

## Investigation of a Hybrid Process: Multipoint Incremental Forming

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**Abstract :** Multi-point forming (MPF) and asymmetric incremental forming (ISF) are two flexible processes for sheet metal manufacturing. To take advantages of these two techniques, a hybrid process has been developed: The Multipoint Incremental Forming (MPIF). This process accumulates at once the advantages of each of these last mentioned forming techniques, which makes it a very interesting and particularly an efficient process for single, small, and medium series production. In this paper, an experimental and a numerical investigation of this technique are presented. To highlight the flexibility of this process and its capacity to manufacture standard and complex shapes, several pieces were produced by using MPIF. The forming experiments are performed on a 3-axis CNC machine. Moreover, a numerical model of the MPIF process has been implemented in ABAQUS and the analysis showed a good agreement with experimental results in terms of deformed shape. Furthermore, the use of an elastomeric interpolator allows avoiding classical local defects like dimples, which are generally caused by the asymmetric contact and also improves the distribution of residual strain. Future works will apply this approach to other alloys used in aeronautic or automotive applications.

**Keywords :** incremental forming, numerical simulation, MPIF, multipoint forming

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