

## Evaluation & Improvement of Traffic Progression Using Microsimulation, Geometric Design Standards & Cost Benefit Analysis at An Intersection

**Category:** Infrastructure/Technologies

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**Summary:** This project addresses the critical issue of urban traffic congestion by employing innovative microsimulation techniques using PTV Vissim software. The study focuses on an intersection in Rawalpindi, Pakistan, to evaluate current traffic conditions and propose sustainable solutions for enhancing traffic flow, reducing environmental impacts, and optimizing costs. By simulating underpass and overpass designs, the research identifies a signal-free underpass as the most effective solution for reducing congestion, emissions, and fuel consumption over a 10-year design period.



**Objectives:** The project aims to mitigate emissions and energy inefficiencies, improve urban traffic flow, and support sustainable urban planning as its long-term goals. Short-term targets include evaluating current traffic conditions using microsimulation, simulating and comparing design alternatives, and recommending an optimal solution.

**Key Achievements:** The project successfully modeled traffic conditions and evaluated alternatives, identifying a signal-free underpass as the optimal solution. The findings have been shared with urban planning and transportation stakeholders.

**Implementation Challenges:** The project faced challenges such as data collection delays, coordination with stakeholders, and limited access to advanced tools.

**Proposed Solutions:** To overcome these challenges, the project emphasizes strengthening partnerships with local authorities and industry, enhancing training, expanding access to technological resources, and advocating for policy updates to support innovative traffic solutions.

**Impacts:** The project has significantly impacted students by providing hands-on experience in traffic simulation and urban planning. Professors have expanded interdisciplinary teaching resources. The university has aligned the project with its sustainability goals and enhanced industry

collaborations. Citizens and the government have benefited from sustainable urban development, aligning with national goals.