Influence of the Friction Time on the Shape and Microstructure of the Mixing Zone of the Friction Welded Joint

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An analysis of the friction time influence on creation and structure of the mixing zone during the friction welding process of the two dissimilar steels is presented in this paper. The changes were monitored on the two welded samples, made of the highly-alloyed steel HS 6-5-2-5 and the high carbon C60 steel. The objective of this work was to show how the mixing zone is created and to point to its influence on the quality of the whole welded joint, since it is characterized by the inhomogeneity of the microstructure and the chemical composition. Those problems arise due to the thermal and deformation conditions, so during the experiment the welding pressure (70-90 MPa) and the welding time (3-18 s) variations were monitored. Experimental results have shown that the shape and the structure of the friction zone are strongly dependent on the friction time and that by its variation one can obtain the desired structure and thus the quality of the friction welded joint. Based on obtained results the minimum value for the friction time is recommended.

Keywords: Friction time, mixing zone, dissimilar steels, microstructure, welded joint quality

Acknowledgment

This research was partially financially supported by the Ministry of Education, Science and Technological Development of Republic of Serbia through Grants TR35024 and ON174004 and Slovak state budget by the project "Research Centre of the University of Žilina" - ITMS 26220220183.

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Paper number: M2016251