World Academy of Science, Engineering and Technology
International Journal of Materials and Textile Engineering
Vol:11, No:02, 2017

Non-Destructive Evaluation for Physical State Monitoring of an Angle Section Thin-Walled Curved Beam

Authors : Palash Dey, Sudip Talukdar

Abstract : In this work, a cross-breed approach is presented for obtaining both the amount of the damage intensity and location of damage existing in thin-walled members. This cross-breed approach is developed based on response surface methodology (RSM) and genetic algorithm (GA). Theoretical finite element (FE) model of cracked angle section thin walled curved beam has been linked to the developed approach to carry out trial experiments to generate response surface functions (RSFs) of free, forced and heterogeneous dynamic response data. Subsequently, the error between the computed response surface functions and measured dynamic response data has been minimized using GA to find out the optimum damage parameters (amount of the damage intensity and location). A single crack of varying location and depth has been considered in this study. The presented approach has been found to reveal good accuracy in prediction of crack parameters and possess great potential in crack detection as it requires only the current response of a cracked beam.

Keywords : damage parameters, finite element, genetic algorithm, response surface methodology, thin walled curved beam
Conference Title : ICCMS 2017 : International Conference on Composite Materials and Structures
Conference Location : Bangkok, Thailand
Conference Dates : February 07-08, 2017