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A Preliminary Study on the Level of Noise Attenuation by a Natural Green Hedge

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Abstract

Traffic noise can be considered a weightless pollutant, and it is far growing daily in urban areas all over the world. Few countries have started to introduce sound barriers to minimize a significant amount of traffic noise. This study investigates the sound reduction ability of a natural green hedge in applying as a noise barrier. The study result is based on a naturally grown green fence of Small Nuga (*Ficus benjamina*) having a high packing factor with thickness×height×length of 2.0×4.0×6.0 m^3. The average weight of the fresh plant of a unit volume of the fence is 5.6 kg. Handheld sound analyzer (IEC 60651, B&K 2250L, class 1) and B&K omni-directional dodecahedron sound source (0.8-3.15 kHz) type 2734-A amplifier (50-5,000 Hz, 1/3 octave bands) are the primary equipment used for the study. The speaker was placed 1 m away from the fence and 1.2 m above the ground. The transmitted sound through the fence was monitored for three locations in a line of 1 m, 2 m, and 3 m with the same speaker level. All exterior sounds were avoided during the measurements. Sound propagation after the green fence was estimated and mapped using iNoise software (version 2021.1) and ArcMap software (version 10.7.1). The study reveals that the vegetation barrier could reduce 34.4% of the incident acoustic energy, and approximately 26 dB of noise drop was identified at a point 2 m away from the vegetation barrier. The adequately structured noise barrier will effectively increase noise reduction.

Keywords: Traffic noise, Vegetation barriers, Sound absorption, Noise reduction

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