

Investigating the acoustical and vibrational response of stiffened steel plate opening wall in a RC room subject to blast

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Abstract

The need to understand how to implement the structural quieting techniques into the design processes has led the engineers to pay more attention to noise generation and transmission from the vibrating structures. In this study, utilizing the finite element software ABAQUS, the acoustical and vibrational response of stiffened steel plate opening wall in a RC (Reinforced Concrete) room subject to blast was investigated. Moreover, frequency analysis was performed on each of the stiffener arrangements, in order to obtain the transmission loss of the generated noise in frequency domain under the effect of a diffused field of a white noise. The three stiffener arrangements of diagonal, cross, and parallel were used in the analysis. The results indicate that the stiffener arrangements had marginal effect on the vibrational response of the system, whereas its influence on the acoustical response of the system was substantially high. For instance, the cross and diagonal stiffeners showed, in a descending order, the best performance in the noise transmission loss of the system.

Keywords: Acoustical response, Vibrational response, Transmission loss, Stiffened.

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