

Some issues on the correlation between experimental and numerical results in sheet metal forming benchmarks

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ABSTRACT

The validation of numerical models requires the comparison between numerical and experimental results, which led to the development of benchmark tests. In the sheet metal forming research field, the benchmarks proposed by the Numisheet conference series are a reference because they represent a challenge for the numerical codes, but also give a reference for their validation, since at least one experimental result is always available for comparison with the numerical ones, delivered by the participants. Anyhow, when several experimental results are available, it is observed that besides the expected dispersion of numerical results, also some fluctuation of experimental results is perceived. This dispersion of experimental results was one of the motivations for a international project involving partners from academia and industry, which was mainly focused on springback prediction [1]. In fact, springback prediction poses many challenges because it is strongly influenced by numerical parameters such as the type, order and integration scheme of finite elements as well as the shape and size of the finite element mesh, but also of the constitutive model adopted. Moreover, its measurement also requires the definition of a fixture that should not influence the actual springback and the proper definition of the measurement locations and directions. This is the subject of this contribution, which analyses the benchmark focused on springback prediction, proposed by the Numisheet 2016 committee [2]. Numerical results are obtained using AUTOFORM and DD3IMP solvers and comparisons are performed between both numerical and numerical and experimental data. The analysis gives an insight into issues related to the comparison of results in complex geometries involving springback, leading to some recommendations for similar benchmarks.

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