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Influence of Stacking Sequence and Temperature on Buckling Resistance of GFRP Infill Panel

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Abstract : Glass Fiber Reinforced Polymer (GFRP) is a major evolution for energy dissipation when used as infill material for seismic retrofitting of steel frame, a basic PMC infill wall system consists of two GFRP laminates surrounding an infill of foam core. This paper presents numerical analysis in terms of buckling resistance of GFRP sandwich infill panels system under the influence of environment temperature and stacking sequence of laminate skin. Mode of failure under in-plane compression is studied by means of numerical analysis with ABAQUS platform. Parameters considered in this study are contact length between infill and frame, laminate stacking sequence of GFRP skin and variation of mechanical properties due to increment of temperature. The analysis is done with four cases of simple stacking sequence over a range of temperature. The result showed that both the effect of temperature and stacking sequence alter the performance of entire panel system. The rises of temperature resulted in the decrements of the panel's strength. This is due to the polymeric nature of this material. Additionally, the contact length also displays the effect on the performance of infill panel. Furthermore, the laminate stiffness can be modified by orientation of laminate, which can increase the infill panel strength. Hence, optimal performance of the entire panel system can be obtained by comparing different cases of stacking sequence.

Keywords : buckling resistance, GFRP infill panel, stacking sequence, temperature dependent
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