

**EVALUATING THE IMPACTS OF COORDINATED
TRAFFIC SIGNAL SYSTEMS**

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Degree of Master in Highway and Traffic Engineering

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DECLARATION OF THE CANDIDATE AND SUPERVISOR

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ABSTRACT

Evaluating the Impacts of Coordinated Traffic Signal Systems

Traffic congestion due to increasing number of vehicles and pedestrians is one of the major problems that need to be tackled especially in urban areas. Numerous methods are available to reduce delays and financial losses and environmental problems caused by road traffic in major cities.

Signalizing is one of the main methods to control traffic at intersections. Most of the signalized junctions in Sri Lanka are isolated fixed-cycle type. Signal coordination is considered as one of the cost effective and successful strategies to reduce congestion problems worldwide. Sri Lankan road development and management agencies are in their initial stage of implementing this system for signalized intersections. However, little has been done to quantify the benefits that can be obtained from coordinated traffic signal systems and hardly done studies to recommend a suitable guideline for Sri Lankan context. Therefore, objective of this research is to evaluate the impacts from traffic signal coordination in reducing delay and queue length and propose a guideline, which can be used in signal coordination in Sri Lankan context in optimized manner.

As a case study, closely spaced three signalized junctions are selected for the analysis. SIDRA, Signalized (and unsignalized) Intersection Design and Research Aid is used to generate the timing plans for each junction. Manual calculations are also done. The system was modeled using PTV VISSIM software and each junction is analyzed considering as a non-coordinated isolated junction and as an individual junction of a coordinated system using that software model. Travel time, delay, effective stop rate and queue length are identified as important parameters to evaluate the benefit/impact of the coordinated system. Data related to above parameters taken from the VISSIM output is used to compare coordinated system and in the isolated system. Using the evaluation results, reduction of delay and reduction of queue length are presented as percentages, as quantified measures of the benefits of the signal coordination. Limitations of signal coordination such as time for pedestrians, longer waiting time to minor street traffic are also identified during the study. Various coordination strategies were modeled as both direction coordination, single direction coordination, multiple cycle times etc. Using the results of the case study, a proper methodology is proposed to optimize the signal coordination in a considered set of junctions.

Keywords: Coordination – Junctions – Peak time

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TABLE OF CONTENTS

DECLARATION OF THE CANDIDATE AND SUPERVISOR	i
ABSTRACT	ii
ACKNOWLEDGEMENT	iii
LIST OF FIGURES.....	vi
LIST OF TABLES	vii
1 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	1
1.3 Objectives.....	2
1.4 Research Approach.....	2
2 LITERATURE SURVEY	4
2.1 Introduction to Signal Coordination.....	4
2.1.1 Benefits of signal Coordination	4
2.1.2 Limitations of Signal Coordination.....	5
2.1.3 Simulation Studies and Software used Worldwide.....	6
2.2 SIDRA Intersection Software.....	6
2.2.1 VISSIM Software.....	7
2.2.2 Optimizing the Coordination	7
3 METHODOLOGY	8
3.1 Summary of the Methodology.....	9
3.2 Selection of Junctions for Case study.....	10
3.3 Existing Situation	12
3.4 Traffic Data Collection.....	14
3.5 Calculation of Signal Timing	14
3.5.1 Input Data for SIDRA software	14
3.5.2 Manual Calculation	19

3.6	Calculation of Offset Time	21
3.7	Modeling the System Using VISSIM Software	23
3.7.1	Single direction coordination (main traffic flow direction)	24
3.7.2	Coordinating the both direction (main traffic flow direction and opposite direction)	24
3.7.3	Coordination Using Equal Cycle Times/Multiple cycle times	24
3.8	Finding the Most Suitable Cycle Time.....	25
3.9	Comparison of Delay.....	25
4	RESULTS AND DISCUSSION	26
4.1	Benefits/Drawbacks of Single Direction Coordination.....	26
4.2	Coordinating the both direction (main traffic flow direction and opposite direction)	27
4.3	Coordination using equal cycle times for all junctions	28
4.4	Coordination Using Multiples of cycle Times	29
4.5	Selection of the Proper Cycle Length.....	29
4.6	Variation of Delay with respect to Cycle time-Narahenpita Junction.....	29
4.7	Variation of Delay with respect to cycle time of Coordinated Network at Morning Peak	30
4.8	Variation of Delay with respect to cycle time of coordinated network at Evening Peak.....	31
4.9	Variation of Delay with respect to Cycle Time of Coordinated Network at Off- Peak	32
4.10	Delay comparison Results	33
4.10.1	Variation of Delay with respect to Cycle Time-Park Road Junction.....	33
4.10.2	Variation of Delay with respect to Cycle time- Narahenpita Junction	34
4.10.3	Variation of Delay with respect to Cycle time-Kirimandala Mawatha Junction	34
5	Conclusions and Recommendations.....	36
5.1	Benefits and Drawbacks of Signal Coordination	36

5.2 Recommendations for Coordination of Traffic Signals in Sri Lanka.....	36
REFERENCE LIST	38

LIST OF FIGURES

Figure 3-1: Intersection data input for park road Junction.....	14
Figure 3-2: Traffic volume input for park road junction	15
Figure 3-3: Movement data input for Park road junction	15
Figure 3-7: Opposing volume data input for Park road junction	16
Figure 3-8: Pedestrian data input for Park road junction	16
Figure 3-9: Phasing arrangement input for Park Road junction	17
Figure 3-10: Timing Output for Park road junction.....	17
Figure 3-11: Timing output for Narahenpita junction.....	18
Figure 3-12: Timing output for Kirimandala junction	18
Figure 3-13: Hourly Traffic Variation at Park Road Junction-all directions.....	20
Figure 3-14 Hourly Traffic Variation of Narahenpita Junction-all directions.....	21
Figure 3-15 Hourly Traffic variation of Kirimandala Mawatha Junction-all directions	21
Figure 3-16: Green wave concept in signal coordination	22
Figure 3-17: Modeled road network in VISSIM interface.....	23
Figure 4-1: Delay Result-Coordination towards Borella Direction-Morning Peak.....	26
Figure 4-2: Queue length Result-Coordination towards Borella Direction-Morning Peak	26
Figure 4-3: Delay Result-Without Coordination-Morning Peak	27
Figure 4-4: Delay Result-Without Coordination-Morning Peak	27
Figure 4-5: Delay Result-both direction coordination Coordination-Morning Peak	27
Figure 4-6: Queue length Result-both direction coordination Coordination-Morning Peak	28
Figure 4-7: Delay Result-Coordination using equal cycle times-Morning Peak	28
Figure 4-8: Queue length Result-Coordination using equal cycle times-Morning Peak	28

Figure 4-9: variation of Delay with respect to cycle time-Narahenpita junction.....	30
Figure 4-10: variation of delay and queue length of coordinated network at morning peak	31
Figure 4-11: variation of delay and queue length of coordinated network at evening peak	32
Figure 4-12: variation of delay and queue length of coordinated network at off peak	33

LIST OF TABLES

Table 3-1-Summery of manual Calculations-8 to 9am	19
Table 3-2 Summery of manual Calculations-off peak	20
Table 4-1: variation of delay with cycle time in Narahenpita Junction	29
Table 4-2: variation of delay and queue length of coordinated network at morning peak	30
Table 4-3: Variation of delay and queue length of coordinated network at evening peak	31
Table 4-4: variation of delay and queue length of coordinated network at off peak	32