SCHEMMER

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Summer Internship Report 2021

By Brandon Vogel

This summer throughout my MATC internship, I worked at Schemmer in their geotechnical and field services department. At first, I really did not know exactly what I was going to get myself into at the start of the summer, however, as time went on, I felt like I really learned and understood my role in this department and the certain tasks geotechnical engineers work with on a daily basis. I performed a large range of tasks: anything from soil testing, concrete testing, and everything in between. I was constantly learning new things week to week, and I never felt like I was doing the same thing every week. I really enjoyed this aspect of my internship. I felt like I really was able to explore all the different aspects of field services and geotechnical investigations.

I started out the summer performing lab work such as unconfined, moisture and density tests of soil samples, as well as studying and training to be able to do compaction testing in the field. Throughout the National Nuclear Gauge training course to be able to do compaction nuclear gauge testing I learned a large variety of chemistry, as well as safety whilst in the field. I think this set of training was very important for me to be able to perform the duties of compaction testing safely and effectively. This training, along with training for concrete testing really helped me understand why it is important to test soil and concrete prior to construction.

In geotechnical engineering it is important to make sure that anything that is involved with construction is built to last and have a strong compacted base prior to construction. It is also important in these investigations that the soil or concrete that is being laid down has as little voids as possible. Voids are small air or water pockets found in soil or concrete. These voids are important to be limited for concrete and compaction tests to pass. If soil is not compacted enough this is because of too many

voids in the soil or air pockets resulting in a failed test. Also, in the instance of concrete testing I would use an air pot to determine the amount of air in each concrete sample. If the air is not in each specification range for a site this could result in the concrete not being strong enough for any given purpose. Furthermore, I would create and test concrete cylinders on different sites throughout Nebraska. I would test these cylinders by placing them under a large device that would slowly crush the concrete sample. This would give out a final resulting load onto the sample which would then help determine the given strength of the concrete. It is very important for geotechnical engineers to check these voids, air and water particles, in soil and concrete to prevent potential hazards from arising in the future.

The first time I went out into the field for compaction tests I learned a lot from this experience. I called my boss at Schemmer, and he walked me through how to set up the nuclear gauge, as well as perform my first test. I learned a lot from this experience. I learned that the nuclear gauge utilizes two different types of radioactive material to perform its two purposes which are to determine the moisture content, as well as determine the density of any given soil. Americium 241 is one of the two radioactive sources, and this is at the base of the nuclear gauge, and it is used to send out radioactive particles to bounce off the water droplets in a soil area to determine moisture content. Cesium 137, on the other hand, is a source rod that goes into a hole in the soil to measure density. This density can then be compared to the proctor density of a soil sample to determine the resultant compaction of a given soil sample. This compaction is important to make sure that the soil is stable and there are not many voids in the soil.

Schemmer has a geotechnical engineering lab that is separate from the main corporate office that I was working out of. I learned a large variety of tests that geotechnical engineers use in their investigations to understand the type of soil that is used at different locations across the country. Two tests that I learned and performed frequently were the Atterberg Limits test and the Sieve test. The Atterberg limits test is used to determine the plasticity and the liquid limit of a given soil sample. The result of this test is to determine the type of soil that is being investigated for a sample. I also learned how to perform and investigate a sieve test. It is important to perform this test for geotechnical investigations in sandier soil to determine the particle distribution that there is any given sample. This is done by placing a washed dry soil sample into a sieve which is a mechanical device that has holes in it that only allow different sized particles to pass through each level.

Over the course of my 2 and a half months at Schemmer, I learned a large variety of soil testing, and concrete testing techniques. I was very fortunate to work at Schemmer and learn from the geotechnical engineers what the job entails day in and day out. I learned a variety of ways that soil is tested for geotechnical investigations, as well as concrete. I am nearing the end of my summer internship, however, along the way I have learned many things involved with Civil and Geotechnical engineering at my time here. I am sure I will continue to learn and carry the lessons I have learned from my time at Schemmer to my future career in engineering.