MATC Summer Internship Program

Final Report

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My MATC internship with Schemmer last summer was filled with firsts: my first internship, my first fulltime job, my first time travelling for work, and my first real insight into what civil engineering could look like on a day-to-day basis. This introduction was extremely valuable in giving me basic skills and knowledge of the transportation engineering subdiscipline, supplementing what I had learned in my college courses. On the other hand, my internship this summer with Lincoln Transportation and Utilities (LTU) has served more as a comparative experience than an introductory one. Having already worked with one employer for multiple months, which gave me a baseline of what to expect from the profession at any place of work, this LTU internship has allowed me to notice differences in the two jobs. Schemmer is a private firm while LTU is a public agency. My work at Schemmer was more roadway design whereas at LTU I am in the traffic engineering division. Schemmer does projects in multiples cities and states while LTU operates only within Lincoln. These differences have resulted in a variety of new important takeaways for me this summer and I will be discussing these through a description of my individual office work, my site visits and meetings, and the Nebraska Institute of Transportation Engineers (NITE) events that I have attended the last few months.

While the majority of my time at Schemmer was devoted to a single project, my assignments at LTU have been more diverse. To begin the summer, I was given video of different intersections around the city, most of which were part of designated school walking routes and had received complaints from users with safety concerns. With the wellbeing of Lincoln citizens being a top priority for a city municipality such as LTU, these voiced concerns are not taken lightly and the issues that are brought up are

studied. Watching the recordings of these intersections, I tracked the volume and direction of all pedestrians, bicyclists, and vehicles during an average day and measured gaps between vehicles during the evening peak traffic hour. I then reported this data to others in my department, where decisions could then be made about whether changes were required at the intersection or not. A few other assignments that I was given included creating a proposed map of the hospital signing across town and taking stock of the temporary traffic control specifications present in the Lincoln Standard Plans, as well as those for the Nebraska and Iowa DOT's.

The two most recent projects that I have been tasked with have been the most demanding but have also allowed me to greatly improve my understanding of the engineering process. The first of these assignments was to create plans sheets for three different intersections where new advance warning flashers would be installed to alert drivers of upcoming school zones or pedestrian crossings. For this, I had to locate the intersections, pull aerial imagery and existing utilities and other objects into the file, draw and callout new wiring and cables, layout the removal and replacement of signs and sidewalk, and calculate quantities and approximate costs for the entire project. The other assignment was a large-scale revision of many of the Lincoln Standard Plans. I was given 10 to 15 plans that needed updates such as new details, removal of obsolete items, more descriptive notes and callouts, or simply a more organized layout. This second project was entirely different from anything I did at Schemmer; for a public agency, it is important that LTU creates strong and clear source material for private firms and contractors to work from.

These final two projects were extremely frustrating many times throughout my time working on them. I was constantly having to look up standards, dealing with computer issues, or asking my boss questions. Each of these assignments had a review process where my drafts were sent out to those with greater expertise in areas such as signals, signs, or sidewalks and it was interesting for me to be a part of this process as this was something I had not experienced at Schemmer, but these reviews often called out mistakes or missing information in my work which could be disheartening. Overall, however, I was able to recognize that these comments were not personal attacks on my drafts, but rather just a normal part of the design operation to yield the most complete and accurate final product. While frustration was certainly a factor often present during my work, both projects were eventually completed to the best of my abilities and my knowledge of traffic engineering, plan sheets, and MicroStation were advanced during the process.

