

**STUDY THE EFFECT OF VEHICLE COMPOSITION ON
SATURATION FLOW AT SIGNALIZED
INTERSECTIONS**

Pathirage Dinushka Roshani Perera

(148311F)

Degree of Master of Engineering

Department of Civil Engineering

University of Moratuwa

Sri Lanka

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Pathirage Dinushka Roshani Perera

(148311F)

Dissertation submitted in partial fulfilment of the requirements for the degree of
Master of Engineering in Highway and Traffic Engineering

Department of Civil Engineering

University of Moratuwa

Sri Lanka

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person.

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ABSTRACT

Study the effect of vehicle composition on saturation flow at signalized intersections

Signalized intersections are an essential component of a road network in urban areas where the traffic congestion has been a severe problem. Capacity is the most important factor which used for designing the signalized intersections and saturation flow rate plays an important role in determining the capacity. Therefore, saturation flow can be considered as an important parameter which is used for the planning, designing and controlling a signalized intersection. It is required to obtain the accurate saturation flow rate values to control and designing the signal timing efficiently and effectively. Many countries had executed researches regarding the saturation flow rates to suit their traffic conditions and identified the major factors which affects to the saturation flow which might be not suited for our local traffic conditions.

Sri Lanka is a developing country and it is experiencing a rapid urbanization in all cities. As a result, road traffic is subjected to growing rapidly and the traffic movement has become quite complex due to all type of vehicles are sharing the same carriageway. In addition to that, those mixed traffic consist of slow moving and fast moving vehicles and vary with the size and vary with static and dynamic characteristics and maneuverability as well. With this study, it can be identified that this heterogeneous traffic condition is one of the major factor which affects the variation of the saturation flow. Large number of motorcycles and three-wheelers can be seen in the traffic stream of the signalized intersections.

The objective of this study was to collect a large sample of field measurements and identify the way of pattern of varying the saturation flow with the mixed traffic condition. In that point of view, correlation was calculated with each vehicle types with the saturation flow. From the analysis, it was found that high percentage of motorcycles and three-wheelers increase the saturation flow and high percentage of heavy vehicle and cars decrease the saturation flow.

Generally passenger car units (PCU) were assigned to various type of vehicles in this heterogeneous traffic condition in order to regularize the capacity calculation in a common base. However with this study it was clear that those values cannot be used as fixed values and that values also vary with the static and dynamic characteristic of those vehicles.

By considering all those facts it is clear that PCU values and saturation flow rates which uses for the signal timing calculation should be reviewed and corrected to suit with the local traffic condition.

Key Words: Signalized intersection, Saturation flow, Capacity, Mixed traffic, Correlation

DEDICATION

To my Parents

Who Always Encouraged Me towards the Success

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P.D.R. Perera

148311F

Transportation Engineering Division

Department of Civil Engineering

University of Moratuwa

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LIST OF ABBREVIATIONS

Abbreviation	Description
HCM	Highway Capacity Manual
PCU	Passenger Car Unit
RDA	Road Development Authority