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Statistical Analysis of Parameters Effects on Maximum Strain and Torsion Angle of FRP Honeycomb Sandwich Panels Subjected to Torsion

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Abstract : In recent years, honeycomb fiber reinforced plastic (FRP) sandwich panels have been increasingly used in various industries. Low weight, low price, and high mechanical strength are the benefits of these structures. However, their mechanical properties and behavior have not been fully explored. The objective of this study is to conduct a combined numerical-statistical investigation of honeycomb FRP sandwich beams subject to torsion load. In this paper, the effect of geometric parameters of the sandwich panel on the maximum shear strain in both face and core and angle of torsion in a honeycomb FRP sandwich structures in torsion is investigated. The effect of Parameters including core thickness, face skin thickness, cell shape, cell size, and cell thickness on mechanical behavior of the structure were numerically investigated. Main effects of factors were considered in this paper and regression equations were derived. Taguchi method was employed as experimental design and an optimum parameter combination for the maximum structure stiffness has been obtained. The results showed that cell size and face skin thickness have the most significant impacts on torsion angle, maximum shear strain in face and core.

Keywords : finite element, honeycomb FRP sandwich panel, torsion, civil engineering
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