My time at LTU has largely been spent at my cubicle or in my boss's office, but over the summer I have also attended a variety of meetings and visited job sites across Lincoln. These have included a discussion of questions about signs and pavement markings, decision-making on school zone intersections using data that I had collected, an overview of the progress of current and future city projects, the routine checking of temporary traffic control devices along a North 27th Street construction corridor, and the installation of a new traffic cabinet, which required police officers to direct vehicles through 27th and Cornhusker Highway for multiple hours. Because of my relative inexperience in the profession, I served mainly as an observer for most of these events, but I feel that they were valuable for me to attend nevertheless. It was interesting to see

the interactions between professional civil engineers, LTU sign and signal shop workers, private contractors, and constructions workers, all with varying areas of expertise. This diversity of individuals sometimes caused misunderstandings or challenges, but for the most part, these groups collaborated well together and used their different knowledge bases to have high-level discussions of the issue at hand. In class, we only ever really get the chance to work with other civil engineering majors, so being able to watch every person involved in a traffic project communicate, negotiate, and solve problems together is an experience that I am grateful for. I am not naturally the most outgoing or most outspoken, so knowing that these types of conversations are a crucial part of a civil engineer's career gives me further motivation to grow in this area.

There was one instance of field work where I was actually heavily involved and that was on a set of site visits for the school zone advance flashers project that I discussed previously. My boss and I drove to each of the three locations, where a crew had already located and marked existing utilities within the proposed site. My job then was to take measurements of where the utilities were compared to surrounding reference points and to take pictures of the site as a whole. These tasks were not exactly what one would imagine an engineer doing and were far from precise but were necessary steps in the project. Also, I was made aware that any measurements that I took that were included in the final plans would be verified by a construction crew before any earthwork was done. The results of the work that my boss and I performed revealed that the utilities could potentially interfere with proposed pedestal pole foundations or sidewalks, which led to problem-solving back in the office and the eventual changing of the initial plans to suit the existing conditions more effectively. This experienced helped

to solidify in my mind the fact that conflicts and issues will always arise in engineering projects, regardless of their size, but that engineers are also trained to work through these issues and find solutions that are both safe and cost-effective. The real world is never as simple as examples from a book or situations in a laboratory, so being able to make these quick adjustments is critical for the success of a project.

Finally, I attended a couple events in Omaha organized by NITE. These were both single day events, the first being a joint conference with the local chapter of the American Society of Civil Engineers (ASCE) and the second being a mini-golf social outing. The conference featured around a dozen speakers presenting about new projects, initiatives, or technologies in the traffic and transportation engineering fields. One of these topics was about a new pedestrian trail in Council Bluffs that would utilize engineering, architecture, and landscaping concepts to yield an appealing and functional product for its users. Thus far in my college career, I have been versed in the fundamentals of engineering, but haven't necessarily been exposed to some of the more unique applications or cutting-edge ideas in civil engineering, so this conference was a good way to expose me to these concepts. The conference also had dedicated times to talk and network throughout the day. I spoke with engineers from Schemmer, Olsson, and UNL that I recognized, as well as a fellow MATC intern, and met engineers from firms such as FHU. Later in the summer, at the mini-golf outing, I was able to meet again with some of these individuals and get to know more about them and their work while also getting some recreation on a Friday afternoon. Similar to our company intern meetings at Schemmer last year, these NITE events allowed me to connect with engineers my own age and deviate my days from the typical office work.

Through writing and CAD drafting in the office, meetings, field work, and special events, my MATC internship at LTU has made this summer another very informative and enjoyable one. More challenges of civil engineering were revealed to me, but so too was more confirmation that this is the field that I would like to make my career in. This internship paired with my experiences of last summer have allowed me to compare the public and private sectors, as well as transportation and traffic subdisciplines. I know that I enjoy the lower pressure atmosphere at LTU, but also the greater range of project types and locations in the private sector is appealing. Transportation engineering, or more specifically, roadway design, was easier for me to visualize, while traffic engineering has had a lot of electrical concepts that have been difficult for me to grasp, but also is interesting to me in its methods and scale. These ideas that I have developed over the last two years have not led me to a final decision of what kind of job I will be looking for in the future but will certainly give me something to think about as I gain more technical knowledge in my final year of UNL's civil engineering program. Regardless of what path I end up taking, the lessons that I have learned through the MATC program about technical writing, drafting, plans creation, field procedures, and communication will be extremely valuable.