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應用剛塑性有限元素法於冷擠製加工之研究

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摘要

本文使用剛塑性有限元素模擬軟體 DEFORMTM 3D 研究單層桿穿過圓錐形模具之軸對稱擠製加工。本研究進行一系列的模擬分析，其模擬擠製條件包含模具入口半模角、胚料擠製比、摩擦因子等，預測擠製過程中單層桿之破壞因子分佈、應力應變分佈、模具負荷大小和胚料流動速度分佈等。模擬分析結果希望能確認有限元素軟體對三維單層鋁桿擠製加工過程之適用性。

關鍵字: 有限元素;軸對稱擠製擠製比;擠製比

Study of Cold Extrusion Processes Using the Rigid-Plastic Finite Element Method

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Abstract

This paper employs rigid-plastic finite element DEFORMTM 3D software to investigate the plastic deformation behavior of a single rod during its axisymmetric extrusion through a conical die. Under various extrusion conditions, the present numerical analysis investigates the damage factor distributions, stress-strain distribution, die load and flow velocity of the billet at the exit. The relative influences of the semi-angle of the die, extrusion ratio and the friction factors, respectively, are systematically examined. The simulation results verify the suitability of the current finite element software for modeling the 3D extrusion of single aluminum rod.

Key words: Finite element;Axisymmetric extrusion;Extrusion ratio