Submitted by:
David McClintock

"WHAT I DID DURING MY MATC SUMMER INTERNSHIP"
Final Report

Prepared For:
Mid-America Transportation Center

August 8th, 2011
The summer of 2011 marks my second year of involvement in the Mid-America Transportation Center (MATC) summer Internship Program. Both last summer and this summer I have interned with Iteris, Inc in Lincoln, NE. Iteris provides traffic consulting services to Federal, State and City agencies, and assists private developers and businesses with traffic management needs. Iteris has a company mentality that:

"Success is a journey, not a destination."

This mentality is a mindset of continuous learning and innovation. The learning aspect of this mindset entails understanding that engineering practices and technology are always changing, and embracing the pursuit of knowledge. The innovation aspect is applying learned practices and new technology to improve the safety and the efficiency of the transportation infrastructure.

During my first MATC summer internship I learned a lot about the fundamental principles and tools that Traffic Engineers utilize. This included exposure to reference material such as the Manual on Uniform Traffic Control Devices (MUTCD) 2009, the Highway Capacity Manual (HCM) 2000, the Institute of Transportation Engineers (ITE) Trip Generation 8th Edition manual and the Manual of Traffic Signal Design, and the American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets (Green Book) 2004. Last summer also introduced me to much of the software applied in the traffic engineering profession.
including Microsoft Office Suite, Adobe software, Microstation V8 XM, Jamar mechanical tube counting and turning movement counting software.

My second MATC summer internship created an opportunity to broaden my knowledge and experience even further. Since the summer of 2011 AASHTO has released the 1st Edition of the Highway Safety Manual (HSM). This publication documents the recommended methodologies for the evaluating and improving the safety of roadways and intersections. This resource has played an integral part in the work I have done at Iteris this summer.

The majority of my time this summer was focused on assisting senior engineers in completing the 2009 Lincoln Crash Study. The scope of this project involved the review of about 55 intersections with high crash rates and/or distinct crash patterns. The data for this project is generated from the Lincoln Police Department accident reports. The review process involved sorting the crash data at each selected intersection by Time of Day, Day of Week, by Crash Type, by Pavement Condition, and by Lighting Condition. Additionally all crashes at an intersection were drawn on Collision Diagrams to check for crash patterns at that location. The next step of the review process incorporated field visits to the intersections to check if the physical conditions were contributing to the crash pattern. Once an intersection review was complete Iteris staff provided recommended countermeasures that could potentially reduce the frequency of crashes at an intersection. My roles in this project primarily
consisted of creating detailed appendices for all of the intersections and taking photos at the locations Iteris reviewed (please see attachment for sample of work).

In addition to sorting and processing crash data, I had the opportunity to assist senior Iteris staff at progress meetings with the Lincoln Engineering Services staff (client for Lincoln Crash Study). This experience taught me the importance of taking thorough notes for meeting minutes and the importance of searching out a client's needs within a project. Senior Iteris staff provided an excellent example of tailoring the company skill set in a manner that maximized client benefit.

In conclusion, my second MATC summer internship was an experience of growth. I expanded my knowledge base and embraced new opportunities. I would like to thank the Mid-America Transportation Center and Iteris, Inc for the opportunity to further expand my knowledge and experience in the traffic engineering industry.

Photo right: Lonnie Burklund PE, PTOE on left and Steve Garbe, PE on right. Lonnie and I had a meeting with the City of Lincoln staff this day and we decided to wear slacks and polos. Neither of us thought we would both wear blue polos and black slacks. Steve got lucky with his clothing selection.
Crash Statistics

**N 27th Street and Vine Street Intersection Crash Data**

- **Total Number of Crashes**: 50
- **Crash Rate (crashes/MEV)**: 2.6
- **EPDO Rate (crashes/MEV)**: 9.75

**Intersection Ranking (Signalized Major-Major)**

- **Total Number of Crashes**: 1st of 29
- **Crash Rate (crashes/MEV)**: 1st of 29
- **EPDO Rate (crashes/MEV)**: 1st of 29

**Similar Intersection Average (Signalized Major-Major)**

- **Total Number of Crashes**: 10.0
- **Crash Rate (crashes/MEV)**: 0.84
- **EPDO Rate (crashes/MEV)**: 2.3

**Crashes by Type**

- **Turning**: 28%
- **Rear End**: 46%
- **Side Swipe**: 8%
- **Other**: 8%
- **Ran off Road**: 4%
- **Parked**: 2%

**Crashes by Pavement Condition**

- **Dry**: 76%
- **Wet**: 6%
- **Icy**: 2%
- **Snow/Slush**: 16%

**Crashes by Lighting Condition**

- **Daylight**: 74%
- **Dark, Lighted Roadway**: 22%
- **Dawn**: 2%
- **Dusk**: 2%

**2009 Crash Study**

**City of Lincoln, NE**

**Crashes by Time of Day**

**Crashes by Day of Week**

---

**NOT FOR PUBLICATION**
<table>
<thead>
<tr>
<th>Crash Pattern</th>
<th>Correctable EPDO</th>
<th>Countermessure</th>
<th>% Crash Reduction</th>
<th>Uniform Annual Benefit</th>
<th>Benefit/Cost Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB &amp; SB Rear End Crashes</td>
<td>66.24</td>
<td>Update signal timing to improve signal coordination along N 27th Street (Top Countermessure recommended for this intersection).</td>
<td>10 %</td>
<td>$52,885</td>
<td>149.6</td>
</tr>
<tr>
<td>Left Turn Crashes</td>
<td>101.92</td>
<td>Implement flashing yellow arrow signal.</td>
<td>10 %</td>
<td>$88,495</td>
<td>132.0</td>
</tr>
<tr>
<td></td>
<td>101.92</td>
<td>Review signal timings for clearance intervals.</td>
<td>10 %</td>
<td>$81,370</td>
<td>460.4</td>
</tr>
</tbody>
</table>

Countermeasures
N 27th Street and Vine Street