madridge CONFERENCES
European
Physics Conference 2018
December 6-7, 2018 Valencia, Spain

ANN Prediction of the Surface Roughness of Plasma Arc Cut Plates for Different Materials

Amir SA Abdelmaseh*, Samy J Ebeid, Mostafa RA Atia and **Mostafa M Sayed**
Ain Shams University, Egypt

Plasma arc cutting Process (PAC) is a thermal cutting operation uses as a restricted, high-speed jet of extremely high temperature dissociated, ionized inert gas known as plasma (4th state of matter) formed from the electrical arc between the nozzle, and the surface to melt and cut conductive materials.

This paper deals with the potential of using PAC technology to cut copper plates and experimental investigations of the effect of cutting variables on the quality of the cut surface monitored by the arithmetic average roughness Ra. And a comparison between Ra response of copper and ST 37-2 (S235JR) plates is conducted. Cutting current intensity, Speed, Standoff distance, and cutting gas pressure are selected as cutting variables. The experiments were all carried out on 5 mm specimens for copper and 8 mm thickness for steel plates. Ra was measured using Surtronic-3, Taylor-Hobson surface texture equipment. An Artificial Neural Network (ANN) was developed, trained and tested to predict the Ra response for both materials under investigation.

Results from this investigation shows that accurate prediction of surface roughness can be achieved using the trained feed forward-back propagation neural network for both copper and steel, and this trained network could be used to optimize the cutting parameters to get lower values of Ra.

Biography:

Amir Samir Azer Abdelmaseeh was born in Cairo – Egypt on 1st of October 1991. He graduated from Design and production department – Faculty of engineering Ain Shams University (ASU) on July 2014. Started working as a demonstrator and researcher Ain Shams University since October 2015. And Sound and vibration control engineer at ASUGARDS. Currently a master's degree student at Ain Shams University. He Travelled to Politecnico di Torino (POLITO) at Turin, Italy) to attend a training on integrated additive manufacturing on September 2018 under a fully funded project (VET-ENG) by the Erasmus+ Programme of the European Union.