

Experimental Analysis of Structure Borne Noise in an Enclosure

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Abstract : This paper presents the experimental analysis conducted on a structure borne noise in a rectangular enclosure prototype made by joining of sheet aluminum metal and plywood. The study is significant as many did not realized the annoyance caused by structural borne-noise. In this study, modal analysis is carried out to seek the structure's behaviour in order to identify the characteristics of enclosure in frequency domain ranging from 0 Hz to 200 Hz. Here, numbers of modes are identified and the characteristic of mode shape is categorized. Modal experiment is used to diagnose the structural behaviour while microphone is used to diagnose the sound. Spectral testing is performed on the enclosure. It is acoustically excited using shaker and as it vibrates, the vibrational and noise responses sensed by tri-axis accelerometer and microphone sensors are recorded respectively. Experimental works is performed on each node lies on the gridded surface of the enclosure. Both experimental measurement is carried out simultaneously. The modal experimental results of the modal modes are validated by simulation performed using MSC Nastran software. In pursuance of reducing the structure borne-noise, mitigation method is used whereby the stiffener plates are perpendicularly placed on the sheet aluminum metal. By using this method, reduction in structure borne-noise is successfully made at the end of the study.

Keywords : enclosure, modal analysis, sound analysis, structure borne-noise

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