

A Method for Sensitive Analysis of Workpieces Rupture During Extrusion Processes

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Abstract

This paper describes a method for sensitive analysis of workpieces rupture during extrusion processes. The proposed approach includes finite element simulation and neural networks analysis. The simulation can predict forming defects such as cracks initiation and propagation within the workpiece.

Because Finite element simulation is a time consuming repeated analyses, the neural networks are employed in this investigation as numerical devices for substituting the finite element code needed for the workpiece defect prediction.

The results obtained by simulation in the case of extrusion show that the risk of appearance of defects is localized to external surfaces, which is in conformity with experimental observations.

A back propagation training neural network model was trained by using the numerical results. The network has been employed as numerical devices for substituting the finite element code needed for the maximum damage prediction within the extruded part.

Keywords: *Reliability, Failure, Extrusion processes, Sensitive analysis, Finite element, Neural network.*