

Accepted Manuscript

Title: Prospects of laser welding technology in the automotive industry: A review

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PII: S0924-0136(17)30052-3
DOI: <http://dx.doi.org/doi:10.1016/j.jmatprotec.2017.02.008>
Reference: PROTEC 15120

To appear in: *Journal of Materials Processing Technology*

Received date: 8-12-2016
Revised date: 14-2-2017
Accepted date: 15-2-2017

Please cite this article as: Hong, K.-M., Shin, Y.C., Prospects of laser welding technology in the automotive industry: a review, *Journal of Materials Processing Technology* (2017), <http://dx.doi.org/10.1016/j.jmatprotec.2017.02.008>

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Prospects of laser welding technology in the automotive industry: a review

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Abstract

This review discusses the prospects for the use of lightweight materials (aluminum alloys, magnesium alloys, and titanium alloys) in high volume vehicle manufacturing. Laser welding of galvanized steel is compared to resistance spot welding of galvanized steel, along with ongoing efforts to improve the quality of laser welding of galvanized steel by altering the weld configuration, changing the element composition, utilizing a pulse laser, and removing the zinc coating. The feasibility of implementing these techniques in the industrial setup is discussed. Laser welding of magnesium alloys, aluminum alloys, titanium alloys, and dissimilar materials are examined. Microstructure changes and defects encountered during laser welding of these materials are described, and mechanical properties of welds such as hardness, shear and tensile strength are analyzed.

Keywords

Laser welding, keyhole welding, galvanized steel, aluminum alloys, magnesium alloys, titanium alloys, porosity, solidification cracking, intermetallic, dissimilar materials

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