# ANALYSIS OF ARRIVAL TYPE ESTIMATION PROCEDURE

A Thesis

Submitted to the Faculty

Of

Purdue University

by

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In Partial Fulfillment of the

Requirements for the Degree

of

Master of Science in Civil Engineering

May 2001

This thesis is dedicated to my late father, Kenneth George Eidson. His love of music and passion for education has shaped me more than he could have ever known. He was always encouraging me to increase my knowledge and was a driving force in my decision to pursue a graduate degree. I love you, Dady.

# ACKNOWLEDGEMENT

I would like to thank all the people who have helped and encouraged me to reach this stage in my life. Thank you to my Master's Examining Committee members, Dr. Andrzej Tarko and Dr. Robert Proctor. Thank you to Dr. Darcy Bullock, for advising and encouraging me for the last two years. Thank you to my mother, whose love and support has kept me strong throughout many difficult times. Finally, thank you to my best friend, Kelly. Your love and determination has helped me accomplish this monumental task. I love you all. Thank you.

Special thanks are also in order to all of the individuals who participated in this study. Thanks to the employees of the Indiana Department of Transportation, the students in John Lewis' Physics class at Glenbrook South High School, my colleagues and friends at Purdue University, the students enrolled in several classes at Purdue University, and students enrolled in Dr. Messer's Traffic Engineering class at Texas A&M University.

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# ABSTRACT

Eidson, William, C. M.S.C.E., Purdue University, May 2001. Analysis of Arrival Type Estimation Procedure. Major Professor: Darcy Bullock, P.E.

This thesis explores the estimation of arrival type, an important part of the Highway Capacity Manual 2000 (HCM 2000) procedure for estimating delay and level of service at signalized intersections. Arrival type is a proxy variable, which represents the quality of progression of traffic arriving at an intersection. The research examines whether arrival type can be reliably estimated using the procedures outlined in Chapter 16 of the HCM 2000. The objective is to review the impact arrival type has on delay estimation and to quantitatively evaluate the variance and statistical similarity of arrival types estimated under controlled conditions. Progression quality issues are discussed and potential additions and clarifications are explored. To understand the impact that arrival type estimations have on delay results, an experiment was conducted using the HCM 2000 arrival type estimation procedure. In the experiment, participants were shown video clips of traffic at different intersection approaches and asked to estimate the arrival type. The results are categorized by response groups and approaches, and are compared to the calculated results from the HCM 2000 analytical procedure. The results show generally consistent responses when compared within groups and between groups, but significantly different results when compared to the calculated arrival types. Based on the response trends, several additions to the HCM method are proposed. Recommendations are to include the impact of green split percentages, instructions

specifying the need for unique arrival type estimations for each lane group, and generally clarifying the instructions for estimating arrival types. The study results suggest that these changes and clarifications should be considered for incorporation in the HCM 2000 delay estimation and level of service procedure for signalized intersections.