Interning with the City of Lincoln Public Works Traffic Engineering

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Perhaps the quote that stuck with me the most from my Intro to Highway and Traffic Engineering course I took last spring was “Everybody thinks they are a traffic engineer”. This quote really stayed with me because of how true it was. Traffic engineering is the one sub field of engineering that everyone can comment on because almost everyone drives. With this opportunity, I got to work with traffic engineers which has answered a lot of questions I have thought about every day while driving. What decides where there are stop lights and where there aren’t? What decides how much green time a light gets? I learned all these processes and more during the last few months. My days were split between work at the office, meetings, and fieldwork throughout Lincoln.

I worked with several programs throughout this summer. Some I had experience with such as Excel and Google Earth Pro, and others were completely new to me including Avigilon and Synchro. I learned a lot through all of these programs, especially Excel. I always knew excel was powerful, but I had never seen firsthand how useful it was. The project I spent the most time on was working on a turning movement count spreadsheet that also could prepare signal warrants.

This project is actually a continuation of the project last year’s MATC intern, Ben, was working on. I began by adding pedestrian direction arrows to the graphics that display the peak hour volumes of each road and crosswalk. After deciding on a good layout for the graphic, I was taught how to work with macros using visual basic in excel. I used this to implement a macro that changed all the graphics to the peak hour volume for the selected crosswalk. This would bold the selected crosswalk and make the other crosswalks more transparent. It would then display the peak hour volumes for the peak

hour of that crosswalk. For example, if the north leg of crosswalk was of interest, one could see the peak pedestrian volume and the volumes of the traffic at that time for just that time. This was a great learning experience for me as I had to learn how to run my macro in a loop so that it had a shorter run time and would be easier to edit in the future if need be.

A few weeks later I began to work on signal warrants. The MUTCD has nine warrants that an intersection can pass in order to justify installation of a traffic signal. This template is equipped with several worksheets designed to calculate whether or not an intersection passes each warrant. All of my previous work with the template did not involve the worksheets that calculated the warrants so I had to learn how these worksheets related to the rest of the template. I made several improvements to this area including adding a macro that hides and un-hides certain groups of sheets (the template has 42 worksheets, making it very cluttered at times). With the warrant area of the template complete I could check which intersections from my list would pass. Despite all the intersections only needing to pass one warrant to be considered for a signal, none of them passed, which made writing the reports for the aforementioned warrants easier.

I also used Excel on several other smaller projects as well. I used it to make crash studies for several street segments and intersections. These were necessary for the neighborhood traffic mitigation studies I wrote. If a Lincoln resident thought that their street was suffering from “cut-through traffic”, or traffic was using the neighborhood roads as a short cut, they can request that the city do a study on it. We then put up radar sensors for a week in order to get both volume and speed data. For the three studies I wrote, the data was already collected so I only needed to use the data to make

graphs and write the report. If the volumes or average speed passed the set thresholds of 1000 vehicles per day or 30 miles per hour the neighborhood can go onto the next step of the process which is getting 60% of the residents in the affected area to agree that there is a problem and want to solve it. If that passes, then the neighborhood must pay for how the city thinks the problem would best be solved.

Another reason I made crash studies was to see how the newly installed flashing yellow arrows (FYAs) were affecting left turn crashes at select intersections. Ideally the FYAs can make left turns at an intersection 30% safer just by keeping the drivers eyes on the signal head in front of them.

I enjoyed all the work I did at the office, but working in the field throughout Lincoln was always a welcome break. I was treated to a great variety of interesting tasks. It spanned from newly painted crosswalk inspections, installing radar sensors for studies, and measuring crosswalk/vehicle clearance distances. All this was done while wearing my bright neon traffic engineering safety vest of course! One day of field work I thought was particularly interesting was helping lay out parking spot lines on resurfaced roads in the Haymarket. It was really cool working on something that people are going to use every day. I've now got an even bigger appreciation for the elusive parking spots downtown.

One thing I didn't realize would be an important takeaway from this internship is how meetings are conducted. I attended several Green Light Lincoln meetings with consultants as the project continued and found as my knowledge of the meeting subjects grew, so did my familiarity with how meetings were run. I learned the events typically followed like this: friendly banter at the beginning, to quick introductions, to the

meat of the meeting. It was especially nice having a typed agenda as it made it easier to follow along when I wasn't familiar with the subject of the meeting. I have come a long way from the first meeting I attended just a few short months ago. I have gone from barely being able to keep up, to understanding the bulk of the meeting subject. However, my favorite "meeting" was a meeting that didn't even happen.

Nothing is better than getting a text saying that the traffic engineering group was skipping its team meeting in favor of riding the self-driving shuttle that had just arrived in Lincoln. Upon showing up to innovation campus, the shuttle operator demonstrated many of the shuttles features to us. I was very impressed by the shear accuracy of the pre-programmed path it followed. With its two centimeter path accuracy, we joked about putting our phones next to the wheels of where it started to see how much we would trust it. The shuttle rode very well and didn't break too hard when we had someone walk in front of it (although when someone hit the emergency stop button it was rough). Getting to see something that may be an integral part of the future of transportation was amazing. I am excited to see how these technologies will be implemented in the future.

Without this internship, I would have never gotten to experience this. I have learned an innumerable amount of information during my short few months here. I will never be able to look at a stoplight, crosswalk, or downtown parking spot the same. My experiences have left me excited about transportation engineering and my future career in engineering as a whole. I am very thankful for this opportunity and would say it was well worth my drive from Omaha every day.