

## **Investigating road traffic noise level in Muscat Governorate**

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### **Abstract**

usage of vehicles thereby resulting into several environmental problems including noise pollution. The aim of this research is to investigate and assess vehicular noise pollution levels in Muscat governorate, the capital of the Sultanate of Oman. Vehicular sound pressure levels were measured in various Wilayat/regions in Muscat Governorate to define existing noise exposure levels. The measurements carried out in 2018 with Noise Sensor type MK:427. The measured sound levels were modeled and validated for prediction through Artificial Neural Network (ANN) using MATLAB. Traffic counts were used as input data along with meteorological factors. The traffic counts were provided by Muscat Municipality while meteorological factors were measured by the air pointer instrument. The attitudes toward noise pollution and perceived annoyance impact were assessed based on survey through questionnaire distributed among 470 residents exposed to the traffic noise. The percentage of highly annoyed persons was calculated according to the dose-response model established by World Health Organization (WHO). The results of this study showed that, the traffic noise levels in Muscat were found to be acceptable during day time with an average of 60-61 dB and exceeding the Ministry of Environment and Climate Affairs (MECA)(55 dB), the Environmental Protection Agency (EPA)(50 dB) and WHO (45 dB) recommended noise level at night. Pearson correlation analysis resulted in a weak correlation between meteorological variables and measured noise levels ( $r$  value ranged between -0.4 to 0.3). On the other hand, stronger relationships ( $r = 0.8$ ) were found between traffic count and measured noise in some locations. Generally, the ANN model showed good traffic noise prediction with maximum and minimum Root Mean Square Error (RMSE) value of 1.7- 0.17 dB, respectively. According to the survey results, about of 91.7 % of the respondents found traffic noise at home as source of annoyance. Moreover, about 50% of the respondents reported moderate to high prevalence of perceived annoyance. Finally, a set of recommendations is presented to reduce traffic noise problem in Muscat Governorate.