Time and Speed Management to Coordinate Signalized Intersections in Arterial Urban Street (Case Study)

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A Thesis

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List of Abbreviations

Abbreviation	Meaning
EPM	Engineering Project Management
MOEs	Measure of Effectiveness
TSM	Transportation System Management
TDM	Transportation Demand Management
TMS	Traffic Management System
TNMS	Traffic Network Management System
QoS	Quality of Service
AS	Autonomous System
DTA	Dynamic Traffic Assignment
DRIP	Dynamic Route Information Panel
ITE	The Institute of Transportation Engineers
PHF	Peak Hour Factor
PHV	Peak Hour Volume
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
AADT	Annual Average Daily Traffic
ITS	Intelligent Transportation System
PCE	Passenger Car Equivalent
TRB	Transportation Research Board
JD	Jordanian Dinar
LOS	Level of Service

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ABSTRACT

Amman city has the highest proportion of automobile ownership in Jordan, with highest level of congestion. Due to the high automobile dependency, the congestion is increasing dramatically, this situation calls for an urgent solution. Many solutions can be done to reduce congestion levels and improve the traffic flow conditions, this solution is varying among the implementation cost. Although the lower-cost solutions would be more acceptable for decision-makers due to the limited budget.

This study aims to apply a coordination system on one of the dynamic arterials in Amman which is Al-Hurriyeh street, which have six signalized intersections with very traffic congestion.

SYNCHRO-10, SIM TRAFFIC-10 and PASSER II software programs were used to evaluate, optimize, simulate, and coordinate by using leading and lagging left turn phasing the signalized intersections. the measure of effectiveness (MOEs) such as delays, stops and travel time that are using to managing the time and speed thru coordinate the selected signalized intersections for the year 2018 and the year 2023 with growth factor 5.5%.

The result shows that the coordination of the selected traffic signalized intersections of arterial urban street are 62% better than before coordination, also the result shows that the intersections delay isolated after coordination are improved for 58,5% before coordination, and for entire network the total delay, stops, travel time, fuel consumption and air pollution were reduced 42%, 11%, 28%, 19%, 19% respectively, and the saving after coordination for the next five years is 895950 JD in the peak hour for the workdays. The level of service (LOS) for all intersections has been improved after coordination. Based on the clear improvements of this study it is highly recommended to apply the suggested coordination system since it's the lower implementation cost of any solutions.

Keywords: Coordination, Optimization, measure of effectiveness (MOEs), level of service (LOS), Delay, Stops, Travel time, Fuel consumption, Air pollution.