Numerical Modelling of Drawbeads for Forming of Aluminium Alloys

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The drawbeads in stamping tools are usually designed based on experience from the forming of steel. However, aluminium alloys display different forming behaviour to steels, which is not reflected in the drawbead design for tools used for stamping aluminium. This paper presents experimental results from different semi-circular drawbead geometries commonly encountered in automotive dies and compares them to those obtained from Stoughton's analytical drawbead model and the 2D plane strain drawbead model set up using LS-DYNA. The study was conducted on lubricated NG5754 strips. The results presented are in terms of drawbead restraining force versus strip displacement, as a function of drawbead depth. The FE drawbead model agrees well with the experiments whereas the analytical model overpredicted the drawbead forces.

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