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Analysis of spring back and bend power of galvanized iron sheet in V-Die Bending Phase

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Abstract: *This dissertation explores the springback effect of Galvanized Iron board. Performance of galvanized Iron sheet metal is determined by sheet thickness, die angle, die opening, and punch radius. The parameters above are performed experimentally, and the S / N curve is plotted using Taguchi analysis to classify most affected parameters. The Regression-based mathematical models for springback prediction in the Galvanized Iron sheet bending process V-Die were developed. Sheet thickness, Die angle, Die opening, and Punch radius were considered input parameters, and springback and Bend force were considered output parameters for model creation. For Galvanized Iron sheets, various regression models were built based on experimental findings, including linear, linear-square, linear-interaction, and quadratic terms for the springback prediction.*

Keywords: *Simulation of processes-GI steel – V-Die bending – Bend force – Springback.*

List of symbols

t Thickness of sheet in mm
Θ Die angle in degrees
X Die opening in mm
R Punch radius in mm
Θs Springback angle (θ1 − θ2) in degrees
θ1 Bending angle before springback in (deg)
θ2 Desired bending angle after springback (deg)
Y Estimated value
Bi Regression coefficient of *i* th
βi j Regression coefficient of interaction of *i* th independent variable
xi *i* th independent variable

Introduction

Automotive industries, to a great extend are dependent upon the manufacturing of automobile parts which is being used by thin metal sheet. The salient features of sheet metal items are low cost and weight, smooth surface finish and best interchangeability. For past few decades several studies were conducted in order to get better idea in sheet metal bending,. Drawing Processes for sheet metal formation including bending, stretching and drawing are commonly used in industry. Sheet metal bending is an important process in method and manufacture of sheet metal formation. Spring back calculation is a most important problem for sheet metal manufacturing in determining a product's desired form. Springback refers to the difference in form between the configurations fully loaded and unloaded. The process selected for analyzation is V-Die bending due to its outstanding elasticity and lessening in bend power. In V-Die bending, the appropriate angle is created on the piece of work by adjusting the punch depth that enters the die opening. Changing the size of the opening die often affects the amount of force needed for bending. When the die opening , there was a decrease in force for bending and vice versa. In the present investigation the sheet material of Galvanized Iron (GI) steel is used because of its own excellent formability.

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