

ABSTRAK

ANALISIS BEBAN EMISI GAS BUANG KENDARAAN DAN DAMPAKNYA TERHADAP KUALITAS UDARA PADA SIMPANG EMPAT BERSINYAL

(Studi Kasus: Simpang Empat Bersinyal Jalan Letjen Alamsyah Ratu Prawiranegara - Jalan Urip Sumoharjo - Jalan Arif Rahman Hakim)

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Peningkatan volume kendaraan bermotor di kawasan perkotaan menyebabkan bertambahnya emisi gas buang yang berdampak pada kualitas udara, terutama di area simpang bersinyal dengan tingkat tundaan dan antrian kendaraan yang tinggi. Simpang Empat Bersinyal Jalan Letjen Alamsyah Ratu Prawiranegara – Jalan Urip Sumoharjo – Jalan Arif Rahman Hakim di Kota Bandar Lampung merupakan salah satu titik lalu lintas padat yang berpotensi menghasilkan emisi kendaraan dalam jumlah besar. Penelitian ini bertujuan untuk mengetahui besaran beban emisi kendaraan bermotor serta dampaknya terhadap kualitas udara di sekitar simpang. Pengumpulan data dilakukan melalui survei lapangan pada hari kerja dan akhir pekan saat jam sibuk sore pukul 16.00–18.00 WIB. Data yang dianalisis meliputi volume lalu lintas, klasifikasi kendaraan, geometrik simpang, dan siklus APILL. Analisis kinerja simpang mengacu pada PKJI 2023, sedangkan perhitungan emisi menggunakan metode faktor emisi berdasarkan Peraturan Menteri Lingkungan Hidup Nomor 12 Tahun 2010 dengan parameter polutan CO, HC, NO₂, SO₂, dan PM₁₀. Hasil penelitian menunjukkan bahwa volume lalu lintas tertinggi terjadi pada hari kerja sebesar 2.531 smp/jam dengan tundaan rata-rata simpang sebesar 47,02 detik/smp dan panjang antrian maksimum mencapai 154 meter. Polutan karbon monoksida (CO) menjadi emisi dominan dengan kontribusi terbesar berasal dari sepeda motor akibat tingginya jumlah kendaraan yang melintas. Berdasarkan analisis ISPU, kualitas udara di sekitar lokasi penelitian masih berada dalam kategori “baik”, namun peningkatan volume kendaraan secara berkelanjutan berpotensi menurunkan kualitas udara di masa mendatang.

Kata kunci: beban emisi, kualitas udara, simpang bersinyal, kendaraan bermotor, ISPU.

ABSTRACT

ANALYSIS OF VEHICULAR EXHAUST EMISSION LOADS AND THEIR IMPACT ON AIR QUALITY AT A SIGNALIZED FOUR-WAY INTERSECTION

**(Case Study: Signalized Four-Way Intersection of Letjen Alamsyah Ratu
Prawiranegara Street – Urip Sumoharjo Street – Arif Rahman Hakim Street)**

By

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The increase in motor vehicle volume in urban areas has contributed to higher exhaust emissions, which affect air quality, particularly at signalized intersections with high traffic delays and vehicle queues. The Signalized Intersection of Letjen Alamsyah Ratu Prawiranegara Street – Urip Sumoharjo Street – Arif Rahman Hakim Street in Bandar Lampung City is one of the densely trafficked intersections with the potential to generate significant vehicle emissions. This study aimed to determine the magnitude of motor vehicle emission loads and analyze their impact on the surrounding air quality. Data collection was conducted through field surveys on weekdays and weekends during peak hours from 4:00 PM to 6:00 PM. The analyzed data included traffic volume, vehicle classification, intersection geometric characteristics, and traffic signal cycles. Intersection performance analysis referred to the Indonesian Road Capacity Guidelines (PKJI) 2023, while emission load calculations used the emission factor method based on the Regulation of the Minister of Environment Number 12 of 2010, with pollutant parameters including CO, HC, NO₂, SO₂, and PM₁₀. The results showed that the highest traffic volume occurred on weekdays, reaching 2,531 pcu/hour, with an average intersection delay of 47.02 sec/pcu and a maximum queue length of 154 meters. Carbon monoxide (CO) was identified as the dominant pollutant, with the largest contribution originating from motorcycles due to the high traffic volume. Based on the Air Pollution Standard Index (ISPU) analysis, the air quality around the study area was still categorized as “good”; however, the continuous increase in vehicle volume may potentially reduce air quality in the future.

Keywords: *emission load, air quality, signalized intersection, motor vehicles, ISPU.*