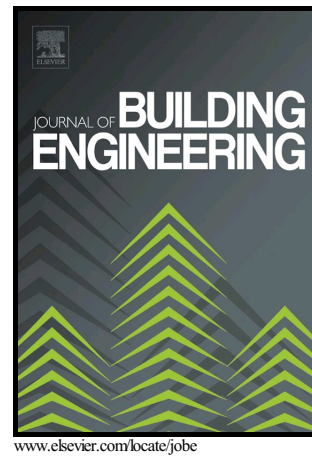


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Modal analysis related safety-state evaluation of hidden frame supported glass curtain wall

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Abstract:

The dropping off of hidden frame supported glass curtain wall (HFSGCW) glass panel due to structural sealant failure has become a severe safety problem and there is no a rapid and effective evaluation method up to now. The modal analysis of a simulation of HFSGCW glass panel at different working condition was done using data acquisition and signal processing sensor system, and the safety-state evaluation model for HFSGCW glass panel is proposed on the basis of modal parameters. The results showed that: the modal frequency of HFSGCW glass panel decrease and the damping ratio increase with the damage increase of structural sealant, and the first order modal parameters are more suitable for glass safety-state evaluation. The modal analysis results can be replaced by the first peak frequency and damping ratio obtained from the self-power frequency spectrum of the middle sensor location of HFSGCW glass panel. The sealant failure can be identified according to the amplitude change of the first peak frequency when the structural sealant is chosen as the excitation point. The safety-state HFSGCW glass panel can be divided into three levels which provide important guiding significance for HFSGCW safety-state evaluation.

Key words: Hidden frame supported glass curtain wall (HFSGCW); Glass panel; Modal parameters;

Safety state; Evaluation model

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