

71

A Study of The Impact of Vehicles Emission on Environment and Human. Cass Study – Hebron City

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Abstract

This study aims to analyze the environmental and health impacts of emissions from internal combustion engine vehicles in the city of Hebron, using a combined theoretical and practical field-based approach. Vehicle exhaust is one of the main sources of air pollution, containing harmful pollutants such as carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO_x), hydrocarbons (HC), and fine particulate matter (PM).

The theoretical part focuses on the mechanisms of pollutant formation inside the combustion chamber, explaining the related chemical reactions—such as the formation of NO due to high temperatures and CO due to incomplete combustion. It also examines key factors affecting emission levels, including fuel type, engine design, air-to-fuel ratio, and operating temperatures. Technical solutions such as catalytic converters, exhaust gas recirculation (EGR) systems, and particulate filters are also reviewed.

The practical part involved collecting emission data from approximately 1,000 vehicle samples across the streets and neighborhoods of Hebron, using modern field measurement devices. The analysis included measuring pollutant concentrations and correlating them with vehicle type, fuel type, and age. Statistical analysis was conducted using appropriate software tools, with results presented in tables and charts showing the relationship between traffic density and increased pollution levels.

The findings revealed alarming concentrations of certain pollutants exceeding international environmental standards, highlighting the urgent need for environmental intervention. The study recommends the adoption of strict environmental policies and the promotion of sustainable transportation to improve air quality and public health in Hebron