

Abstract Details

Title Virtual analysis and manufacturing of flat specimen of carbon fiber composite for computing tensile strength

Authors: Joginder Singh, M.R.Tyagi , Abhinav Chawla, Vinay Prabhakar, Dinesh Kashyap, Abdul Ahad

Abstract : Tensile strength is one of the important mechanical properties. To check the tensile strength, flat specimen is designed as per the ASTM E8M standard. Two materials were selected to compare the tensile strength i.e. Steel and Carbon Fibre Composite material. The overall dimensions of the specimen were 200 x 70 x 4 mm. The Specimen of Steel was manufactured with the help of Wire Cut Machine. The Specimen of composite was developed from the scratch i.e. Carbon Fibres and Epoxy. The developed specimen was machined by Water Jet Machine. 2D and 3D of the specimen was developed in the CATIA software. Both machines were computer operated therefore good accuracy achieved in the 2D profiles. Few problems were faced during machining of Carbon Fibre Composite material with Water Jet Machining like delamination, fibre pull out and abrasive embedment in the specimen. There was huge difference in the weight of specimen of said materials. Weight was reduced by 83.2% when Carbon Fibre Composite material used. Virtual analysis of Steel and Carbon Fibre Composite material was performed in ANSYS software. For the same boundary and loading conditions, Carbon Fibre Composite material showed the better results in context of stresses. Future belongs to the Carbon Fibre Composite material because of its various advantages.

Keywords: Carbon Fiber Composite, Water Jet Machining, CATIA, ANSYS.