

UNIVERSITI TEKNOLOGI MARA

**EVALUATION OF TRAVEL TIME AND SPEED
ON MID-BLOCK URBAN STREET USING
COMPUTER SIMULATION MODELS**

AHMAD FAIRUZ BIN OTHMAN

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ABSTRACT

With the ever increasing technological improvement to personal computers, traffic simulation approach has been gaining popularity in applications of traffic operation analyses. Simulation is easily executed on the personal computer and is gaining favour with practitioners. Therefore by developing and tailored made one's own software through effort and initiative, one will be able to develop an understanding of how simulation software work and as a tool that can help to overcome local traffic issues. The primary aims of this study are to evaluate the microscopic traffic operation model such as travel time and average spot speed based on computer simulation. Computer simulation based on car following theory was developed based on empirical traffic data and then incorporated into computer modeling. In the simulation development process, validation with site empirical data was compared with simulation output using paired T-test and discrepancy measure such as MSE, MAE, and MAPE. In the next stage the simulation output was then checked and validated with established model from Transportation of Research Board, 2000. Through this software output on traffic trajectory profile both travel time and average spot speed can be retrieved, several descriptive models are established to assist the engineers to evaluate and have a better understanding of the local traffic system. As the software is a local made and hence, fit to the localized traffic system operation. Furthermore, the simulation software can be used to established models such as travel time and average spot speed. For other sites and traffic evaluation for localities can be made. Several applications advantages of using traffic simulation approaches are traffic disruption is avoided, traffic simulation is less costly as compared to real case study, the results can be obtained quickly and sensitivity analysis can be performed easily with no physical changes required as for experimental purpose. Thus, with traffic simulation approach one can evaluate traffic conditions effectively efficient and above all, safe solution prior to implementation of the traffic policy.

Keywords: *Car following theory; Simulation software; traffic trajectory; travel time model.*

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CHAPTER 1

INTRODUCTION

1.1 General

Traffic simulation is an often used tool in the study of traffic systems. It is a powerful, cost efficient tool for the study and analysis. It is also become an important tool for modelling the operation of dynamic traffic system. Over the past half century, research and field experiments to study car-following behavior have been conducted on test tracks and roadways, and then modeled to represent drivers' behavior. Car-following models form one of the main logical processes in all microscopic traffic simulation models such as INTEGRATION, CORSIM, VISSIM and PARAMICS, and in modern traffic flow theory. Therefore, a computer simulation is a need for this study to have a better understanding on the dynamic characteristics of traffic flow. A variety of theoretical approaches and mathematical description have been applied to the study of traffic flow on a roadway. A part of those theory is called "car following" that has been explored extensively in this situation.

The general idea is that the motion of each car in a stream of traffic depends on lead and lag vehicle. Car following theory and single lane no passing will involve the headway between vehicles in a traffic stream which is fundamental importance in traffic engineering application. The novel of car following theory was initiated by Pipes (1953) and Forbes et al (1958) which was derived from the minimum safety distance concept.