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Optimization of Springback Prediction in U-Channel Process Using Response Surface Methodology

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Abstract : There is not much effective guideline on development of design parameters selection on springback for advanced high strength steel sheet metal in U-channel process during cold forming process. This paper presents the development of predictive model for springback in U-channel process on advanced high strength steel sheet employing Response Surface Methodology (RSM). The experimental was performed on dual phase steel sheet, DP590 in U-channel forming process while design of experiment (DoE) approach was used to investigates the effects of four factors namely blank holder force (BHF), clearance (C) and punch travel (Tp) and rolling direction (R) were used as input parameters using two level values by applying Full Factorial design (24). From a statistical analysis of variant (ANOVA), result showed that blank holder force (BHF), clearance (C) and punch travel (Tp) displayed significant effect on springback of flange angle (β2) and wall opening angle (β1), while rolling direction (R) factor is insignificant. The significant parameters are optimized in order to reduce the springback behavior using Central Composite Design (CCD) in RSM and the optimum parameters were determined. A regression model for springback was developed. The effect of individual parameters and their response was also evaluated. The results obtained from optimum model are in agreement with the experimental values

Keywords : advance high strength steel, u-channel process, springback, design of experiment, optimization, response surface methodology (rsm)
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