

## ABSTRAK

Simpang ini memiliki karakteristik khusus karena merupakan titik temu antara arus lalu lintas lokal perkotaan dan arus kendaraan keluar–masuk tol, sehingga berpotensi menimbulkan kemacetan dan konflik arus lalu lintas. Tujuan penelitian ini adalah mengevaluasi kinerja eksisting simpang tak bersinyal berdasarkan Pedoman Kapasitas Jalan Indonesia (PKJI) 2023, dengan meninjau parameter kapasitas, derajat kejenuhan, tundaan rata-rata, panjang antrean, serta potensi konflik lalu lintas. Metode penelitian meliputi survei primer volume kendaraan, pengamatan geometri simpang, serta analisis kuantitatif menggunakan pendekatan PKJI 2023 untuk menentukan *Level of Service (LOS)*. Hasil penelitian menunjukkan bahwa simpang Kapten Sumarsono – Tol Helvetia masih beroperasi dalam kondisi stabil dengan tingkat pelayanan C–D, dan derajat kejenuhan tertinggi sebesar 0,78 terjadi pada jam puncak sore hari. Nilai tundaan rata-rata berkisar antara 5,51–11,50 detik/kendaraan dengan panjang antrean maksimal 36 kendaraan. Faktor hambatan samping, keterbatasan median, dan ketiadaan trotoar berkontribusi terhadap penurunan efisiensi dan keselamatan simpang. Berdasarkan hasil tersebut, penelitian merekomendasikan penerapan APILL (Alat Pemberi Isyarat Lalu Lintas) dan penataan ulang geometri simpang sebagai upaya peningkatan kinerja lalu lintas.

Kata Kunci: Simpang Tak Bersinyal, Kinerja Simpang, PKJI 2023, Derajat Kejenuhan, Tol Helvetia.

## ABSTRACT

The intersection possesses unique characteristics as it serves as a convergence point between urban local traffic and vehicles entering or exiting the toll road, which often leads to congestion and traffic conflicts. The main objective of this research is to evaluate the existing performance of the unsignalized intersection based on the Indonesian Road Capacity Guidelines (PKJI) 2023, focusing on parameters such as capacity, degree of saturation, average delay, queue length, and potential traffic conflicts. The research employed field surveys to collect primary data on traffic volumes, intersection geometry, and side friction, followed by quantitative analysis using the PKJI 2023 approach to determine the Level of Service (LOS). The results show that the Kaptan Sumarsono–Helvetia Toll intersection operates under stable conditions with a Level of Service ranging from C to D, and the highest degree of saturation recorded at 0.78 during the afternoon peak hour. The average vehicle delay ranges from 5.51 to 11.50 seconds per vehicle, with a maximum queue length of 36 vehicles. High side friction, limited median width, and the absence of pedestrian facilities were identified as key factors reducing the efficiency and safety of the intersection. Based on these findings, this study recommends the installation of traffic signal control (APILL) and the redesign of intersection geometry to improve operational performance.

Keywords: Unsignalized Intersection, Intersection Performance, PKJI 2023, Degree Of Saturation, Helvetia Toll Gate.