

An Experimental Study of Bolt Inclination in a Composite Single Bolted Joint

Authors : Youcef Faci, Djillali Allou, Ahmed Mebtouche, Badredine Maalem

Abstract : The inclination of the bolt in a fastened joint of composite material during a tensile test can be influenced by several parameters, including material properties, bolt diameter and length, the type of composite material being used, the size and dimensions of the bolt, bolt preload, surface preparation, the design and configuration of the joint, and finally testing conditions. These parameters should be carefully considered and controlled to ensure accurate and reliable results during tensile testing of composite materials with fastened joints. Our work focuses on the effect of the stacking sequence and the geometry of specimens. An experimental test is carried out to obtain the inclination of a bolt during a tensile test of a composite material using acoustic emission and digital image correlation. Several types of damage were obtained during load. Digital image correlation techniques permit to obtain the inclination of bolt angle value during tensile test. We concluded that the inclination of the bolt during a tensile test of a composite material can be related to the damage that occurs in the material. It can cause stress concentrations and localized deformation in the material, leading to damage such as delamination, fiber breakage, matrix cracking, and other forms of failure.

Keywords : damage, digital image correlation, bolt inclination angle, joint

Conference Title : ICAA 2024 : International Conference on Aeronautics and Aeroengineering

Conference Location : Rome, Italy

Conference Dates : February 19-20, 2024