

**DEVELOPMENT OF A DEMAND MODEL FOR  
SCHOOL TRIPS IN COLOMBO DISTRICT, SRI LANKA**

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Degree of Master of Philosophy

Department of Civil Engineering  
University of Moratuwa  
Sri Lanka

September 2021

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Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree of  
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## DECLARATION OF THE CANDIDATE & SUPERVISOR

I declare that this is my own work, and this dissertation does not incorporate without acknowledgment 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 acknowledgment is made in the text.

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## **DEDICATION**

I dedicate this dissertation to my parents who encouraged me to complete this study successfully and supported me throughout.

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30.09.2021

## **ACKNOWLEDGEMENTS**

I am especially indebted to Dr. G.L.D.I. De Silva, Senior Lecturer of the Department of Civil Engineering, University of Moratuwa, and Dr. (Mrs.) R.M.N.T. Sirisoma, Director of the Career Guidance Unit, General Sir John Kotelawala Defence University, for their supervision and guidance throughout the entire period of the study.

This research work could not have been succeeded without the financial support provided by the SRC (Senate Research Council) of the University of Moratuwa under the grant number SRC/LT/2020/22. Further, I wish to express my gratitude to the Department of Civil Engineering, University of Moratuwa and its academic and non-academic staff members. Special mention to Prof S.A.S. Kulathilaka the former Head of Department and Prof (Mrs.) Chintha Jayasinghe the current Head of Department, in giving all the administrative support whenever necessary.

I would like to thank all the lecturers in the Transportation Engineering Group in addition to my supervisor, Prof. J. M. S. J. Bandara, Prof. W. K. Mampearachchi Dr. H.R. Pasindu and Dr. Loshaka Perera, who helped me both academically and otherwise during my time as a researcher.

Further, I would like to express my gratitude to my research progress committee members including Dr. Ganga Samarasekara (Chairman of the panel), Dr. J. C. P. H. Gamage (Former Research coordinator), Dr. (Mrs.) A.S. Ranathunga (Research coordinator), who provided me extensive personal and professional guidance to improve my research findings.

Finally, I must thank all the people whose names are not individually mentioned who helped me in many ways throughout the period of the study.

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## **ABSTRACT**

A school trip is defined as a trip that originated from home or a temporary residential location and terminates at an educational institution. According to the ComTrans study, a major portion of the traffic congestion in the Colombo district in the morning peak and afternoon peak are due to the school traffic. Understanding the distribution of origin-destination patterns of these school trips is important to manage the school traffic. This research targeted developing an origin-destination matrix for the home-to-school trips attracted to the government schools located in the Colombo district. The O-D matrix developed for the study area is further divided into four sub O-D matrices based on the mode of travel as active transportation, public transportation, private transportation and school van/bus services. Further, the research identifies a mathematical model to estimate the number of school trips between origin-destination pairs in the study area using the multiple linear regression techniques. The distribution of home-to-school trips is found to be directly proportional to the number of school-aged children residing in the origin zone, the number of students studying at separate categories of schools at the destination zone while it is inversely proportional to the distance between origin and destination zones and the number of Category I schools (which have classes up to advanced level all streams) at the origin zone. Based on the findings of this research, two mathematical models are developed for inter-zonal school trips and intra-zonal school trips separately. The outcomes of this research can be used for planning transport supply services for school children to fulfil their educational travel needs on a normal day. It may help the authorities to promote active transportation and public transportation among school children as a sustainable mode of travel. The methodology used in this study can be extended to other districts of the country to develop a national-level travel O-D matrix for school trips. Further, the mathematical model proposed in this research can be used for other districts of the country after validating it through a sample trip length frequency distribution diagram.

**Keywords:** School Trips, Travel Demand Modelling, Travel O-D matrix, Colombo District

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## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Description</b>
BOI	Board of Investment
G.C.E	General Certificate of Examinations
O/L	Ordinary Level
A/L	Advanced Level
O-D	Origin-Destination
CMC	Colombo Municipal Council
CMR	Colombo Municipal Region
DSD	Divisional Secretariat Division
JICA	Japan International Cooperation Agency
TAZ	Traffic Analysis Zone
MoE	Ministry of Education
TLFD	Trip Length Frequency Diagram
I-I	Internal to Internal
E-I	External to Internal
E-E	External to External
WED	Weighted Euclidean Distance

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