

Experimental Characterization of Composite Material with Non Contacting Methods

Authors : Nikolaos Papadakis, Constantinos Condaxakis, Konstantinos Savvakis

Abstract : The aim of this paper is to determine the elastic properties (elastic modulus and Poisson ratio) of a composite material based on noncontacting imaging methods. More specifically, the significantly reduced cost of digital cameras has given the opportunity of the high reliability of low-cost strain measurement. The open source platform Ncorr is used in this paper which utilizes the method of digital image correlation (DIC). The use of digital image correlation in measuring strain uses random speckle preparation on the surface of the gauge area, image acquisition, and postprocessing the image correlation to obtain displacement and strain field on surface under study. This study discusses technical issues relating to the quality of results to be obtained are discussed. [0]8 fabric glass/epoxy composites specimens were prepared and tested at different orientations 0[o], 30[o], 45[o], 60[o], 90[o]. Each test was recorded with the camera at a constant frame rate and constant lighting conditions. The recorded images were processed through the use of the image processing software. The parameters of the test are reported. The strain map output which is obtained through strain measurement using Ncorr is validated by a) comparing the elastic properties with expected values from Classical laminate theory, b) through finite element analysis.

Keywords : composites, Ncorr, strain map, videoextensometry

Conference Title : ICCM 2019 : International Conference on Composite Materials

Conference Location : Amsterdam, Netherlands

Conference Dates : August 06-07, 2019