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A study on optimization of welding parameter to thick plates for application laser-arc hybrid welding

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Recently, there has been increasing interest in various welding methods to achieve automation and high-efficiency process design when applying welding to thick plates. Therefore, various studies are being conducted on new methods that can be automated rather than the existing welding methods. Among many new methods, the Laser-Arc Hybrid Welding (LAHW) method opens up the possibility of applying thick plates as the laser output increases, and can reduce deformation and heat-affected zone due to welding heat compared to existing welding methods. In addition, LAHW has high efficiency because welding can be performed in a single pass. There are studies related to humping that investigate the causes and mechanisms, but the analysis of the effects of each welding parameter is relatively insufficient. Therefore, in this study, we attempt to determine the cause and mechanism of occurrence by changing the welding process parameters applied during LAHW. Parameters being considered include laser output, arc output, distance between heat sources, presence or absence of improvement, etc., and we would like to select parameters with the greatest influence by creating a process window. In addition, we derive optimal conditions which humping does not occur through analysis of each parameter.