

**EVALUATION OF THE CRITERIA FOR  
DETERMINING PARKING REQUIREMENTS IN  
DEVELOPMENT PROJECTS IN URBAN AREAS**

Muhandiram Rallage Madara Priyadarshanie

178041E

Degree of Master of Science

Department of Civil Engineering

University of Moratuwa

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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 except where the acknowledgement is made in the text.

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## **ABSTRACT**

Urban commercial development is an integral part of the urban land use that affects the trip generation pattern in the city. Lack of adequate parking facilities will impact the road network as it will lead to on-street parking. Moreover, the provision of parking within the premises increases in the cost of the development. Therefore, regulations need to ensure that adequate number of parking is required based on the type of development. The parking requirement for office developments in the city of Colombo is based on the gross floor area of the building. But it may not represent the real parking requirement of the building. Therefore, the existing parking regulations for these types of development need to be revised in order to get the optimal parking requirement.

This research is focused on evaluating criteria for determining parking requirements in office development projects of urban areas. The scope of this study is defined as urban office development projects located within the Colombo Municipal Council boundary. To achieve the research aim, it evaluates the adequacy of parking provisions based on the vehicle trip generation patterns for urban office developments. In and Out, surveys were conducted to assess the adequacy of parking provisions. Literature analysis and opinion surveys were used to identify novel criteria for parking demand as well as trip generation. To rank the criteria AHP technique was used. Floor area, Employees, Service population and Parking capacity were ultimately selected as the novel criteria which can affect parking demand and trip generation for office developments.

Regression models were developed to estimate parking demand and daily vehicle trip generation. It was observed that floor area and employees have a significant influence on parking demand and employees, service population and parking capacity have a significant influence on trip generation.

More importantly, based on the study results, five recommendations were developed as due to obsolete and less effectiveness a new method is needed to estimate parking demand with a wide range of criteria, new criteria can be used to determine parking requirements and trip generation for urban office developments, developed models can be used to estimate parking requirement and daily trip generation.

**Keywords:** Parking requirement, Trip generation, Office developments

## **DEDICATION**

I dedicate this dissertation to Dr. H.R.Pasindu, my supervisor who encourage me to complete this study successfully, Prof. J.M.S.J.Bandara, my co-supervisor who guided me to complete this study and my loving parents who guided and supported me throughout.

M.R.M.Priyadarshanie

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M.R.M.Priyadarshanie

Department of Civil Engineering

University of Moratuwa

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## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Description</b>
UDA	Urban Development Authority
AHP	Analytical Hierarchical Process
OD	Origin Destination
ITE	Institute of Transportation Engineers
CMC	Colombo Municipal Council
SPSS	Statistical Package for the Social Sciences
MAE	Mean Absolute Error
MAPE	Mean Absolute Percentage Error
AAGR	Average Annual Growth Rate
VOR	Vehicle Ownership Rate
DSD	Divisional Secretariat Divisions
GDP	Gross Domestic Product
USD	US Dollars
MCDM	Multi Criteria Decision Making
DW	Durbin Watson
CCDP	City of Colombo Development Plan
UNDP	United Nation Development Programme
GND	Grama Niladari Division
MC	Municipal Council
PS	Pradeshiya Saba
MLR	Multiple Linear Regression
CI	Consistency Ratio
CI	Consistency Index
RI	Random Index