

**DEVELOPMENT OF GUIDELINES TO COORDINATE  
TRAFFIC SIGNALS FOR NON-SIMILAR  
INTERSECTION CLUSTERS**

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Degree of Doctor of Philosophy in Civil Engineering

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## **Declaration of Candidate and Supervisor**

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## **Abstract**

### **Development of guidelines to coordinate traffic signals for non-similar intersection clusters**

Despite the mega scale projects focusing on the long term benefits, proper traffic management initiatives should be introduced and implemented to reduce the unnecessary delays on roads resulting in road user frustration. Traffic signal coordination has been identified as one of the most sustainable solutions, if properly utilized. When it comes to traffic signal coordination, various techniques are available for coordinating similar type intersections. However, when non-similar intersection clusters are encountered, no proper guidelines have been developed for coordination.

The research sets out the preliminary requirements essential to be established for the progress of traffic signal coordination. As the first step, selection of an appropriate micro simulation model to support analysis and a procedure to identify and calibrate important input parameters are established. Second, guideline for signal phasing and timing design for individual intersections with fixed time signal timing is proposed. The guidelines are produced for intersections considering geometrical arrangements, traffic signal phasing and timing. Third, guidelines for real time traffic signal designs are produced where the guidelines address the extension of green split for different traffic situations.

Finally, the criteria for selecting intersections that should be clustered for traffic signal coordination is established. When clustering, importance of relying on travel time than distance is discussed when developing clustering guidelines. Further, seven basic categories of non-similar intersections based on the intersection geometry and priority directions for green platoon are identified. Based on the analysis, two matrixes are developed for peak period and off-peak period to be utilized by traffic and transportation engineers when non-similar intersections are encountered for traffic signal coordination. The developed guidelines are successfully verified using two case studies, for a selected Baseline road intersection cluster for fixed time traffic signal coordination and Kadawata intersection cluster for real time traffic signal coordination.

*Keywords:* traffic signals, traffic signal coordination, non-similar intersections

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