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Intermetallic size effect on strength and failure mechanism in dissimilar titanium and aluminium welds processed by Friction Melt Bonding

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Abstract

Joining dissimilar titanium and aluminium possess significant interest for aerospace industry due to their low density and good corrosion resistance. Given the difference in their mechanical properties, Ti/Al assemblies can offer high strength and low weight structures. However, joining titanium and aluminium is challenging. Conventional fusion welding processes lead to the formation of excessive brittle intermetallic compounds and high residual stress. In the current study the titanium and aluminium welds were joined by spot Friction melt bonding (FMB) process [1][2]. The FMB Ti-Al welds were subjected to Post weld heat treatment (PWHT). The mechanical performance of these PWHT welds showed significant increase in strength. The Intermetallic thickness had a significant impact on the weld strength and failure mechanism.

Keywords: Titanium-Aluminium spot welds; Failure mechanism; weld strength; Intermetallic thickness;

References

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