

ABSTRACT

Noise barriers are the most widespread solution to mitigate noise produced by the continuous growth of vehicular traffic, thus reducing the large number of people exposed to it and avoiding unpleasant effects on health. However, conventional noise barriers present the well-known issues related to the diffraction at the edges which reduces the net insertion loss, to the reflection of sound energy in the opposite direction, and to the complaints of citizens due to the reduction of field of view, natural light, and air flow. In order to avoid these shortcomings and maximize noise abatement, recent research has moved toward the development of sonic crystals as noise barriers. A previous review found in the literature was focused on the theoretical aspects of the propagation of sound through crystals. The present work on the other hand reviews the latest studies concerning the practical application of sonic crystal as noise barriers, especially for road traffic noise mitigation. The paper explores and compares the latest developments reported in the scientific literature, focused on integrating Bragg's law properties with other mitigation effects such as hollow scatterers, wooden or recycled materials, or porous coating. These solutions could increase the insertion loss and frequency band gap, while inserting the noise mitigation action in a green and circular economy. The pros and cons of sonic crystal barriers will also be discussed, with the aim of finding the best solution that is actually viable, as well as stimulating future research on the aspects requiring improvement.