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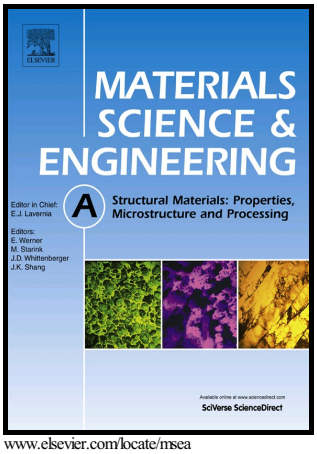

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PII: S0921-5093(18)31287-5
DOI: https://doi.org/10.1016/j.msea.2018.09.080
Reference: MSA36961

To appear in: *Materials Science & Engineering A*

Received date: 19 August 2018
Revised date: 20 September 2018
Accepted date: 21 September 2018

Cite this article as: M. Rahdari, M. Reihanian and S.M. Lari Baghal, Microstructural control and layer continuity in deformation bonding of metal laminate composites, *Materials Science & Engineering A,* https://doi.org/10.1016/j.msea.2018.09.080

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Abstract

An experimental and simulation study is carried out to investigate the microstructure and tensile behavior of the roll-bonded metallic laminated composites incorporating a single hard layer. To control the microstructure, the effect of the hard layer thickness, hard layer material and layer sequence on the layer continuity is investigated in term of the strain partitioning, degree of necking and strain amplification factor. It is found that at low strain regimes, the thickness reduction of different layers is almost identical and the strain is partitioned equally between the layers. At high strain regimes, depending on the thickness and hardness ratio, unstable necks and rupture occurs in the hard layer that leads to the strain partitioning between the constituent layers and causes the deformation to be inhomogeneous. Generally, the strain partitioning, degree of necking and strain amplification factor increases with increasing the thickness and hardness ratio. It is found that these parameters are affected by changing the layer sequence. Tensile test results show that the tensile strength of a fragmented structure is higher than that of a layered or continuous