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Effect of Induction Heating on Temperature and Force Characteristics in Rotary Friction Welding of AISI 1018 Mild Steel Rods

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WORKING PAPER

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Title: Effect of Induction Heating on Temperature and Force Characteristics in Rotary Friction Welding of AISI 1018 Mild Steel Rods

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Abstract (150 words, Font 12): Rotary friction welding, which is a solid-state process of joining cylindrical blocks using the heat of friction, is examined in this work. The joining characteristics has been evaluated in terms of temperature distribution, axial shortening, tensile strength, and microstructure evolution under the effect of induction heating during the process. Induction heating has been supplied at four different stages of the process – (a) at the start of friction force, (b) halfway through the friction force, (c) at the start of upsetting force, and (d) halfway through the upsetting force. It has been noted that the induction heating effect is best utilized when it is supplied at the start of the welding or at the start of the friction force. During latter stages of the process, the welding flash formation takes place which increases the diameter at the weld region. As a result, the supply of induction heating gets restricted to the flashes, due to skin effect, and does not reach to the weld region of the shaft.

Purpose: To understand the effect of induction heating during rotary friction welding on the joining characteristics

Design/Methodology/ Approach: Experimental

Findings: The induction heating effect is best utilized when it is supplied at the start of the welding. It results in the best tensile strength of the joint.

Research Limitations/ implications: The research applicability is limited to mild steel rods such as AISI 1018

Originality/ Value: Induction heating during rotary friction welding

Keywords: Rotary friction welding, Induction heating, Tensile strength, AISI 1018 MS rods

Description: Paper writing in underway