

Experimental study on flow forming process of AISI 321 steel tube using the Taguchi method

N A Razani¹, A Jalali Aghchai^{1*}, and B Mollaei Dariani²

¹Engineering and High Tech. Department, Iran University of Industries and Mines, Tehran, Iran

²Mechanical Engineering Department, Amirkabir University of Technology, Tehran, Iran

The manuscript was received on 12 October 2010 and was accepted after revision for publication on 4 January 2011.

DOI: 10.1177/0954405411398195

Abstract: Flow forming is an effective process for the manufacturing of thin-walled seamless tubes. It has been found that a number of parameters affect the quality and dimensional precision of flow-formed tubes. In this study, the required flow forming tools are manufactured. The out-of-roundness of an annealed and flow-formed AISI 321 steel tubular pre-form is investigated for various levels of effective process parameters experimentally. Taguchi's method is employed to design of experiments (DOE). The parameters considered are the feed rate, the depth of cut and the roller attack angle. The effects and contributions weight and interaction effects of these parameters on the out of roundness as response function are analysed. It is found that the depth of cut is the most important process parameter affecting out of roundness. The out-of-roundness decreases with increase in the depth of cut and it increases with increase in the feed rate and roller attack angle.

Keywords: flow forming, Taguchi method, out of roundness