



Simulation-Driven Analysis of Urban Intersection's Efficiency: A Case Study in Konya

Ali ALMUSAWI^{*1}, Syed Shah Sultan Mohiuddin QADRI², H. S. Abdulrahman³,
Mustafa ALBDAIRI⁴

¹Çankaya University, Civil Engineering Department, Ankara, Türkiye

²Çankaya University, Industrial Engineering Department, Ankara, Türkiye

³Federal University of Technology, Civil Engineering Department, Minna, Nigeria

⁴AL-Qalam University College, Civil Engineering Department, Kirkuk, Iraq
^{*}ali.almusawi@cankaya.edu.tr

Keywords:

Intersection
Level of Service
Traffic Simulation
Capacity
Delays

Abstract

Urban traffic congestion poses significant challenges, impacting city life's economic, social, and environmental aspects. Intersections are crucial in urban traffic networks, necessitating efficient management to alleviate congestion and improve traffic flow. This study uses SIDRA INTERSECTION software to evaluate the performance of intersections in Konya, particularly in high-traffic areas such as İhsaniye, Sille, and Kule. The research aims to assess the current level of service (LOS) and identify potential improvements to enhance traffic efficiency and safety. Data was collected using MOBESE (MOBil Elektronik Sistem Entegrasyonu) cameras during peak traffic periods at critical intersections, and vehicle counts were recorded at 15-minute intervals. The data was analyzed with SIDRA INTERSECTION to simulate traffic conditions and assess performance metrics such as delay, degree of saturation, and queue lengths. Findings from the simulations indicated that the intersection at İhsaniye operates at a Level of Service F, characterized by significant delays and congestion across all approaches. The Sille intersection showed a more varied performance, with LOS ratings ranging from B to D, indicating moderate congestion levels. The Kule intersection, with a cycle time of 90 seconds, exhibited LOS ratings of C and D across its approaches, indicating a need for improvements to handle traffic more efficiently. The study proposes targeted improvements, including optimizing traffic signal timings and enhancing lane configurations, to alleviate congestion at these intersections. Implementing these measures is expected to improve traffic flow, reduce delays, and enhance overall intersection performance, contributing to better traffic management and urban mobility in Konya.