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Single Step Forming Tool Inspection Analysis of Cross Member of a Car

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Abstract

— To check the formability of sheet metal components at design stage Forming tool Inspection Analysis (FTI) is used. In this paper new designed Cross member of a car is analyzed for its formability in design stage so that the product development time & cost is minimized. During FTI analysis of Cross member plots like Safety Zone, safety Margin, Forming Zone, Thickness Strain, Forming limit diagram (FLD) are plotted and analyzed. Depending upon the results of these plots the geometry of Cross member was modified such that it complied with the requirement of FTI analysis. A successful stamping on formation regarding shape and defect free panel. The results gives a high quality panel, which meet design intent, processing requirements with robust process, which is economical to produce. FTI software that is integrated with CATIA software is used.

Keywords—CatiaV5, FTI, FLD

1. INTRODUCTION

In conventional production engineering method formability of panels is checked at die design stage which consumes lot of time. In this method design data is transferred to the production engineering peoples then the detail study of formability is done and feedback to design department is given, in design department part is modified as per production department which consumes a lot of time so the product development time increases and ultimately it also affects the cost of component. This drawback is overcome by using a single step forming tool inspection analysis by the designer at its station itself. So that all the failures of geometry during production i.e. splitting or wrinkling tendency of component during production is analyzed and overcome during the design phase. This helps to produce the component of high quality with design intent function and in the economic way.

For FTI analysis the FTI CATIA software is used in which plots like Safety Zone,

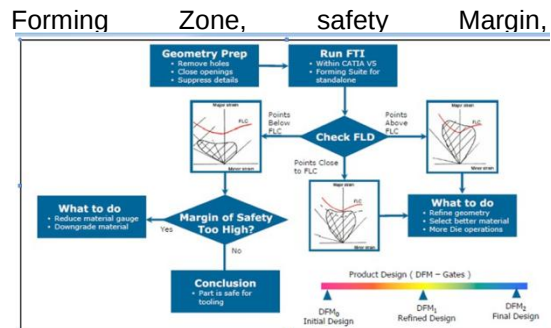


Fig. 1. DFM Cycle

Thickness Strain, Thickness and forming Limit diagram are plotted and panel is modified after analyzing the results so that the geometry of panel was compiled with requirement of analysis.

DFM Cycle -

Figure1 shows a DFM cycle process the first step while running the analysis is geometry preparation. While preparing the geometry the holes, notches, which will, pierced in second operation, should remove before running the analysis. After preparing the geometry FTI analysis and Forming Limit