

Effect of Incremental Forming Parameters on Titanium Alloys Properties

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Abstract : Shear spinning is closely related to the asymmetric incremental sheet forming (AISF) that could significantly reduce costs incurred by the fabrication of complex aeronautical components with a minimal environmental impact. The spinning experiments were carried out on commercially pure titanium (Ti-Gr2) and Ti-6Al-4V (Ti-Gr5) alloy. Three forming modes were used to characterize the titanium alloys properties from the point of view of different spinning parameters. The structure and properties of the materials were assessed by means of metallographic analyses and micro-hardness measurements. The highest value wall angle failure limit was achieved using spinning parameters mode for both materials. The feed rate effect was observed only in the samples from the Ti-Gr2 material, when a refinement of the grain microstructure with lower feed rate and higher tangential speed occurred. Ti-Gr5 alloy exhibited a decrease of the micro-hardness at higher straining due to recovery processes.

Keywords : incremental forming, metallography, shear spinning, titanium alloys

Conference Title : ICEMA 2014 : International Conference on Engineering Materials and Applications

Conference Location : Istanbul, Türkiye

Conference Dates : January 27-28, 2014