차체 레이저 용접을 위한 로봇 적용 기술에 관한 연구

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Research on Industrial Robot Application Technology for Laser Welding of Car Body

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Abstracts ; On this research, laser welding technology for manufacturing automobile body is studied. Laser system, robot and seam tracking system are used for consisting the laser welding system. The laser system is used 4kW Nd:YAG laser(HL4006D) of Trumpf and 1.6kW Fiber laser of IPG. The robot system is used IRB6400R of ABB(payload:120kg) and HX130-02 of Hyundai Heavy Industry(payload : 130kg). The welding joints of steel plate are butt and lap joint. The 3 dimensional laser welding is performed on the non-linear welding line of pipe specimen. The robot laser welding system is equipped with a seam tracker and plasma sensor. The monitoring method of welding quality and seam tracking technology along the butt-joint are studied. The precise positioning (<200㎛) of the laser beam on the welding joint to be welded is obtained by seam tracker. The seam tracking system is SMART-20LS and RAPAL of Servo-Robot and MVS-5 sensor of MVS. We investigate the parameters which have influence on the welding quality through the plasma intensity signals measuring method. The artificial defects (<ø1㎜) in joint are well observed by using the plasma intensity signals measured by the plasma sensor of UV and IR. The laser welding tests are performed after the observation the bead on plate and the welding process for non-linear tailored blank and front side member is studied. The new laser source and the new laser scanner system permit to increase the processing speed up to 10m/min or more and to improve the process efficiency. The paper introduces the robot based remote laser welding system to permit to resolve the limited welding speed and accuracy of the conventional laser welding system.

Key Words : robot, laser, welding, car, body