

## Abstract

This project is to study and to analyze the parameters of laser power that can effect on the characteristic of joint of laser welding. For leading to the optimum of laser welding condition with appropriate to the factory usage. Three consideration parameters were (1) peak power, (2) pulse repetition rate, and (3) work piece rotational speed. The characteristics of joint welding; such as dimension of joint welding, orderliness of welding profile, and spot overlap, are being considered. This project was using Nd:YAG laser with the pulse mode for welding two types of stainless steel such as SUS 430 and DHS\_1. In laser welding process, work piece moves while laser beam (1.3 J/pulse) is fixed. This laser welding process used inert gas argon to cover the work piece surface. The results of the experiment were; (1) The peak power was direct variation to the dimension of joint welding, spot overlap and orderliness of welding profile. The suitable peak power of the experiment was 1.00 kW. (2) The pulse repetition rate was direct variation to the spot overlap and the orderliness but did not have effect on the dimension of joint welding. The suitable pulse repetition rate of this experiment was 20 pps. (3) Work piece rotational speed was reverse variation to the spot overlap but did not have effect on the dimension of joint welding including the orderliness of welding profile. The suitable speed was found to be at 3 rpm. Finally, the mathematical model of unidirectional thermal distribution of the welded joint was studied. The results of both mathematical model and the experiment showed very few different of the thermal distribution.