ABSTRAK

Achmad Maulady Hasibuan (NIM. 5193550042) "Analisis Kinerja Simpang Tidak Bersinyal Menggunakan Perangkat Lunak Vissim (Studi Kasus Simpang Tiga Jl. Denai - Jl. Mandala By Pass)". Fakultas Teknik Universitas Negeri Medan. 2026.

Pertumbuhan wilayah perkotaan yang pesat menyebabkan peningkatan jumlah kendaraan bermotor yang berdampak pada menurunnya kinerja lalu lintas, terutama pada kawasan persimpangan. Penelitian ini bertujuan untuk menganalisis kinerja Simpang Tiga Jalan Denai – Jalan Mandala By Pass Kota Medan sebagai simpang tidak bersinyal menggunakan Pedoman Kapasitas Jalan Indonesia (PKJI) 2023 dan perangkat lunak PTV VISSIM. Data penelitian diperoleh melalui survei lapangan berupa data geometrik simpang dan volume lalu lintas pada jam puncak pagi, siang, dan sore. Hasil analisis berdasarkan PKJI 2023 menunjukkan bahwa simpang memiliki kapasitas sebesar 3.109,70 SMP/jam dengan derajat kejenuhan sebesar 0,87 dan tundaan simpang sebesar 15,03 detik/SMP sehingga tingkat pelayanan simpang berada pada kategori C. Sementara itu, hasil simulasi menggunakan PTV VISSIM setelah proses kalibrasi parameter perilaku pengemudi menghasilkan rata-rata tundaan kendaraan sebesar 32,83 detik/kendaraan dengan tingkat pelayanan LOS D. Validasi model dilakukan menggunakan uji statistik GEH untuk memastikan kesesuaian hasil simulasi dengan kondisi lalu lintas di lapangan. Berdasarkan hasil penelitian, Simpang Tiga Jalan Denai – Jalan Mandala By Pass telah mendekati kondisi jenuh pada jam puncak sehingga diperlukan upaya peningkatan kinerja simpang melalui pemasangan Alat Pemberi Isyarat Lalu Lintas (APILL), rekayasa lalu lintas, serta penanganan hambatan samping dan perbaikan geometrik simpang.

Kata kunci: Simpang tidak bersinyal, PKJI 2023, PTV VISSIM, kinerja simpang, derajat kejenuhan, tingkat pelayanan.

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ABSTRACK

Achmad Maulady Hasibuan (Student ID: 5193550042). "Performance Analysis of an Unsignalized Intersection Using VISSIM Software (Case Study: Three-Leg Intersection of Denai Street – Mandala By Pass Street)." Faculty of Engineering, State University of Medan, 2026.

The rapid growth of urban areas has led to an increase in the number of motor vehicles, resulting in a decline in traffic performance, particularly at intersections. This study aims to analyze the performance of the Denai Street – Mandala By Pass Street Three-LLeg Intersection in Medan City as an unsignalized intersection using the Indonesian Road Capacity Guidelines (PKJI) 2023 and PTV VISSIM software. The research data were obtained through field surveys, including intersection geometric data and traffic volume during the morning, midday, and evening peak hours. The analysis based on PKJI 2023 showed that the intersection has a capacity of 3,109.70 PCU/hour, a degree of saturation of 0.87, and an intersection delay of 15.03 seconds/PCU, resulting in a Level of Service (LOS) C. Meanwhile, the simulation results using PTV VISSIM, after calibrating the driver behavior parameters, produced an average vehicle delay of 32.83 seconds/vehicle with a Level of Service (LOS) D. The simulation model was validated using the GEH statistical test to ensure that the simulation results were consistent with the actual traffic conditions in the field. Based on the results of this study, the Denai Street – Mandala By Pass Street Three-Leg Intersection is approaching saturated conditions during peak hours. Therefore, efforts to improve the intersection performance are required through the installation of Traffic Signal Control (APILL), the implementation of traffic engineering measures, the management of roadside friction, and improvements to the intersection geometry.

Keywords: unsignalized intersection, PKJI 2023, PTV VISSIM, intersection performance, degree of saturation, level of service.

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