Section E1

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A case study on noise pollution caused by exhaust noise of road vehicles of categories L, M, and N

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Exhaust noise of vehicles contributes significantly to noise pollution in Sri Lanka. Since there are no regulations in Sri Lanka to control vehicle exhaust noise, this study focused on addressing it. Comprehensivedata related to exhaust sound pressure levels (ESPLs) of a sample of stationary vehicles parked at the premises of Industrial Technology Institute (ITI) during the period from July to September 2017 were collected, along with their target engine speeds, years of manufacture, mileages etc., which are the factors that can influence the ESPLs. Measurement procedure was in accordance with ISO 5130:2007_ENREF_1. The relationships between ESPL, and variables such as target engine speed, year of manufacture, mileage etc., were determined using linear regression and correlation analysis. Functional relationship between ESPL and the influencing factors were determined by multiple regression analysis. The principle findings of the study revealed that the ESPLs of automatic transmission vehicles are lower than those of manual transmission vehicles, ESPLs of diesel engine vehicles are higher than those of petrol engine vehicles and the ESPLs of hybrid vehicles on battery mode, are lower than those of non-hybrid vehicles. The current international regulations relating to noise such as ECE R41 and ECE R51 were also reviewed and the limits specified in them for different vehicle categories were compared with the measurements taken. The ESPLs of several stationary road vehicles exceeded the maximum permissible noise limits specified in these international regulations. Frequencies in the range 100-200 Hz which are annoying were found to be dominant in vehicle exhaust noise and preventive measures would be necessary to lower their values. Finally, baseline data were established to facilitate control of noise pollution in Sri Lanka through relevant regulations, so that the vehicle owners will have to take steps to maintain the ESPLs of their vehicles at appropriate levels. All facilities required were provided by ITI, and hence no additional funding was required.

Key words: Noise pollution, exhaust noise, manual and automatic transmission, hybrid vehicles, vehicle noise regulations

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