عنوان مقاله:

Parametric Optimization On roundness of flow formed tubes by using Taguchi Methodology

محل انتشار:

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نویسندگان:

Hossein Gheshlaghi gadim
Payam Rahimlou
Ali Doniavi
Vali Alimirzaloo

خلاصه مقاله:

Flow forming is an advanced, chip-less and cost-effective metal forming process to produce precise, seamless, axi-symmetric tubular products. This study was carried out to analyze the effect of process parameters on roundness of flow formed parts. The experiments were carried out using a commercial pure copper UNS C11000 tubular pre-form. Thickness reduction ratio, Feed rate and Angular speed of mandrel were considered as variables. A set of roller and mandrel was designed and manufactured to convert an NC lathe to a single roller flow forming machine. This present investigation uses Taguchi method, which is a powerful design of experiments tool. This method provides a simple, efficient and systematic approach to determine optimal forming parameters. An L9 orthogonal array of Taguchi method was applied to carry out the design of experiments. A CMM machine was used to measure the roundness error of parts. The analysis of result was performed based on average of results and analysis of variance. Through ANOVA analysis it was revealed that the feed rate is the most significant variable that affects the roundness followed by thickness reduction ratio. The minimum roundness error of 9 μm was obtained when variable parameters were adjusted at optimum values. Comparison of optimum value of roundness error and overall average of roundness error showed a significant improvement in roundness.

کلمات کلیدی:

Taguchi method, Flow forming, Roundness, ANOVA

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