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Wiriyakorn Phanitwong, Sutasn Thipprakmas

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Development of anew spring-back factor for a wiping die bending process

Wiriyakorn Phanitwong [a] and Sutasn Thipprakmas [a]

[a]*Department of Tool and Materials Engineering, King Mongkut's University of Technology Thonburi, Thailand*

Abstract

In the present study, anew spring-back factor for a wiping die bending process was proposed and characterized to achieve a more accurate predicted bend angle. The analysis was performed on aluminum A1050-H14 using the two-dimensional plane strain modeling of an elasto-plastic, finite element model. The simulated results were validated by comparison with experimental results. It was revealed that, in contrast to previously suggested theories, the spring-back factor depended not only on the ratio of the die radius to workpiece thickness but also on the bend angle. The application of the new spring-back factor, which considers the effects of the bend angle on the bending characteristics in the bending allowance zone and the reversed bending characteristics in the unclamped leg of the workpiece, resulted in better accuracy of the bend angle prediction compared with that obtained using the conventional spring-back factor.

Keywords: Bending; Wiping die; Spring-back; Spring-back factor; Finite element method

Corresponding author: Sutasn Thipprakmas, D.Eng.

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