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DEVELOPMENT OF A TRAFFIC NOISE PREDICTION MODEL FOR FOUR-LANE INDIAN HIGHWAYS

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Abstract

Heterogeneous traffic flow significantly influences the noise level in the surrounding area of highways. The traffic composition in India comprises vehicles with different sizes, speeds, and operating characteristics. Noise pollution is recognized as a major environmental stressor affecting human health. This study predicts traffic noise using traffic data from National Highways with free-flow traffic conditions. A radar gun measures vehicular speed, and videography documents traffic volume. Furthermore, the octave spectrum characteristics of traffic acoustics were analyzed. 460 data sets were meticulously compiled at 15-minute intervals across weekdays and weekends, encompassing peak and off-peak periods. This data was used to predict equivalent noise levels (L_{Aeq}) using multiple regression techniques. The developed model is compared with the Calculation of Road Traffic Noise (CORTN) model and other recent empirical models. A comparative significance of the input variables is evaluated. Heavy vehicles are observed as the most significant variable, followed by speed. Six scenarios were developed to predict the traffic noise. The results of this study will help to predict and reduce traffic noise in mixed traffic flow conditions.

Key words: highway traffic noise model, influencing variable, noise pollution, regression

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