Evaluation of NH3-Slip from Diesel Vehicles Equipped with Selective Catalytic Reduction Systems by Neural Networks Approach

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Abstract : Selective catalytic reduction systems for nitrogen oxides reduction by ammonia has been the chosen technology by most of diesel vehicle (i.e. bus and truck) manufacturers in Brazil, as also in Europe. Furthermore, at some conditions, over-stoichiometric ammonia availability is also needed that increases the NH_3 slips even more. Ammonia (NH_3) by this vehicle exhaust aftertreatment system provides a maximum efficiency of NOx removal if a significant amount of NH_3 is stored on its catalyst surface. In the other words, the practice shows that slightly less than 100% of the NOx conversion is usually targeted, so that the aqueous urea solution hydrolyzes to NH_3 via other species formation, under relatively low temperatures. This paper presents a model based on neural networks integrated with a road vehicle simulator that allows to estimate NH_3-slip emission factors for different driving conditions and patterns. The proposed model generates high NH_3 slips which are not also limited in Brazil, but more efforts needed to be made to elucidate the contribution of vehicle-emitted NH_3 to the urban atmosphere.

Keywords : ammonia slip, neural-network, vehicles emissions, SCR-NOx

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