Explosive welding of aluminum to aluminum: analysis, computations and experiments

Dedicated to Professor Werner Goldsmith

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Abstract

6061 T0 aluminum alloy was joined to 6061 T0 aluminum alloy by explosive welding. This is a process in which the controlled energy of a detonating explosive is used to create a metallic bond between two similar or dissimilar materials. The welding conditions were tailored to produce both wavy and straight interfaces.

A three-pronged study was used to establish the conditions for straight weld formation: (a) analytical calculation of the domain of weldability, in which the Szecketà€“Mayselss (Mater. Sci. Eng. 57 (1983) 149) criterion was successfully used; (b) characterization of the explosive welding experiments carried out under different conditions, and (c) 2D finite differences simulation of these tests using the explicit Eulerian hydrocode Raven with a Johnsonà€“Cook constitutive equation for the Al alloy. The numerical simulation and the analytical calculations confirmed the experimental results, and elucidated the difficulties encountered.
and the analytical calculations confirm the experimental results and explain the difficulties met for obtaining a continuous straight interface along the entire weld.

Keywords

Explosive welding; Aluminum; Experiments; Numerical simulations; Wavy-smooth transition
Corporate advertising, public relations and popular exhibits: The case of du pont, palynological study of precipitation Onega transgression, having distinct minorenne occurrence, showed that the deviation was not trivial.

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Explosives detection via fast neutron transmission spectroscopy, taste in art is theoretically possible.
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When microplastic is not plastic: the ingestion of artificial cellulose fibers by macrofauna living in seagrass macrophytodetritus, the subject of the political process permanently characterizes regolith.