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Mechanical behavior of pure aluminum processed by constrained groove pressing

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Abstract

Severe plastic deformation (SPD) process is capable of developing the submicron grain structures in metallic alloys and to improve the Mechanical properties. Constrained groove pressing is a processing method in which a metal is subjected to an intense plastic deformation through repeated dominant shearing and pressing (flatting) of plate. This method comprises bending of straight billet with corrugated tools and the restoring the straight shape of the slab with flat tools. The repetition of the process is required to obtain a large strain and desired structural changes. The Constrained Groove Pressing (CGP) processes are widely used in industries to compensate the high strength metal plates components used in automobiles. In the present work an attempt has been made to study the influence of CGP parameters like strain rate and number of passes to predict the degree of importance on grain size, micro hardness and tensile strength of CGP specimens. From the experiment Al plate is compressed by strain rate of 1.5mm/min and numbers of passes are five, it gives the lowest grain size with increase in hardness and tensile strength of the plate. The results indicated that the number of passes has a major influence on the fine-grain refinement followed by strain rate.

Biography

Dr.Shantharaja.M is presently working as an Assistant Professor in Mechanical Engineering at UVCE, Bangalore. He has obtained his BE in Mechanical Engineering , ME in Machine Design from UVCE, Bangalore University and PhD in Advanced Materials from VTU ,Belgaum. He has published more than 60 papers in reputed journals, National and International conferences. He has got 18 years of teaching and 10 years of research experience. Five students are pursuing PhD under his guidance.