

عنوان مقاله:

Numerical Simulation of Ultrasonic Assisted Indentation Tube Forming

محل انتشار:

مجله بین المللی طراحی پیشرفته و تکنولوژی ساخت, دوره 13, شماره 3 (سال: 1399)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

Indentation forming is an internal tube forming process in which a mandrel with a diameter slightly larger than that of the tube is pressed inside the tube and in so doing, creates the internal profile. Forming forces have a significant effect on the spring back, residual stress, quality of the inner surface, quality of tube dimensions, and tool wear. In this study, the forming process of CK45 steel tube by carbide tungsten tool in the presence of ultrasonic vibration has been simulated and the effect of ultrasonic on the forming mechanism has been investigated by introducing two regimes according to the forming conditions. The effects of tool feed-speed and amplitude of vibration on forming force reduction have been investigated. According to the simulation results, the main reason for the force reduction in the presence of longitudinal tube ultrasonic vibration is the intermittent phenomenon which is the continuous or impulsive regime. The critical amplitude which determines the borderline of continuous and impulsive regimes is obtained $38\mu\text{m}$ by the simulation of the process. The maximum force reduction obtained in continuous regime is 64.2% at the critical amplitude. The simulation results are consistent well with the previous experimental data

کلمات کلیدی:

Finite Element Method, Indentation Tube Forming, Intermittent Phenomenon, Ultrasonic Vibration

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