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PUNCH FORCE OPTIMIZATION IN THE DEEP DRAWING OF AA 6061 SHEET MATERIAL

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ABSTRACT

Deep drawing is one of the fundamental sheet forming operations that has complicated deformation mechanisms. Fundamental understanding of variation of the parameters that affect the process has become essential for accurate rapid design of tooling and processes in early design stage. The punch force needed for deep drawing is one of the important factors as this force is a resultant of the forces needed to bend, straighten, compress and overcome friction. These forces are significantly influenced by the parameters such as die shoulder radius, punch nose radius and blank holder force. Smaller punch force is desired for successful drawing process. And also prediction of forming load is necessary to select the suitable forming machine. Therefore, in this paper, the effect of such parameters on the punch force needed in deep drawing of AA 6061 sheet material has been investigated and the parameters have been optimized for minimum punch force.

KEYWORDS: Deep Drawing, AA 6061, Optimization, Response Surface Methodology, Punch Force