend having a car since not much is within walking distance, and Wisconsin quickly gets too cold to bike.

I was the only intern at the company, so finding something to do after work and on weekends was difficult at first. After a few weeks though, I found out that FME was just down the street from Beloit College so I went over there to meet people. Being a small liberal arts school everyone was really friendly, and I was able to find an awesome group of friends. They had Nerf fights and games every Wednesday, so it was really fun to join in. I definitely recommend meeting people there, because sitting in your apartment every night gets really boring after a while.

V. Evaluation

I believe that deciding to participate in the co-op program was one of the best decisions I have made. One of the things I liked most about this job was how closely the work I did related to my major. Originally I had thought that MSE was so small that I wouldn’t find a directly connected job, but after working for a semester I have a better idea of how large professional networks really are. I now know more about what working in engineering is really like, and how that work is related to the overall function of a company. Overall I really loved my experience at FME, and if I were to go through the same experience again I wouldn’t change anything.