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Rapid Evaluation of Hidden Frame Supported Glass Curtain Wall Safety State Based on Remote Vibration Measurement

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Abstract

The vibration performance of simulation hidden frame supported glass curtain wall (HFSGCW) was tested using Laser Doppler Vibrometer (LDV) in this paper. The effect of silicon structural sealant on the first order inherent frequency of HFSGCW and the spectral characteristics got by LDV on different points were studied. Meanwhile, the test results of LDV were verified using traditional sensor (DASP modal analysis system) in order to evaluate the feasibility of LDV used for safety state evaluation of HFSGCW. The results show that the first order inherent frequency obtained by LDV matches well with DASP modal analysis results. The first order inherent frequency decreases with the increase of sealant failure, and increases significantly when the structural silicon sealant was completely destroyed. The safety state of HFSGCW was divided into three levels. Meanwhile, the safety state rapid evaluation model and key detection technologies of HFSGCW based on LDV was proposed.

Key words: Laser Doppler Vibrometer (LDV), Hidden frame supported glass curtain wall (HFSGCW), Modal analysis, Safety state, Evaluation model

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