Development of the VISSIM Model for Traffic Simulations of the Compound Junction at Peradeniya

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Traffic congestion has become a planning, modelling, and research problem for transportation planners, especially in developing countries where many cities have undergone unplanned development. The continuous growth in research and computer technology along with simulation capabilities has increased the use of traffic models around the world. This paper attempts to develop a VISSIM model for Sri Lanka's heterogeneous traffic conditions based on a case study at Peradeniya compound junction. VISSIM is a microscopic traffic simulation software which was introduced by PTV group which is capable of obtaining individual traffic behaviour. However, a properly calibrated model is needed to secure better results especially in Asian traffic simulations where most of the in-built model parameters are based on European traffic conditions. Peradeniya junction consists of two three-way intersections which are connected by a road link of 150m in length, and it has become one of most congested junctions in Kandy suburban area. Traffic flow reaches nearly 6,000 vehicles per hour in peak hours and is manually operated by the traffic police. Based on a comprehensive literature survey, average standstill distance, additive part of safety distance, multiplicative part of safety distance, waiting time before diffusion, minimum headway, safety distance reduction factor, distance standing (0 kmph) and distance driving (50 kmph) were selected as calibration parameters for VISSIM. Calibration was carried out using measured field travel times and validated using queue lengths collected through a traffic survey. Our model validation results show a mean error of 11.5% which is a well below value than the respective limits found in the literature as a range of 17% - 22%. The calibrated model can be efficiently used as a test bench to compare the operational alternatives at Peradeniya compound junction.

Keywords: *Traffic simulation, VISSIM, Peradeniya junction, model calibration, traffic congestion*