Experimental investigation on multi pass drilling of GFRP using fuzzy inference system

[1]S.SANKARA NARAYANAN, [2]B.KUMARAGURUBARAN, [3]T.SENTHIL KUMAR
[1]P.G Scholar M.E. (Manufacturing Engineering)Mechanical Engineering Department
University college of Engineering, BIT Campus, Anna university
Trichy, Tamil Nadu, India.
[2]Assistant Professor ,Mechanical Engineering Department
University college of Engineering, BIT Campus, Anna university
Trichy, Tamil Nadu, India.
[3]Professor, Mechanical Engineering Department
University college of Engineering, BIT Campus, Anna university
Trichy, Tamil Nadu, INDIA.
ssnsptc@gmail.com

Abstract :- Drilling is an hole making process in metal cutting operation performed by extrusion which finds wide application in various industries for manufacturing components using metals and non metals. This process is applied widely in assembly of components or elements, where processing challenges are severe issue such as to maintain surface integrity, ovality, machining time, Metal Removal Rate etc., In the recent trends of engineering GFRP is a fast growing material which found to have the application of drilling operation and also facing the above mentioned processing challenges in the hole making process. So in this work the drilling of GFRP was investigated for characteristic behavior of cutting parameters spindle speed, feed with 10 mm diameter of hole. The experiment was carried out using 6 mm HSS, 6 mm TiN coated HSS,10 mm HSS, 10 mm TiN coated HSS drill bits in three different configuration of drill pass ie., three multipass (1. 6mm HSS then 10mm HSS drill 2. 6mm TiN coated HSS then 10mm TiN coated HSS drill 3. 6mm TiN coated HSS then 10mm HSS drill). The responses considered were Surface finish, Delamination, ovality and machining time were tested for significance for the effects of parameters and the results were found to be good. The inferences were analyzed both in regression modeling and fuzzy logic modeling and it was found that the fuzzy logic gives more detailed inference system comparatively than regression modeling.

Keyword:- single objective, GFRP, delmaination, drill combination, speed, feed, Taguchi method, FIS.