MATC SUMMER INTERNSHIP PROGRAM

SUMMER 2018

Mid-America Transportation Center

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Over the summer months I participated in the Mid-America Transportation Center (MATC) internship program. I worked under Dr. Aemal Khattak and PhD candidate Myungwoo Lee collecting data on traffic flow. Our goal was to determine the effect a variable message sign (VMS) displaying estimated delays due to train activity would have on the route vehicles take.

The main task I worked on as an MATC intern was watching recorded video of westbound traffic on Old Cheney heading into the intersection of Old Cheney and Warlick Boulevard, then entering that data into an Excel sheet. The times I recorded data for were the morning peak traffic times, (7-10 AM) and the evening peak times (4-7 PM). I extracted data from videos before the VMS was present, then later when the VMS was displaying an estimated delay.

I recorded five main types of information: cycle length, composition of left turning traffic, composition of through traffic, train activity, and unusual activity. For the cycle length, I recorded green and red light start times in order to calculate the cycle length. Each cycle was given an ID and the data for that time period was recorded on that cycle's Excel row. For both left and through traffic, I recorded the number of passenger cars, SUVs, minivans and vans, pickup trucks, heavy trucks and buses, motorcycles, and bicycles, as well as the total number of vehicles through each of these lanes. For train activity, I recorded when I could first see the train starting to cross Old Cheney, when it leaves the intersection, and the duration the train occupies the intersection. In the unusual activity category, I recorded the number of times a vehicle crossed the solid line that marks the turn lane, as well as the number of illegal throughs and left turns

made. In addition to this, I recorded any unusual traffic situations that could affect our data.

Several unusual situations arose that affected the data. The main hindrance being the videos freezing frequently. When the video would freeze for a length of time that I thought would affect the accurate count of cars, I would note it. Some days would have upwards of 70% of the cycles affected, others had as few as 10% affected. Other unusual situations included a car crash on the opposite side of the street I was watching, and the road being used as part of a detour.

The second main task I had was installing the VMS and activating it when a train was present. The installation only took a day and consisted of mounting the VMS screen and solar panel on a trailer, then parking it next to the intersection. The VMS was set at a point where people would have time to see the estimated delay, and turn off Old Cheney onto Warlick Boulevard. We drove past the sign while it was activated to make sure drivers had a reasonable amount of time to see the message and merge to the turning lane if they choose to.

In order to activate the VMS, I would sit by the train tracks and radio Myungwoo when the crossing guard began to flash. He would then activate a timer on the VMS that would display and count down the estimated delay. In addition to this, I recorded the time the guard started to flash, when it was upright, the time from when the guard started to flash to the train physically occupying the intersection, and the time from when the train had passed to when the guard was fully upright.

We had no way of knowing precisely how long the delay would be due to factors such as length and speed of train, as well as the delay caused by the queue dissipating.

Because of this, we displayed what seemed to be a reasonable delay of five minutes. If the train was still present after the five minutes, we extended the delay message. Out of 59 observed trains, only 4 required extensions. If the train finished crossing before the five minutes, we terminated the message early. We did this for two weeks during the morning (7-10 AM) and evening (4-7 PM) traffic peaks. Half of these sessions I split with another intern, Aaron Schneider.

The video recorded during the VMS activation was then processed in the same manner as the video taken before the VMS.

I would like to thank MATC for giving me the opportunity to get hands-on experience in the engineering field. This experience gave me an appreciation for the behind the scenes work that goes into a project, as well as insight into the day to day civil engineering work environment. I would also like to thank Dr. Aemal Khattak for sponsoring me, as well as Myungwoo Lee for answering all my questions.