# ABSTRAK

## ANALISIS SISTEM ANTRIAN LALU LINTAS PADA SIMPANG BERSINYAL LENGAN EMPAT

Oleh

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Penelitian ini bertujuan untuk menganalisis kinerja sistem antrian pada simpang bersinyal Jalan Urip Sumaharjo – Jalan Soekarno Hatta – Jalan Endro Suratmin di Kota Bandar Lampung, yang dikenal memiliki volume kendaraan tinggi dan kemacetan pada jam sibuk. Pengumpulan data dilakukan melalui survei primer pada pukul 06.30–08.00 dan 16.00–17.30, meliputi volume kendaraan, waktu siklus sinyal, serta panjang antrian. Analisis menggunakan model antrian M/M/1 digunakan untuk menentukan parameter kinerja seperti tingkat kedatangan, tingkat pelayanan, rata-rata panjang antrian, serta waktu tunggu kendaraan. Hasil menunjukkan bahwa volume kendaraan tertinggi mencapai 10.523 kend/jam pada pagi hari dan 10.569 kend/jam pada sore hari, dengan antrian terpanjang terjadi pada Lengan Utara di pagi hari (tundaan 47,02 detik) dan Lengan Selatan di sore hari (49,96 detik). Rata-rata waktu tunggu kendaraan dalam sistem adalah 18,14 detik, sementara kapasitas antrian berada pada rentang 51–67 kendaraan, menandakan kondisi masih terkendali meskipun mendekati batas maksimum pada jam puncak. Penelitian ini menyimpulkan bahwa simpang masih berfungsi cukup baik, namun peningkatan kapasitas seperti pembangunan *flyover* direkomendasikan untuk mengurangi tundaan dan kemacetan.

Kata kunci : antrian lalu lintas, simpang bersinyal, panjang antrian, waktu tunggu, M/M/1.

## ABSTRACT

## ANALYSIS OF TRAFFIC QUEUEING SYSTEM AT A FOUR-LEGGED SIGNALIZED INTERSECTION

By

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This research aims to analyze the queuing performance of the signalized intersection at Jalan Urip Sumaharjo – Jalan Soekarno Hatta – Jalan Endro Suratmin in Bandar Lampung, an area characterized by high traffic volume and recurring congestion during peak hours. Primary data were collected through field surveys conducted from 06:30–08:00 and 16:00–17:30, including traffic volume, signal cycle duration, and queue length. The M/M/1 queuing model was applied to evaluate key performance parameters such as arrival rate, service rate, average queue length, and vehicle waiting time. Results indicate that the highest traffic volumes reached 10,523 veh/hour in the morning and 10,569 veh/hour in the afternoon, with the longest queues occurring on the North approach in the morning (47.02 seconds delay) and the South approach in the afternoon (49.96 seconds). The average waiting time within the system was 18.14 seconds, while queue capacities ranged from 51 to 67 vehicles, indicating that the intersection remains operationally stable despite nearing capacity limits during peak periods. The study concludes that the intersection still performs adequately, but capacity improvements—such as constructing a flyover—are recommended to reduce delays and congestion.



Keywords : traffic queue, signalized intersection, queue length, waiting time, M/M/1.