

Influence of Different Asymmetric Rolling Processes on Shear Strain

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Abstract : Materials with ultrafine-grained structure and unique physical and mechanical properties can be obtained by methods of severe plastic deformation, which include processes of asymmetric rolling (AR). Asymmetric rolling is a very effective way to create ultrafine-grained structures of metals and alloys. Since the asymmetric rolling is a continuous process, it has great potential for industrial production of ultrafine-grained structure sheets. Basic principles of asymmetric rolling are described in detail in scientific literature. In this work finite element modeling of asymmetric rolling and metal forming processes in multiroll gauge was performed. Parameters of the processes which allow achieving significant values of shear strain were defined. The results of the study will be useful for the research of the evolution of ultra-fine metal structure in asymmetric rolling.

Keywords : asymmetric rolling, equivalent strain, FEM, multiroll gauge, profile, severe plastic deformation, shear strain, sheet

Conference Title : ICAME 2014 : International Conference on Automotive and Mechanical Engineering

Conference Location : New York, United States

Conference Dates : June 05-06, 2014