

Title :

Investigating the effects of process parameters on heat flow and cutting edge quality during laser cutting of steel sheets through experimental and numerical analysis

Abstract :

Today, the laser cutting process is one of the most common and advanced cutting methods. In which with a high-power source cut pieces with different thicknesses ideally. The advantages of this process are high speed, high accuracy and good surface quality. In this study, the process of laser shearing of Mild Steel St37 steel sheets with two different thicknesses has been analyzed. Then, for study the quality of the cutting edge and the depth of Heat-affected zone, different tests have been performed to check the effect of each of the basic parameters of the process such as laser beam power, laser beam speed and pressure of protective gas on the quality of the cutting edge and the depth of Heat-affected zone. The simulation of finite element components was studied to check the heat distribution in this process. The results show the effect of three main parameters of laser beam speed, auxiliary gas pressure and laser beam power have a big influence on the surface roughness output and the depth of Heat-affected zone .Also, the values of each of the process parameters in order to achieve the optimal cutting conditions and the desired quality of the edge should be determined according to other parameters and in a specific range, so that optimal output can be extracted from other parameters.

Keywords :

Laser Cutting, Steel plate, Quality of Cutting Edge, Heat-affected zone, Finite Element