The effect of interfacial morphology and weldability window on tin and aluminum plates welded using regulated water shockwaves

Research Paper Published: 12 September 2024

Volume 68, pages 2941–2951, (2024) Cite this article

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Abstract

An effect of distances between the flyer plate and the explosive (d = 30, 40, 50, and 60 mm) on the welded interfaces of tin (Sn)–aluminum (Al) plates is discussed. Sn (flyer) and Al (base) plates were welded by adopting an underwater explosive detonation system. The interfaces were characterized using a metallurgical microscope and scanning electron microscope (SEM). As the distance (d) was increased, a change in the wavy parameters (amplitude and wavelength) of the interfaces was observed. The experimental results for welded Sn/Al plates were investigated based on the welding window (WW) constructed using numerical software (AUTODYN-2D). Based on the data, window parameters (the collision point velocities, V_c, and the collision angles,β) for welded Sn and