

Technical Note

USE OF MICROSCOPIC SIMULATION MODELS TO PREDICT TRAFFIC EMISSIONS

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Abstract

Microscopic traffic simulation models (MSMs) such as AIMSUN, VISSIM and PARAMICS have internal traffic emission prediction capabilities.

We have conducted a preliminary investigation and compared updated AIMSUN emission algorithms with measured emissions data on Australian light-duty petrol vehicles, which revealed large discrepancies.

A large underestimation of emissions has been found, up to more than two orders of magnitude for individual microtrips and, on average, an underestimation of a factor of about 20 (NO_x), 1.5 (HC), 4 (CO₂, freeway) and an overestimation of a factor of about 1.3 (CO₂, non-freeway). These differences were statistically significant at the 95% level for the majority of cases.

We recommend further examination of these discrepancies including other MSMs and all relevant vehicle classes (e.g. diesel trucks) and recalibration of emission algorithms in MSMs using local test data that reflects Australian vehicle emissions and driving behaviour.

INTRODUCTION

Microscopic traffic simulation models (MSMs) such as AIMSUN, VISSIM and PARAMICS have internal traffic emission prediction capabilities. There is, however, no reason to expect reliable emissions and fuel consumption output for Australian road and/or vehicle conditions.

Emission algorithms in MSMs are based on overseas vehicle emissions datasets, which do not reflect Australian vehicles, fuels, climate and fleet composition. For example Australia has: