

# Springback prediction using finite element simulation incorporated with hardening data acquired from cyclic loading tool

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## ABSTRACT

The aims of this article are to present the accuracy of springback prediction in U-bending sheet metal forming processes using finite element (FE) simulation incorporated with kinematics or mixed hardening parameters that are derived from cyclic data provided by the developed cyclic loading tool. The FE simulation results in the form of springback angles are compared with the experimental results for validation. It was found that the mixed hardening model provides better simulation results in predicting springback. This is due to the capability of the isotropic hardening part of this model to describe cyclic transient and the kinematic hardening part to improve description of the Bauschinger effect. Kinematic hardening however, on its own is capable of providing relatively good springback simulation illustrated by errors of less than 8 percent. Overall, the data provided by cyclic loading from the newly developed bending-unbending tool is considered valuable for simulating springback prediction.

## KEYWORDS

Springback prediction; Finite element; Hardening model; Cyclic loading tool

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