INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

The instantaneous measurements of emissions and speeds, collected by an integrated auto–gas analyser and V–Box instrument on a highly–trafficked stretch of an urban traffic corridor in Guwahati, were used for investigating the impacts of interruption and congestion on emissions. The tail–pipe emissions from passenger cars and auto–rickshaws were measured during peak and off–peak hours and analysed according to different mileages, instantaneous speed and acceleration for interrupted and congested traffic flow conditions. The instantaneous emissions of HC, CO, NO_x and CO_2 are influenced by the accelerating and decelerating speeds due to frequent stop's and go. The results showed that magnitude of emissions of CO and HC depend on the combine effect of higher frequency of travel time in the low speeds, whereas emissions of CO_2 and NO_x increases with the increasing speed. Another objective of the research was to estimate the emissions with the COPERT–IV and IVE models, compare with the measured emission factors, and inter-compare the performances. The COPERT–IV model under–predicted the emissions of CO, HC and over–predicted that of NO_x, whereas, the IVE model, which is based on instantaneous speed, was in good agreement with the on–road emission factors, particularly, during off–peak hours. Following this, with the help of IVE model three possible mitigation options for emission reduction were investigated. It was found that with the upgradation to higher Euro–IV standards, the passenger car can reduce upto 50–60% of CO, HC and 55% of NO_x and 31–38% reduction in the CO_2 emissions; switching over to CNG for auto–rickshaw can achieve upto 89% reduction in HC and CO, 23–56% in NO_x and 32–36% in the CO_2 emissions; and regulation of the frequency of bus service at bus stops can reduce upto 40–60% emissions of CO, HC, CO_2 and NO_x.