Chapter 8- Conclusions and Recommendations

Estimation of travel times on arterials has been a challenging task because vehicles traveling on arterials are not only subject to queuing delay but also subject to traffic signal delay as well as bottleneck delay from the downstream link. Few transportation professionals have conducted research at estimating travel times on arterial street networks, and even fewer of them have utilized the dynamic flow methods to estimate these travel times.

This thesis focuses on real-time estimating of arterial travel time by using the real- time detector data on arterial links. Algorithms have been developed for incident and non-incident conditions and have been validated using the CORSIM simulation model. In CORSIM testing and validation for the non-incident case, extreme traffic conditions with high incoming volume as well as a low incoming volume were simulated to check the validity of the boundary conditions. In addition, several time updates of the detector data: 100 seconds, 60 seconds, and 120 seconds were simulated.

The comparison between the algorithms developed and the CORSIM results indicates that the Mean Absolute Error is around 16 sec and the average percent difference is around 20%. The results also indicate that there is no big difference if detector updates of 100, 120, and 60 secs are used. Therefore, we recommend the use of 120 secs (2 minutes update) for its ease of real-time application. For the incident case, a small incoming volume was simulated in CORSIM and only a 12.7%

difference was obtained between the algorithm results and the CORSIM results.

In general, the statistics show that the algorithms are robust and provide good accurate results when compared with CORSIM. However, it is important to emphasize that these algorithms should be tested in a real-world situation using real world data in order to verify their accuracy under different traffic conditions.

Recommendations for Future Studies

The recommendations are divided into two categories: methodological improvements and software development.

8.1 Methodological Improvements.

When the incoming volume is greater than the intersection capacity, uniform delay and over-saturation delay are computed independently to estimate the intersection control delay of the observed group as stated in chapter 4, which is similar to the methods adopted in HCM2000. However, this separation is not needed to estimate the average stopped delay of the observed group behind the intersection, particularly if the 'queue vs time' curve is utilized. Therefore, we recommend that this new approach be explored in future research and compared with the current approach.

8.2. Software Development

Software should be developed to deploy these algorithms in real world application and offer the opportunity to test their accuracy in real world setting. The inputs to the software have two main components: a) geographical information for each link and intersection, and b) dynamic traffic information obtained from the detectors.

- The geographical information pertaining to each link and intersection are:

1. Cycle Length of the intersection.(sec)
2. Signal timing of the intersection.(sec)
3. Saturation flow of the lane.(vph)-normally 1800vph.
4. Total number of lanes on this link.
5. Number of lanes blocked under incident or construction conditions.
6. The location of detector.
7. The length of the link.(ft)
8. Speed limit of the link.(mph)

- The dynamic traffic information obtained from detectors are:

9. Number of detected vehicles.
10. Dwelling time on detector.(Occupancy)
11. Average detected speed.(mph)
12. Detector data updated time interval.