



ANALISIS DISPERSI PM<sub>10</sub> DAN PM<sub>2.5</sub>  
STUDI KASUS INDUSTRI KAYU LAPIS  
DI KECAMATAN KALASAN

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**INTISARI**

Industri kayu lapis di Desa Tirtomartani, Kalasan Sleman, D. I. Yogyakarta melakukan produksi dengan pembakaran kayu pada cerobong boiler dapat berdampak pada kualitas udara. Penelitian ini dilakukan untuk menganalisis sebaran PM<sub>2.5</sub> dan PM<sub>10</sub> serta tingkat pencemaran terhadap indeks standar pencemar udara.

Pengumpulan data konsentrasi aktual PM<sub>2.5</sub> dan PM<sub>10</sub> dilakukan tanggal 3-6 Juni 2024 dengan High Volume Air Sampler (HVAS). Penentuan lokasi disesuaikan dengan SNI 197119.6-2005. Prediksi dispersi PM<sub>2.5</sub> dan PM<sub>10</sub> dilakukan dengan AERMOD. Pengolahan data meteorologi dilakukan dengan AERMET dengan data bulan Juni 2023 – Mei 2024. topografi diolah menggunakan AERMAP menggunakan citra SRTM 3. Data laju emisi dihitung dari estimasi faktor emisi kayu dan volume kayu. Data. Evaluasi tingkat pencemaran PM<sub>2.5</sub> dan PM<sub>10</sub> dilakukan dengan Indeks Standar Pencemaran Udara (ISPU). Data akan dianalisis secara kualitatif berdasarkan prediksi dispersi PM<sub>2.5</sub> dan PM<sub>10</sub> terhadap data aktual dan secara spasial berdasarkan peta dispersi PM<sub>2.5</sub> dan PM<sub>10</sub>.

Konsentrasi rata-rata PM<sub>2.5</sub> selama 24 jam di Titik A 175,76 µg/m<sup>3</sup> dan Titik B 112,35 µg/m<sup>3</sup>, sementara PM<sub>10</sub> di Titik A adalah 136,15 µg/m<sup>3</sup> dan di Titik B 120,73 µg/m<sup>3</sup>. Pola dispersi model dominan ke arah utara, dipengaruhi arah dan kecepatan angin, serta topografi. Hasil pemodelan menunjukkan nilai yang lebih rendah dibandingkan pengukuran aktual dengan RMSPE PM<sub>2.5</sub> sebesar 32.84% dan PM<sub>10</sub> sebesar 34.33%. Konsentrasi PM<sub>2.5</sub> dan PM<sub>10</sub> di permukiman sesuai baku mutu Gubernur DIY Nomor 153 Tahun 2002. Sedangkan pada CV X PM<sub>10</sub> masih di bawah baku mutu, tetapi pada parameter PM<sub>2.5</sub> melebihi baku mutu. Berdasarkan Permenkes RI Nomor 2 Tahun 2023, konsentrasi PM<sub>2.5</sub> dan PM<sub>10</sub> melebihi baku mutu di permukiman dan lingkungan industri, meskipun nilai ISPU berada pada kategori baik hingga sedang.

Kata kunci: AERMOD, Industri, ISPU, Partikulat

*EXPOSURE ANALYSIS OF PM<sub>10</sub> AND PM<sub>2.5</sub>  
CASE STUDY PLYWOOD INDUSTRY  
IN KALASAN SUB-DISTRICT*

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**ABSTRACT**

*The plywood industry in Tirtomartani Village, Kalasan, Sleman, Special Region of Yogyakarta, conducts production activities involving wood combustion in boiler chimneys, which can impact air quality. This study aims to analyze the dispersion of PM<sub>2.5</sub> dan PM<sub>10</sub> and assess pollution levels based on the Air Pollution Standard Index (ISPU).*

*The actual PM<sub>2.5</sub> dan PM<sub>10</sub> concentration data were collected from June 3–6, 2024, using a High Volume Air Sampler (HVAS). The selection of monitoring locations followed SNI 197119.6-2005. The dispersion prediction of PM<sub>2.5</sub> dan PM<sub>10</sub> was conducted using AERMOD. Meteorological data processing was carried out using AERMET with data from June 2023 to May 2024. Topographical data were processed using AERMAP with SRTM 3 imagery. Emission rates were estimated based on wood emission factors and wood volume. The evaluation of PM<sub>2.5</sub> dan PM<sub>10</sub> pollution levels was conducted using the Air Pollution Standard Index (ISPU). Data analysis was performed qualitatively by comparing the predicted dispersion of PM<sub>2.5</sub> dan PM<sub>10</sub> with actual data and spatially through dispersion maps of PM<sub>2.5</sub> dan PM<sub>10</sub>.*

*The 24-hour average concentration of PM<sub>2.5</sub> at Point A was 175.76 µg/m<sup>3</sup> and at Point B was 112.35 µg/m<sup>3</sup>, while PM<sub>10</sub> at Point A was 136.15 µg/m<sup>3</sup> and at Point B was 120.73 µg/m<sup>3</sup>. The dominant dispersion pattern in the model was towards the north, influenced by wind direction, wind speed, and topography. The modeling results showed lower values compared to actual measurements, with an RMSPE of 32.84% for PM<sub>2.5</sub> and 34.33% for PM<sub>10</sub>. The concentrations of PM<sub>2.5</sub> and PM<sub>10</sub> in residential areas complied with the quality standards set by Governor Regulation DIY No. 153 of 2002. However, at CV X, PM<sub>10</sub> remained below the quality standard, while PM<sub>2.5</sub> exceeded it. According to Indonesian Ministry of Health Regulation No. 2 of 2023, PM<sub>2.5</sub> dan PM<sub>10</sub> concentrations exceeded the quality standards in both residential and industrial areas, although the ISPU values fell within the good to moderate category.*

*Keyword: AERMOD, Industry, ISPU, Particulate*