

POSSIBILITIES OF APPLICATION OF LASER WELDING IN THE MANUFACTURE OF CAR PARTS

Filippov Artem Ivanovich; Savin Igor Alekseevich; Protasova Natalia Viktorovna

Kazan National Research Technical University named after A.N.Tupolev,

Naberezhnye Chelny

savin.ia@kaichelny.ru, crossfiunew@mail.ru

Abstract: The article deals with the analysis of the possibility of using laser welding in the manufacture of truck parts. The main advantages of using the laser welding process, technological and physical processes of laser welding.

Keywords: laser welding, technological process of welding, installation of laser welding.

The quality welds vehicle construction details using electric arc welding method is not always obtained stably. [1] In order to eliminate these drawbacks it is proposed a process of laser welding of motor brackets. Since the laser emits a parallel radiation beam of energy has minimal divergence and passes over large distances without energy loss. Coherence provides amplification of the radiation power. Thanks to this energy of the laser beam It concentrated on a relatively small area, which gives a small amount of the weld puddle, the high heating and cooling rates. In consequence of that grows technological strength of welded joints. [1]

For concentrating and directing the laser beam is used a transparent and semi-transparent mirror. Welding takes place by melting edges material or with addition of a filler wire. The hybrid versions of the welding filler material can also create an electric arc. [2]

Welding, laser-active metal compound is used for alloyed steels, especially aluminum, titanium and stainless steel. The focused beam of light capable of transformed melted metal thickness of 0.1 to 10 mm. This allows the weld as the standard plate, and thin elements. With this laser devices have been widely used in electrical engineering. [2]

For laser welding, where a deep proplavka predominantly gas filled lasers are used, preferably carbon dioxide. The original source of them is a cylindrical tube with a mixture of carbon dioxide, helium, nitrogen in certain proportions. On each side of the tube is closed with special mirrors. Inside produce discharge electrodes, which releases electrons in a gas. Is copied photons gain energy atoms. The lenses direct the flow of light on the product. Pulse voltage supply facilitates maximum energy concentration at the outlet. Due to this possible welding metal of up to 10 mm thick.

Laser welding with deep penetration welding is fundamentally different from a shallow penetration by the fact that during the formation of the weld joint formed gas passage through which vaporized metal rises. penetration zone has an elongated shape, a narrow and deep weld. [3]

Currently, laser welding is used to create structures of steel, aluminum, magnesium and titanium alloys. She preferred when the need to obtain precise designs, shapes and sizes are virtually not be changed as a result of welding. Laser welding is used for joining dissimilar metals and identical in electronics and electronic engineering.

Laser welding is a promising technology in the automotive industry. To date, the high costs hamper its widespread industrial use in the automotive industry. The possibility of obtaining an effective and high quality welding in the future may be promising as a laser welding process in the production of quality parts trucks.

References:

1. Grigoryan AG Laser welding of metals. M .: "High School", 1988. - 207 p.
2. Shaparev A., Savin I. Calculation of the amount of the reduction required for the formation of compound layers during cold rolling of bimetals//Materials Science Forum. 2016. Vol. 870. P. 328-333 DOI: 10.4028/www.scientific.net/MSF.870.328
3. Savin I.A. Determination of the effectiveness of the use of robotic systems in mechanical engineering//European Journal of Natural History. 2016. № 3. P. 94-97.