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Multi- Leg Intersection Analysis & Optimization Using VISSIM

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Abstract: *PTV VISSIM is a microscopic traffic simulation tool, use to analyse urban traffic congestion at multi-leg intersections and optimize traffic flow. Panchavati Square at Amravati is one of the complex multi-legintersection. The research involves traffic data collection, including vehicle volumes, turning movements, signal timings at peak hours. The study evaluates the existing intersection performance by assessing key parameters such as average vehicle delay, vehicle travel time, queue lengths, queue counters, level of service (LOS), and emissions. Various optimization strategies are tested, including signal timing adjustments, lane reconfigurations, and adaptive traffic control systems. Simulation results indicate that optimized signal phasing and geometric improvements significantly reduce delays and improve intersection efficiency. The findings highlight the effectiveness of VISSIM-based simulation in enhancing intersection performance, reducing congestion, and improving urban mobility.*

This study investigates traffic performance at the 124 Conflict Area, focusing on critical parameters such as queue length, vehicle delay, and travel time. Data were collected through field surveys and simulation modelling, capturing operational characteristics during peak traffic periods. Analysis of queue dynamics revealed significant accumulation at key intersection approaches, often exceeding acceptable thresholds and indicating poor traffic discharge efficiency. Delay measurements showed prolonged intersection wait times, particularly during high-volume intervals, underscoring inefficiencies in signal timing and intersection geometry. Vehicle travel time data further reflected these inefficiencies, with notable variations indicative of stop-and-go traffic and intermittent congestion. The findings emphasize the need for operational enhancements, including signal optimization and potential geometric reconfiguration. The study provides empirical insights to inform targeted mitigation strategies, contributing to improved safety and flow efficiency in urban conflict-prone intersections.

Keywords: Geometric reconfiguration, multi-leg intersection, queue dynamics signal optimization, traffic simulation, urban mobility, vehicle travel time VISSIM

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