

**PREPERATION OF TIME, BUS AND CREW
SCHEDULES FOR A SELECTED PASSENGER
TRANSPORT BUS COMPANY**

K.A.C. Karunarithna

Thesis submitted in partial fulfillment of the requirement for the degree Master of
Transportation



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

Department of Civil Engineering

University of Moratuwa

Srilanka

January 2010

95717

ABSTRACT

In Sri Lanka the public transport bus services are provided jointly by the state sector and the private sector. The state sector has schedules for buses, and crews, but private sector buses are operated by individual operators and the permits are issued to only one selected route. As a result, the passenger transport services are difficult to manage due to the existing ownership structure. As a solution, the National Transport Commission recently introduced the formation of passenger bus companies.

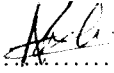
In this study, it is assumed that the buses are operated by well organized passenger transport companies. In order to provide reliable and comfortable service to the passengers, the passenger transport companies should consider two important factors buses and crews. These two factors should be scientifically designed in order to provide the best possible service to the passengers at the lowest possible cost.

Time tabling is the process of determining how frequently buses must operate on routes based on passenger demand. Bus schedules are process of assigning buses to trips to ensure that the total cost is minimized. Scheduling is carried out by assuming that the start and end time as well as the start and end locations of all trips are fixed. Crew scheduling is an important problem of a public transport company, since the crew cost are mostly dominant.

Furthermore, this study delivers a comparison between the efficiency of the new system and the previous system using performance indicators.

Declaration of the Candidate

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 University or other 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. .


.....

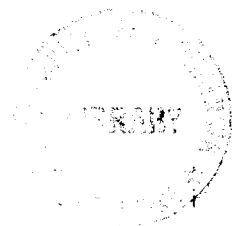
Signature

30/03/2010

Date



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk



Declaration of the Supervisor

I have supervised and accepted this thesis for the submission of the degree.

UOM Verified Signature

.....
Signature of the Supervisor

Prof. Amal S. Kumarage

Head of the Department

Faculty of Transportation and Logistics Management

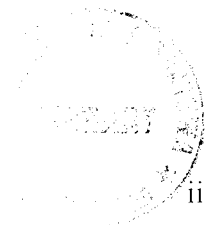
University of Moratuwa.

31/3/2020

.....
Date



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk



ACKNOWLEDGEMENT

This thesis would not have been possible without the precious support of so many people. First and foremost, I am very grateful to my supervisor **Prof. Amal S. Kumarage**, Head, Department of Transport and Logistics, University of Moratuwa for his valuable guidance, advice, proper direction and encouragement in every stage to the completion of this study. Furthermore, I am indebted to Dr. Wasantha Kumara, Course coordinator, Department of Civil Engineering, University of Moratuwa for his support and ever-friendly nature during the study period.

In addition, I would like to thank Mr. M.A. Jeffry, Director General, of the National Transport Commission for providing such a great opportunity and general support during the last four years. Furthermore I would like to thank Mr. Anuradha Piyadasa Consultant, SLTB for his, invaluable guidance and advice. I cannot forget the help, encouragement and support received from Mr. Vipula Hewa Valimuni, Director Operation, National Transport Commission throughout the study.

Finally, I wish to sincerely thank my husband for his constant support and encouragement in all my private and professional endeavors.

K.A.C.Karunarathna.

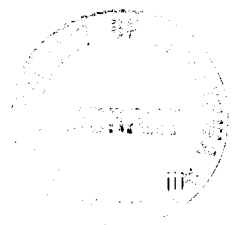


Table of Contents

Declaration of the candidate	i
Declaration of the supervisor	ii
Acknowledgements	iii
Abstract	iv
Table of content	v
List of Figures	vi
List of Tables	vii
List of annexure	viii
Chapter 1: Introduction	01
1.1 Background	01
1.2 Research problem	01
1.3 Proposed solution to the problem	03
1.4 Objectives of the research	06
Chapter 2: Literature Review	07
2.1 Introduction	07
2.2 Public transport planning process	08
2.3 Crew roster types	10
Chapter 3: Methodology of Study	16
3.1 Introduction	16
3.2 Steps of scheduling	17
3.2.1 Demand, Requirements of Regulating Body, Special Characteristics in Routes	18
3.2.2 Headway	18
3.2.3 Vehicle and crew scheduling	20
3.3 Crew requirement	22
3.3.1 Average number of duties	22
3.3.2 Crew requirement	22
3.3.3 Crew roster	22
3.4 Vehicle requirement	24
3.5 Performance indicators	24
Chapter 4: Case Study and Discussion	26
4.1 Introduction	26
4.2 Data presentation	28
4.2.1 Route No 05 - Kurunegala-Colombo Normal service	28
4.2.2 Route No 34/3 – Negombo-Kurunegala Normal service	30
4.2.3 Route No 34/3 – Negombo-Kurunegala Normal service	31
4.3 Preparation of time tables	33
4.3.1 Calculating headway	33
4.3.2 Preparation of panel timetable	34
4.3.3 Preparation of running cards	35
4.3.4 Deciding bus fleet	35
4.3.5 Deciding bus crew	35
4.3.6 Vehicle scheduling	36
Chapter 5: Conclusion and Recommendations	40
References	42

List of Figures

No	Title	Page
1	Public transport planning process	07
2	Crew roster types	11
3	Steps of Scheduling	17
4	Economic dispatch of busses	19
5	Route map of the Seema Sahitha Wayamba K.G.N. Magee Prawahana Samagama	26
6	Demand of Kurunegala to Colombo	29
7	Demand of Colombo to Kurunegala	29
8	Demand of Kurunegala to Negombo	30
9	Demand of Negombo to Kurunegala	31
10	Demand of Giriulla to Negombo	32
11	Demand of Negombo to Giriulla	32



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mru.ac.lk

List of Tables

No	Title	Page
1	Headway Design Constrains	20
2	Existing time tables for the selected bus routes	27
3	Details of Colombo-Kurunegala route	28
4	Details of Negombo-Kurunegala route	30
5	Details of Negombo-Giriulla route	31
6	Headway Calculations	34
7	Comparison of the individual and company timetables	38



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

List of Annexure

Title	Description	Page
Annexure A	Panel Timetables	43...45
Annexure B	Running Cards	46
Annexure C	Crew Rosters	47...49
Annexure D	Performance Analysis	50...53



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk