# ABSTRAK

Sabrina Putri Aulinia
EFEKTIVITAS PROGRAM *CAR FREE DAY* TERHADAP PENURUNAN KADAR $PM_{10}$ DAN GAS $NO_x$ DI KOTA SURABAYA TAHUN 2025
xvii + 57 Halaman + 9 Tabel + 8 Lampiran

Kendaraan bermotor mengalami peningkatan di kota Surabaya tahun 2023 sebesar 98,04%. Hal tersebut berbanding lurus dengan hasil Indeks Kualitas Udara (IKU) kota Surabaya pada tahun 2023. Pemerintah kota Surabaya menangani permasalahan tersebut dengan menyelenggarakan program *Car Free Day* (CFD) yaitu tidak adanya kendaraan yang melintas di beberapa jalan utama kota untuk meningkatkan kualitas lingkungan. Penelitian ini bertujuan untuk mengetahui efektivitas program CFD terhadap penurunan kadar $PM_{10}$ dan gas $NO_X$ di kota Surabaya tahun 2025.

Penelitian ini menggunakan metode kuantitatif dengan studi *cross sectional*. Variabel bebas penelitian ini adalah program CFD dengan variabel terikatnya adalah kadar $PM_{10}$ dan gas $NO_x$ di lokasi CFD. Variabel kontrol yang mempengaruhi adalah suhu, kelembaban, kecepatan angin, dan cuaca. Analisis data menggunakan uji *independent sample t test* dan rumus efektivitas.

Pengukuran yang telah dilakukan mendapatkan hasil bahwa terdapat penurunan kadar $PM_{10}$ sebesar 8,07 $\mu g/m^3$ dengan persentase 19,5% sedangkan kadar gas $NO_x$ mengalami kenaikan sebesar 18,35 $\mu g/m^3$ dengan persentase -7%. Uji *independent sample t test* yang dilakukan menunjukkan tidak terdapat perbedaan yang signifikan antara kadar $PM_{10}$ dan gas $NO_x$ pada saat CFD dan *Non* CFD. Persentase yang didapatkan memasuki kategori tidak efektif.

Kesimpulan yang didapatkan adalah bahwa program CFD tidak efektif untuk mengurangi kadar $PM_{10}$ dan gas $NO_x$ di kota Surabaya. Saran yang dapat dilakukan Pemerintah Kota Surabaya adalah agar menghapus CFD di Jalan Tunjungan karena tidak efektif dalam menurunkan polutan. Bagi peneliti lain dapat menentukan arah angin sebelum mengukur kecepatan anginnya, menambah hari pada pengukuran Non CFD, dan mengukur kadar polutan pada jalan yang menjadi alternative saat penutupan jalan dilakukan pada saat CFD.

Kata Kunci : *Car Free Day* (CFD), Gas $NO_X$, $PM_{10}$, Udara
Daftar bacaan : 51 (43 Jurnal + 6 Buku + 2 Peraturan)

# ABSTRACT

Sabrina Putri Aulinia
*EFFECTIVENESS OF CAR FREE DAY PROGRAM ON REDUCTION OF $PM_{10}$ AND $NO_x$ GAS LEVELS IN SURABAYA CITY IN 2025*
*Xvii + 57 Pages + 9 Tables + 8 Appendices*

*Motor vehicles experienced an increase in Surabaya city in 2023 by 98.04%. This was directly proportional to the results of the Air Quality Index (AQI) of Surabaya city in 2023. The Surabaya city government addressed this problem by organizing the Car Free Day (CFD) program, which was the absence of vehicles passing through several main city roads to improve environmental quality. This research aimed to determine the effectiveness of the CFD program in reducing $PM_{10}$ levels and $NO_x$ gas in Surabaya city in 2025.*

*This research used a quantitative method with a cross-sectional study. The independent variable of this research was the CFD program with the dependent variables being $PM_{10}$ levels and $NO_x$ gas at CFD locations. The control variables that influenced were temperature, humidity, wind speed, and weather. Data analysis used independent sample t-test and effectiveness formula.*

*The measurements that had been conducted obtained results that there was a decrease in $PM_{10}$ levels by 8.07 μg/m³ with a percentage of 19.5%, while $NO_x$ gas levels experienced an increase of 18.35 μg/m³ with a percentage of -7%. The independent sample t-test that was conducted showed that there was no significant difference between $PM_{10}$ and $NO_x$ gas levels during CFD and Non-CFD periods. The percentage obtained fell into the ineffective category.*

*The conclusion obtained was that the CFD program was not effective in reducing $PM_{10}$ and $NO_x$ gas levels in Surabaya city. The recommendation that could be made to the Surabaya City Government was to eliminate CFD on Tunjungan Street because it was not effective in reducing pollutants. For other researchers, they could determine wind direction before measuring wind speed, add more days to Non-CFD measurements, and measure pollutant levels on roads that became alternatives when road closures were implemented during CFD.*

*Keywords : Car Free Day (CFD), $NO_x$ gas, $PM_{10}$, Air*
*References : 51 (43 Journals + 6 Books + 2 Regulations)*