

Chapter



Underwater Explosive Welding of Tin and Nickel Plates and Characterization of Their Interfaces

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ABSTRACT

Most engineering applications require the properties of the metals to be enhanced. Welding dissimilar metals can meet this requirement. Among several welding techniques, explosive welding (EXW) of dissimilar metals is regarded as one of the best solid-state welding methods in which a high-quality metallurgical bond can be achieved. However, traditional EXW to be performed in an open atmosphere is unsuitable for the welding of thin metal plates, particularly those of lower thickness (below 1 mm). Therefore, in the present chapter, by considering underwater EXW as one of the best techniques of welding, fusing of a pure tin (Sn) plate of 0.3 mm thickness to a nickel (Ni) plate of 1 mm thickness is discussed. To weld the Sn and Ni plates, the distance between the explosive and the center of the sample (called as water distance, D) was designed to be 35, 40, 45, and 50 mm, respectively. It was observed that Sn and Ni plates can be successfully welded under controlled underwater shockwaves. Further, the interfacial morphology of Sn/Ni joints and their effect on hardness and bending strength for the Sn/Ni plates welded at different water distances are highlighted.

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