

Comparative Study of Welding Techniques for Joining Dissimilar Metals

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Abstract: This research presents a comparative study of dissimilar metal welding techniques, including traditional arc welding (SMAW and GMAW), laser welding, and friction stir welding (FSW). The investigation involves the fabrication of 50 joints, followed by mechanical testing and microstructural analysis. Laser-welded joints demonstrated superior tensile strength due to controlled heat input and minimal distortion, while microstructural analysis revealed fine-grained structures with reduced intermetallic compounds. Qualitative insights emphasized the precision and complexities of laser welding. The findings hold implications for diverse industries, empowering engineers with valuable knowledge for informed technique selection. In conclusion, this research advances understanding of welding techniques, with laser welding emerging as a robust method for achieving mechanically sound and microstructurally favorable dissimilar metal joints, contributing to the optimization of welding practices and material joining advancements.

Keywords: Welding Techniques, Comparative Study, Dissimilar Metals

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