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Experimental and Numerical Investigation of Hardness and Compressive Strength of Hybrid Glass/Steel Fiber Reinforced Polymer Composites

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Abstract : This paper investigates the experimental study of hardness and compressive strength of hybrid glass/steel fiber reinforced polymer composites by varying the glass and steel fiber layer in the epoxy matrix. The hybrid composites with four stacking sequences HSG-1, HSG-2, HSG-3, and HSG-4 were fabricated by the VARTM process under the controlled environment. The experimentally evaluated results of Vicker's hardness of the fabricated composites increases with an increase in the fiber layers sequence showing the high resistance. The improvement of micro-structure ability has been observed from the SEM study, which governs in the enhancement of compressive strength. The finite element model was developed on ANSYS to predict the above said properties and further compared with experimental results. The results predicted by the numerical simulation are in good agreement with the experimental results. The hybrid composites developed in this study was identified as the preferred materials due to their excellent mechanical properties to replace the conventional materialsused in the marine structures.

Keywords : finite element method, interfacial strength, polymer composites, VARTM
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