Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

TRAFFIC INDUCED NOISE POLLUTION PREDICTION USING TRAFFIC NOISE MODEL (TNM) IN RASHT, IRAN

Ali Ahmadi Orkomi*, Khashayar Mahdiani Bora

Department of environmental sciences and engineering, Faculty of Natural Resources, University of Guilan, Rasht, Iran

Abstract

In this survey, the traffic noise model (*TNM*) has been applied for traffic-induced noise prediction. District 4 of Rasht was chosen as the study area, and three pavement types on the *TNM* model were examined to select the best one for the study area. The model predictions satisfied well with the measured ones by using the *RMSE* statistical parameter and *ANOVA* test. The *DGAC* pavement type proved to have the least *RMSE* (*RMSE*=2.8). *ANOVA* test results showed the measured equivalent A-weighted sound levels ($L_{A,eq}$) and the predicted ones are statistically the same (*P-value*=0.64>0.05 and F=0.22<$F_{critical}$=4.04), meaning that the usage of *DGAC* leads to lower noise level prediction error. After that, the $L_{A,eq}$ induced from traffic have been predicted using the traffic load time series data. The daytime averaged noise levels in the north-eastern parts of district 4 are much higher than the Iranian standard. The nighttime $L_{A,eq}$ contour map also showed that the residential areas around the main roads have sound levels between 55 *dBA* to 60 *dBA* during nighttime, which is unhealthy for human, and the L_{DN} contour for the day-night time indicated that the residential areas have sound levels between 60 to 65 *dBA* that is about 5 to 10 *dB* more than the *EPA* noise pollution standard. Also, the results showed that the cumulative contribution of heavy trucks and different types of bus on the noise level at residential areas is about 43% in average. In this regard, redirecting the heavy trucks and buses traffic routes reduces the L_{DN} value about 2.5 *dBA* in the most polluted parts of the study area.

Keywords: noise pollution, pavement type, sound level, *TNM* model, traffic noise

Received: November, 2020; Revised final: February, 2021; Accepted: March, 2021

* Authors to whom all correspondence should be addressed: e-mail: Orkomi@guilan.ac.ir; Phone: +989124785336; Fax: +981333516042