A Detailed Experimental Study and Evaluation of Springback under Stretch Bending Process

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Abstract : The design of multi stage deep drawing processes requires the evaluation of many process parameters such as the intermediate die geometry, the blank shape, the sheet thickness, the blank holder force, friction, lubrication etc..These process parameters have to be determined for the optimum forming conditions before the process design. In general sheet metal forming may involve stretching drawing or various combinations of these basic modes of deformation. It is important to determine the influence of the process variables in the design of sheet metal working process. Especially, the punch and die corner for deep drawing will affect the formability. At the same time the prediction of sheet metals springback after deep drawing is an important issue to solve for the control of manufacturing processes. Nowadays, the importance of this problem increases because of the use of steel sheeting with high stress and also aluminum alloys. The aim of this paper is to give a better understanding of the springback and its effect in various sheet metals forming process such as expansion and restraint deep drawing in the cup drawing process, by varying radius die, lubricant for two commercially available materials e.g. galvanized steel and Aluminum sheet. To achieve these goals experiments were carried out and compared with other results. The original of our purpose consist on tests which are ensured by adapting a U-type stretching-bending device on a tensile testing machine, where we studied and quantified the variation of the springback.

Keywords : springback, deep drawing, expansion, restricted deep drawing
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