

ABSTRAK

Jodi Anggara. Nim. 5191250011 : Analisis Karakteristik Arus Lalu Lintas Akibat Penyempitan Jalan Di Jalan H. Adam Malik Kota Medan

Penyempitan jalan (bottleneck) merupakan salah satu penyebab utama menurunnya kinerja ruas jalan karena mengurangi kapasitas jalan dan mengganggu kelancaran arus lalu lintas. Kondisi ini terjadi pada ruas Jalan H. Adam Malik Kota Medan, khususnya setelah Jembatan Sungai Deli, yang menyebabkan penurunan kecepatan, peningkatan kepadatan, dan antrean kendaraan pada jam-jam sibuk. Penelitian ini bertujuan untuk menganalisis karakteristik arus lalu lintas akibat penyempitan jalan, mengevaluasi kinerja ruas jalan berdasarkan Pedoman Kapasitas Jalan Indonesia (PKJI) 2023, serta menentukan model hubungan volume, kecepatan, dan kepadatan yang paling sesuai.

Penelitian menggunakan metode survei lapangan dengan pengambilan data selama tujuh hari pada jam puncak pagi, siang, dan sore. Data primer yang dikumpulkan meliputi volume lalu lintas, kecepatan kendaraan, kepadatan, kondisi geometrik jalan, dan hambatan samping. Analisis dilakukan menggunakan PKJI 2023 untuk menghitung kapasitas jalan, derajat kejenuhan, dan tingkat pelayanan jalan (Level of Service/LoS), serta membandingkan model karakteristik arus lalu lintas Greenshields, Greenberg, dan Underwood.

Hasil penelitian menunjukkan bahwa kondisi lalu lintas terpadat terjadi pada hari Senin pukul 16.00–18.00 WIB dengan volume lalu lintas sebesar 3.309,2 smp/jam. Kapasitas ruas jalan pada kondisi normal sebesar 4.551,24 smp/jam, sedangkan pada kondisi penyempitan hanya sebesar 3.034,16 smp/jam. Nilai derajat kejenuhan pada jalan normal sebesar 0,743 dengan tingkat pelayanan C, sedangkan pada kondisi penyempitan mencapai 1,115 dengan tingkat pelayanan F, yang menunjukkan arus lalu lintas telah melampaui kapasitas jalan dan menimbulkan kemacetan. Hasil analisis hubungan volume, kecepatan, dan kepadatan menunjukkan bahwa model Greenshields memberikan tingkat kesesuaian terbaik dalam menggambarkan karakteristik arus lalu lintas pada ruas Jalan H. Adam Malik dibandingkan model Greenberg dan Underwood.

Kata Kunci : penyempitan jalan, karakteristik arus lalu lintas, kapasitas jalan, derajat kejenuhan, tingkat pelayanan jalan, Greenshields, Greenberg, Underwood.

ABSTRACT

Jodi Anggara. Student ID: 5191250011: Analysis of Traffic Flow Characteristics Due to Road Narrowing on H. Adam Malik Road, Medan City

Road narrowing (bottleneck) is one of the main causes of decreased road segment performance because it reduces road capacity and disrupts the smooth flow of traffic. This condition occurs on H. Adam Malik Road in Medan City, particularly after the Deli River Bridge, resulting in reduced vehicle speeds, increased traffic density, and vehicle queues during peak hours. This study aims to analyze traffic flow characteristics caused by road narrowing, evaluate road segment performance based on the 2023 Indonesian Road Capacity Guidelines (PKJI), and determine the most appropriate model for the relationship between traffic volume, speed, and density.

The study employed a field survey method with data collection conducted over seven days during the morning, midday, and afternoon peak hours. The primary data collected included traffic volume, vehicle speed, traffic density, road geometric conditions, and roadside friction. The analysis was carried out using the 2023 PKJI to calculate road capacity, degree of saturation, and Level of Service (LoS), as well as to compare the traffic flow characteristic models of Greenshields, Greenberg, and Underwood.

The results showed that the heaviest traffic conditions occurred on Monday from 4:00 p.m. to 6:00 p.m. (WIB), with a traffic volume of 3,309.2 passenger car units (pcu)/hour. The road segment capacity under normal conditions was 4,551.24 pcu/hour, whereas under road narrowing conditions it was only 3,034.16 pcu/hour. The degree of saturation under normal road conditions was 0.743 with a Level of Service C, while under road narrowing conditions it reached 1.115 with a Level of Service F, indicating that the traffic flow had exceeded the road capacity and caused congestion. The analysis of the relationship between traffic volume, speed, and density showed that the Greenshields model provided the best fit in describing the traffic flow characteristics on H. Adam Malik Road compared to the Greenberg and Underwood models.

Keywords: road narrowing, traffic flow characteristics, road capacity, degree of saturation, level of service, Greenshields, Greenberg, Underwood.