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PERIODIC SYSTEMS AS ROAD TRAFFIC NOISE REDUCING DEVICES: PROTOTYPE AND STANDARDIZATION

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Abstract

The design, the realization of the prototype and the acoustic standardization process of a novel periodic system made up of multi-physical phenomena scatterers as a road traffic noise reducing device are reported in this work. The structure analysed here, inspired by Sonic Crystals, has been designed following the guidelines established in recent works according to the concept of tunability. Thus, the acoustic barrier proposed here includes several mechanisms of noise control, such as scattering, resonances and absorption, in such a way the range of frequencies where each mechanism works can be chosen in the design process. The constructive solutions taken into account in the manufacturing process of the device are also explained. On the other hand, as a road traffic noise reducing device, the system has been evaluated by the European standards. Finally, due to the fact that this device is made up of separated scatterers, an advantage in the reduction of the resistance to wind is observed in a wind tunnel experiment. The results of all these analyses allow us to present a novel type of road traffic noise reducing device with interesting alternative properties with respect to the classical acoustic barriers.

Key words: acoustic barrier, environmental solutions, road traffic noise control, sonic crystals

Received: May, 2012; *Revised final:* October, 2012; *Accepted:* November, 2012
