

DELAMINATION ANALYSIS IN DRILLING OF GFRP COMPOSITE BY USING VARIOUS DRILL BITS

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Abstract

Glass Fiber reinforced polymer (GFRP) composites have been steadily replacing metals as choice engineering materials for various applications. Although GFRP's can be manufactured to near-net shape, post processing operations such as machining are required to create some features such as holes. In order to drill holes efficiently with the least waste and defects, it is essential to understand the machining behavior of GFRP's. As GFRP's are multiphase materials with complex load-response behavior, there is a need to turn to analytical approaches to fully understand the machining process. Delamination is recognized as one of the most critical defects that can result from the machining of composites due to the lack of strength in direction of drilling, which result in poor surface finish, reduction in anisotropic structure and poor performance of the composite. Considerable amount of research work has been carried out to reduce this delamination in various composite structures. The main objective of this experimental analysis was to predict delamination in GFRP work specimen by calculating the thrust force and cutting torque using Taguchi technique with Minitab 15 Analysis software.

Keywords: Composite, Delamination, Glass Fiber Reinforced Plastic, Twist Drill, Taguchi Method, Analysis of Variance