

# 2007 MATC Internship Report

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The Schemmer Associates



My experience with The Schemmer Associates has been unparalleled to anything that I could have learned in the classroom. I never would have thought that I could have got such a broad experience not only in engineering, but also in construction and administration in only one summer. I learned everything from roadway and culvert design in MicroStation to material testing and overseeing the construction process.

I didn't know what to expect on my first day with Schemmer. I had three years of construction experience which is closely related to what I would be doing, but in that job I only did what I was told. I wasn't sure if I was able to be the one who makes the important decisions about the design of the projects.

The first project that I worked on was a preliminary design for a three block run of roadway. This was a pretty straightforward project; the only problem was that I had never used MicroStation before. It was a really good project to learn on. With this project I made a rough alignment design that included pavement, sanitary sewer, storm sewer, and sidewalks. After I finished the design I was asked to make a preliminary cost estimate so the purchaser had a rough idea of what the project would cost so they could determine if they were willing to head forward with the project. I learned that MicroStation has a powerful tool for calculating areas and volumes that I would use in my cost estimate. With this, I compiled all of the quantities of material in a spreadsheet that summarized all the costs of the project.

Now that I was experienced with Microstation, I was able to take on more in-depth projects. I worked on the design of Yankee Hill Road between 70<sup>th</sup>

Street and 84<sup>th</sup> Street, as well as some pavement along 70<sup>th</sup>. I found this to be an interesting project because I couldn't use the current topographic map as a reference because the roadway was going to be widened in the next few years. The design that I was working on was several years down the road, so I had to use the preliminary design of another project as the existing roadway. This was a little tricky because the MicroStation file that I worked in had almost 50 reference files in it that included several different topographic, design and drainage files.

After the design, I analyzed several different aspects of the roadway such as sight distance, pavement markings, construction and removal quantities, construction phasing, and roadway geometrics. After I finalized my design, the next step was to prepare the plans for the project. I made sheet files for the design and compiled them into several pages of plans so that they could be reviewed by many engineers and eventually used by the contractor for construction.

One of the most interesting and unexpected things that I did during my internship with Schemmer was design culverts for drainage flow. The project I worked on had already been designed, but used county standards. My job was to improve the design so that it would meet city standards. On this task I learned how to use the city of Lincoln standard plans in order to ensure that the design would be up to code and estimate the amount of material that needs to be used in order to build the culverts.

Another important consideration to think of when putting in culverts is how much dirt will need to be excavated in order for the pipe or box to be installed. In order to determine this, I had to reference the Nebraska Department of Roads booklet of standard specifications. It described how to estimate the quantity, procedure, and method of payment for installing and constructing the culvert. With that information, I was able to put that on the plan so that the contractor can make an estimate for the project.

For the second half of the summer, I got to get out of the office and get some “hands on” experience with engineering and construction. I spent three weeks with a survey team while we laid out hundreds of stakes for the contractor to build roads, parking lots, and piping systems. The equipment that we used was far more advanced than the instruments that I used in my entry level surveying class. The total station was pretty much the same, but we used a data collector that would determine the coordinates of the stakes. I was really surprised on how meticulous the surveyors were when staking out construction sites. I also learned how to use and operate the GPS system, which I found to be a lot easier and more time efficient.

Another unexpected experience I had with Schemmer dealt with construction administration. My job was to make daily inspections and tests to make sure that the contractor was building the project according to the plans and specifications. Also, I measured the quantities that determined how much the contractor would be paid for certain parts of the project. This included a lot of measuring and referencing to the plans to determine if the construction was built

properly. I also would be on site when concrete was poured and learned how to test the air content, slump, temperature, and make cylinders that would be tested for strength later. I really enjoyed getting out to the office and seeing the project through completion.

My experience with MATC was a great way to get my feet wet and experience what real world engineering is all about. My broad experience definitely allowed me to learn so much that can't be taught in the classroom. I'm glad that I got the opportunity to see how a consulting firm operates and get the experience of working on real world projects.