

عنوان مقاله:

Modulation of sound propagated from the inlet duct of an automotiveturbocharger compressor, using various porous materials

محل انتشار:

دومین کنفرانس بین المللی کاربرد مواد و ساخت پیشرفته در صنایع (سال: 1401)

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خلاصه مقاله:

Sound absorptive materials have been widely utilized to control, manipulate, and mitigate the propagation of sound waves in the aerospace and automotive industries. This paper proposes that porous materials can be fitted as the coating liner to the inlet duct of the turbocharger compressor in order to absorb the incident excitation and hence, reduce the propagation of sound waves. As a result, three different types of absorptive materials are used as coating liners to determine the impact that varying material properties have on the acoustic absorption performance of the system. A finite element approach is conducted, and acoustic pressure and poroacoustics studies are carried out over the desired frequency range (1-20 kHz) using COMSOL Multiphysics. Sound transmission loss (TL) and sound pressure level (SPL) are investigated for the models with and without liners. The results indicate that sound-absorbing materials can be employed to significantly diminish sound levels in the turbocharger compressor inlet duct. According to the results, absorptive liners would considerably increase the maximum TL and lessen the sharp drop in TL that appeared in the model without liners at around 4321 Hz. In addition, the average TL has increased due to the replacement of valleys with peaks. By adding only 5 mm of an absorptive liner, the average TL was increased by 3.3%. The present study intends to introduce a fundamental approach that can be applied to many promising fields such as aerospace and automotive engineering.

کلمات کلیدی:

Porous materials, Sound-absorbing, sound transmission loss, turbocharger compressors, noise and vibration attenuation

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