



## Reducing fuel consumption of vehicles at metered on-ramps: using the applications of vehicle to infrastructure communications



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Ramp meters successfully decrease congestion but leave a burden on the traffic situation at the on-ramps. Most studies made on ramp metering targeted at reducing congestion on the motorway, while little has been done to reduce the traffic emissions at the on-ramps. The objective of this research is to reduce the traffic emissions at ramp metering installations using the applications of vehicle to infrastructure communication. Strategies that aim on acceleration/deceleration and idling of vehicles are developed on a simulation environment. The developed strategies are (1) stopping vehicles following a stop and go movement for a short time on the on-ramp using a virtual stop line, (2) advising motorists to switch off their engine to reduce their fuel consumption and (3) allowing heavy duty vehicles priority at the on-ramps. Utilizing Aimsun microscopic simulation and Versit<sup>+micro</sup> emission model, various scenarios which take the form of computer experiments were carried out. The results obtained from the overall study are promising, furthermore, the results of virtual stop line and truck priority strategies indicated fuel consumption at metered on-ramps can significantly be reduced by applying strategies which target inefficient stop-and-go movements of (heavy) vehicles. For future research, it is recommended that the strategies proposed should be considered for testing with real-life traffic observations, and eventually field-testing.