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Composites of scrap tire rubber particles and adhesive mortar – Noise insulation potential

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1 Composites of scrap tire rubber particles and adhesive mortar -
2 noise insulation potential

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7 **Abstract**

In this work, composite materials made of adhesive mortar and scrap tire rubber particles were investigated with the main aim of characterizing their airborne noise insulation potential. Composites containing 10, 15 and 25% (in mass) of rubber particles with two different granulometry (between 18-35 mesh and between 35-60 mesh) were prepared, and the acoustic properties were evaluated considering the transmission loss and the sound absorption. Both transmission loss and sound absorption coefficient were obtained using an impedance tube with the One Microphone Method in a frequency range from 400 Hz to 2500 Hz. The results show an influence of the rubber particle size and mortar/rubber ratio on both acoustic properties. The apparent density estimation was carried out considering the relationship between the mass and dimensions of each sample, and as expected, composites presented lower density values than pure mortar. Composites containing 15% of rubber particles presented higher transmission loss values compared to pure mortar in all investigated frequency range. Composites containing 25% of rubber particles presented high values of sound absorption coefficient than those observed for pure mortar in a frequency range from 600 Hz to 2400 Hz. Composites presented lower values of tensile bond strength compared to the pure mortar. Composites and pure mortar were also characterized by scanning electron microscopy and X-ray microtomography in order to correlate the acoustic and tensile bond strength behaviors with microstructural properties.

8 *Keywords:* Transmission loss, sound absorption, tensile bond strength, adhesive mortar,
9 scrap tire rubber.

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