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DYNAMIC AIR TOXIC EMISSION FACTOR OF MOTORCYCLES IN BANGKOK, THAILAND

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Abstract

Average emission factors of air toxic compounds, emitted from motorcycles in Bangkok, Thailand were analyzed using the IVE (International Vehicle Emission) model. The model was utilized taking into account the actual fleet and characteristics of motorcycles of the study area. Four air toxic compounds (namely benzene, 1,3 butadiene, acetaldehyde and formaldehyde) and their emission rates were calculated under two main pollution abatement scenarios (the improvement of fuel quality and switching of fuel types). The results were then compared with the BAU (Business as Usual) case to illustrate the effectiveness and appropriateness of proposed measures. In the BAU scenario the average emission factors of air toxics from motorcycles were greatly reduced by the replacement of engine technology from the carburetor system with the electronically controlled fuel injection system. Improvement of fuel quality standard (from EURO II to EURO IV) resulted in a decrease in average emission factors of air toxics from motorcycles. Calculated results indicated that the average emission factors of air toxic compounds in the year 2012 when this policy began as implemented by the Thai government were approximately 93 %, 62 %, 59 % and 59 %, a decrease as compared to the BAU case in the same year for benzene, 1,3-butadiene, acetaldehyde and formaldehyde, respectively. The introduction of gasohol as alternative fuel was found to greatly influence the emission factors of acetaldehyde and formaldehyde. Calculated results in the year 2012 indicated that acetaldehyde average emission factor increased from 123mg/km (BAU case) to 2,272 mg/km (gasohol scenario) in the same year. However, the average emission factors of benzene and 1,3 butadiene that were the result of gasohol usage were less when compared with the BAU case.

Key words: air toxic emission, dynamic emission factor, gasohol emission, motorcycle

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