

Integrated Design, Modelling and Reliability Assessment in Forming (I-DMR)

Main Organizer:

Sandrine Thuillier (sandrine.thuillier@univ-ubs.fr), University of South Brittany, France

Co-organizers

Robertt A. F. Valente (robertt@ua.pt), University of Aveiro, Portugal

Pierpaolo Carlone (pcarlone@unisa.it), University of Salerno, Italy

Ricardo J. Alves de Sousa (rsousa@ua.pt), University of Aveiro, Portugal

Today, “single step” processes in manufacturing technology (stamping, forging, hydroforming, etc.) are frequently not enough to achieve high-value complex industrial products and increase competitiveness in global markets. On the other hand, a unified analysis of the distinct aspects of manufacturing technologies can lead to a better understanding of the implicated physical phenomena in forming operations, improving the overall efficiency of the process.

Outline and Goals:

The main goal of this mini-symposium is to provide a forum for discussion and presentation of research works from academia and industry partners on integrated numerical and experimental methodologies, from design to the final product, in a sustainable way in plastic forming operations.

Design, modelling and reliability assessment stages, in an integrated framework, focus on the use of comprehensive and innovative numerical and experimental strategies dealing with conventional or innovative forming technologies and products as a whole. The idea is, from the project definition to the final product, to optimize plastically formed industrial parts obtained from a multi-step strategy, focusing on the technological processes' efficiency as well as the structural performance of the final components. The main goal of the MS is therefore the modeling and simulation of industrial plastic forming processes, accounting for the interaction between multiple process steps.

Topics:

Papers on the following subjects are expected and welcomed, from both numerical and experimental standpoints:

- Integrated forming approaches (distinct forming strategies towards the final product);
- Multiple process steps;
- Process chain;
- Interaction between stages;
- Design for manufacturability;
- Experimental and/or numerical integrated methodologies;
- Material modelling and testing;
- Conventional and alternative numerical/experimental methodologies for testing and validation;
- Software development;
- Experimental setup development;
- Prediction of defects in formed parts;
- Optimization of multiple manufacturing processes;
- Optimization procedures' coupling to numerical and experimental models;
- Functionality and reliability assessment of multiple processes;
- Integrated energy consumption in the manufacturing processes;
- Integrated analysis of high temperature forming processes and reliability.

The main interest of this MS is the process or the material behavior rather than the algorithms used, and contributions from industrial partners are also welcomed.