Numerical prediction with PAM-STAMP 2G of appearance defects induced by surface deflection on stamped parts

Benoît CHANGEUX

PSA PEUGEOT CITROËN

Appearance is one of the most important criteria for quality rating of visible automotive parts. Surface deflection is the principal type of appearance defects for the concerned large flexible parts (doors, hoods, roofs, fenders, body sides). The defects appear during springback after stamping and they can be detected by visual and manual investigations. They spread over 5 to 30 mm, with amplitudes minor to 0.1 mm.

During years, this surface deflection was predicted by displaying mechanical variables on stamping simulations meant for feasibility, with relatively large mesh size.

The increasing capabilities of computation in stamping simulations have made possible smaller initial and refined mesh sizes. In these simulations, under several other numerical set-up conditions, the defects mentioned above can be approached on final springback results, with convenient post-processing tools, some of which are available in PAM-STAMP 2G, namely : combined stoning and rolling. The advantages of this particular post-processing are to be quantitative, to apply likewise to parts and tools, before and after springback, and that they can be performed on digitized parts.

More recently, works on other post-processing have been led to produce pictures close to expert visual evaluation, with reflection of light lines on final pieces.

The presentation aims to present several successful examples, and their physical counterparts. These simulations are part of the current PSA automotive project workflow, and allow the validation of the product geometry, tools and process.