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Evaluation of mechanical properties of carbon fiber considering size effect

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In this study, the mechanical properties of carbon fiber were evaluated considering the size effect. The material properties tend to degrade as geometric shapes increase due to size effect. Therefore, when designing a structure that maximizes weight, such as a composite pressure vessel, it is necessary to consider properties degradation due to size effect. The carbon fiber used in this study is developed by Hyosung of Republic of Korea and has elastic modulus of 250 GPa and tensile strength of 5,500 MPa. In order to verify size effect, type 4 composite pressure vessels of 250 mm in diameter and 500 mm in diameter were selected. The composite pressure vessels were manufactured by filament winding method. The mechanical properties of carbon fiber were evaluated by hydraulic test for composite pressure vessels.

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