

عنوان مقاله:

Study of Johnson-Cook Model Comprehensiveness at Moderate Strain Rate and Inverse Analysis to Modify the Constitutive Parameters Using Cold Wire Drawing Process

محل انتشار:

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خلاصه مقاله:

Johnson cook constitutive equation was utilized to model the 10100 copper alloy wires at the cold wire drawing process. Johnson cook parameters were determined using several quasi-static tensile tests at different strain rates. The wire drawing experiments carried out at seven drawing conditions with two areal reductions and four drawing speeds caused the strain rate ranged from 37 to 115 s⁻¹. Wire Drawing forces were measured using a load cell connected to the die. Analytical and finite element with VUHARD subroutine solutions were implemented to calculate the drawing forces using the Johnson cook parameters as well. Results showed that the Johnson cook model with parameters determined from a quasi-static condition was not able to predict the material behavior at the wire drawing process with a moderate strain rate. Inverse analysis using the Newton- Raphson method to minimize the objective function was carried out to modify the Johnson cook parameters. Updated Johnson cook parameters showed much more correlation with experimental results.

کلمات کلیدی:

Johnson- cook, Moderate strain rate, Inverse analysis, Wire Drawing

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