CHANGES OF PARAMETERS DURING WELDING OF CERTAIN WELD AND THEIR IMPACT ON COOLING TIME IN TEMPERATURE RANGE OF 800 - 500° C

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Abstract

The cooling time in the temperature range of 800 - 500° C ($t_{8/5}$) has a major impact on the structures that are formed in the heat affected zone of steel welded joints. Data on the optimum cooling time $t_{8/5}$ for a particular steels can be found in the literature. Besides the shape of welded joint, the thickness and physical characteristics of the welded steel, welding process and parameters, such as amperage, voltage, welding speed and the preheating temperature also have the impact on the size of the cooling time $t_{8/5}$. During the calculation of the actual value of the cooling time $t_{8/5}$, which is obtained during the welding of the particular joint, as a rule, the assumption is that the amperage, voltage and welding speed on each section of the joint are equal to the average for the whole joint and that the temperature of the edges of the groove along the entire length are equal to the preheating temperature or inter pass temperature.

Measuring of amperage and voltage during welding of a multi-pass butt - welded joint at the high strength steel, using the MIG process are presented in this paper. Results of the measurement showed that the values of the amperage may differ significantly in certain sections of the weld, the average amperage in one part of the weld may be significantly different from the average value of the amperage in the second part of the same weld, and that both may be different from the average value of amperage for the entire weld. The influence of the changes in welding amperage on the amount of heat input and the size of cooling time $t_{8/5}$ was analysed using numerical methods. It was concluded that, at certain sections of some of the weld, cooling time $t_{8/5}$ goes beyond the given values, although the average values of the cooling time $t_{8/5}$ for these welds are within the given values.

Keywords

Cooling time $t_{8/5}$, amperage, voltage, numerical analysis