

FEM ANALYSIS OF SINGLE POINT INCREMENTAL FORMING PROCESS AND VALIDATION WITH GRID-BASED EXPERIMENTAL DEFORMATION ANALYSIS

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ABSTRACT

In single point incremental forming (SPIF) process, the blank is formed in a stepwise approach by a displacement-controlled round nose tool. Due to specific strain paths induced by the process and limited plastic zones in the contact region between the tool and the workpiece, the formability limit diagrams are different from the traditional deep drawing process. In this paper, the SPIF process is numerically exercised and experimentally validated with grid-based deformation process. Development of strain fields encountered in incremental forming is reported and material formability of AA2024-O is evaluated on conical formed shapes.

KEYWORDS: Single Point Incremental Forming, AA2024-O, Finite Element Analysis, Grid-Based Deformation Process