Non-Traditional Forming Limit Diagrams for Incremental Forming

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Abstract. Although not standard, Forming Limit Diagrams, FLD's, are used throughout the automotive industry as a preliminary tool to determine if a sheet metal forming process is capable of forming a good part. FLD's show a limited range of strains on the diagram; typically the range is 0 to 1 on the major strain axis. A new rapid prototyping process called Single Pont Incremental Forming, SPIF, experiences strains over 3. As FLD's do not typically cover that level of strain, a new method for developing FLD's is needed. Such a method is proposed in this paper.

Research has been conducted with five different shapes, formed using Single Point Incremental Forming. The part shapes utilized contain the most common combinations of angles and curves observed in formed sheet metal products. The strains encountered in forming each of these parts are measured and the strain data is then plotted on the same FLD. These new FLD's can then be utilized as a predictive tool for engineers to determine if their design can be produced using the SPIF process.