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Production and Mechanical Characterization of Ballistic Thermoplastic Composite Materials

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Abstract : In this study, first thermoplastic composite materials/plates that have high ballistic impact resistance were produced. For this purpose, the thermoplastic prepreg and the vacuum bagging technique were used to produce a composite material. Thermoplastic prepregs (resin-impregnated fiber) that are supplied ready to be used, namely high-density polyethylene (HDPE) was chosen as matrix and unidirectional glass fiber was used as reinforcement. In order to compare the fiber configuration effect on mechanical properties, unidirectional and biaxial prepregs were used. Then the microstructural properties of the composites were investigated with scanning electron microscopy (SEM) analysis. Impact properties of the composites were examined by Charpy impact test and tensile mechanical tests and then the effects of ultraviolet irradiation were investigated on mechanical performance.

Keywords : ballistic, composite, thermoplastic, prepreg
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