

عنوان مقاله:

Numerical Analysis of Multi-Directional Forging of AISI 52100 Steel

محل انتشار:

شانزدهمین همایش ملی و پنجمین کنفرانس بین المللی مهندسی ساخت و تولید (سال: 1398)

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خلاصه مقاله:

Severe Plastic Deformation (SPD) methods are used to achieve fine-grain microstructures. Mechanical properties are highly dependent to the microstructure of the specimen. Higher strength and hardness could be achieved by a fine microstructure. Multi-directional forging is a new method of severe plastic deformation. In the present study, DEFORM commercial software was used to investigate the hot multi-directional forging of AISI 52100 steel. Stress, strain, temperature, and dynamic recrystallization were investigated as the process variables. The specimen was subjected to forging in three passes where in each pass the forging direction was perpendicular to the previous forging direction. The maximum effective stress and strain were 176 MPa and 2.72, respectively. The results show that there is a temperature rise during the process which is corresponding to the plastic deformation. The initial and final temperatures were 800 and 838 °C, respectively. The full dynamic recrystallization also occurred in the whole volume of the specimen after the third pass. The well-known Avrami model was used to predict kinetics of dynamic recrystallization.

کلمات کلیدی:

.SPD-FEM-Multi directional forging-AISI 52100 steel

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