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Acoustic Performance of Concrete with Rubber and Vermiculite for Highway Barriers

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The production and import of new tires and the inadequate disposal of waste tires have caused serious environmental and public health problems. One of the direct harmful effects of transport on the environment is noise due to traffic. In this context, to properly allocate the environmental liabilities, waste rubber has been used in concrete to improve its acoustic performance and energy absorption. Studies carried out by the Federal Highway Administration FHWA, in the United States, show that road barriers, regardless of the material used, do not block completely, but can reduce the volume of traffic noise by half. This study aims to propose concrete mixes containing waste tires and vermiculite, in order to verify the acoustic properties of concrete for the construction of road barriers. The method and materials include the use of concrete with waste tires and vermiculite to replace the mass of sand from 10% to 40%. An improvement in the acoustic properties of the concrete was observed, providing a reduction in the total sound intensity level of the rubberized concrete acoustic barrier, by 24 dB and 27 dB, for the frequencies of 500 Hz and 1000 Hz, respectively.