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Effects of the strength and precision properties of filament winding epoxy pipes

Wen-Wu Wang*, Ki-Ha Shin, Young-Bok Lee, Seung-Hyeon Kim

Department of Center for Research, World Technology Co., Ltd., Baekgok-ri 344-10, Mado-myeon, Hwaseong-si, Gyeonggi-do, Korea
Tel. +82 (31) 355-2581; Fax +82 (31) 355-2357; email:wangwenwu@skku.edu

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ABSTRACT

Behavior of fiber reinforced composite pressure vessels has been analyzed and developed theoretically. Winding angle and temperature are two kinds of effect factors on filament wound composite pressure vessels. FEM method, elastic solution procedure based on Lekhnitskii's theory and thick-walled theory were employed to verify the optimum winding angles. The aim of this study was to investigate processing parameters of continuous fiber reinforced epoxy composite pipes produced by the filament winding technique. For this purpose, two kinds of tests were performed for the specimen produced with two different methods, five different winding angles and five different curing temperatures. By determining the hoop tensile strength and precision, the winding angle, thermal properties and fitting temperature were evaluated. It is found that use of winding angles greater than 55° increases the performance of the structures considerably. It is also concluded that the use of the curing temperature of 150°C can increase the precision properties during the curing processing than other temperature conditions; at the same time, time of curing course also is an important effect factor to precision quality.

Keywords: Filament winding; Composite pipes; Strength; Precision; Temperature.

* Corresponding author.