

The Effect of Chisel Edge on Drilling-Induced Delamination

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Abstract : Drilling is one of the most important machining operations as numerous holes must be drilled in order to install mechanical fasteners for assembly in composite structures. Delamination is a major problem associated with the drilling of fiber reinforced composite materials, which degrades the mechanical properties of these materials. In drilling, delamination is initiated when the drilling force exceeds a threshold value, particularly at the critical entry and exit locations of the drill bit. The chisel edge of twist drill is a major contributor to the thrust force which is the primary cause of delamination. The main objective of this paper is to study the effect of chisel edge and pilot hole on thrust force and delamination during drilling of glass fiber reinforced composites. For this purpose, two sets of experiments, with and without pilot hole, were conducted with different drilling conditions. The results show a great reduction in the thrust force when a pilot hole is present which removes the chisel edge contribution.

Keywords : composites, chisel edge, drilling, delamination

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