

Ansys Forming – New GUI for Sheet Metal Forming Simulations with LS-Dyna

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Abstract

Sheet metal forming simulation has greatly evolved over the last 25 years. Simulation of the entire deep drawing process including trimming, flanging and springback is a standard procedure at most automotive OEMs and tool shops. Using LS-DYNA, one of the most accurate solvers for sheet metal forming, still needs some expert knowledge, which makes it difficult to use for method engineers in their day-to-day work. Therefore, Ansys has been developing a dedicated application for sheet metal forming simulation, “Ansys Forming”.

Ansys Forming is an easy-to-use GUI for setting up and analyzing a sheet metal forming simulation without expert knowledge of LS-DYNA. If users know and understand the sheet metal forming process, they can define and run the simulation. Ansys Forming and LS-DYNA work seamlessly for very efficient setup and accurate simulation results. With Ansys Forming we are now able to put functionality where it should be and where the user needs it (Image1).

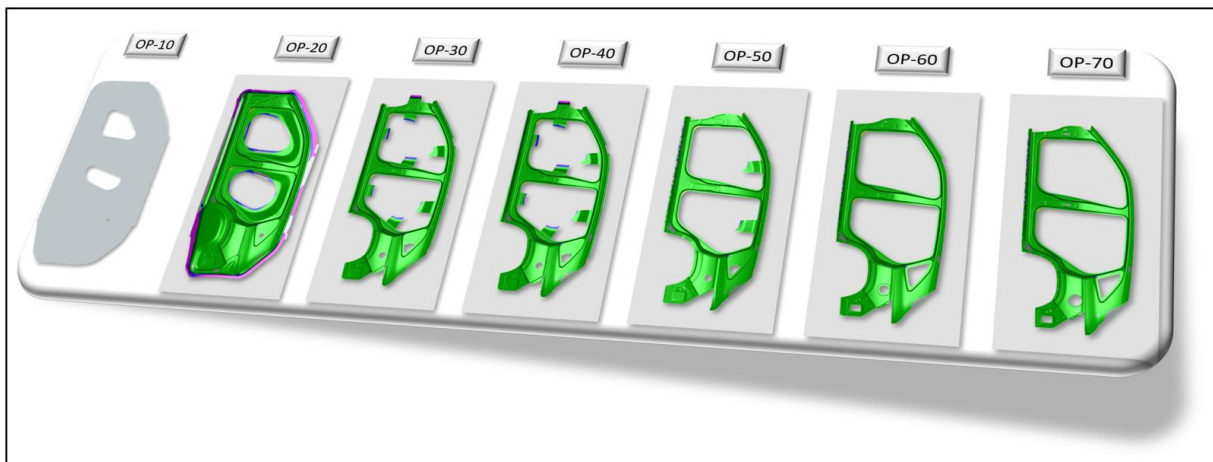


Image 1: Ansys Forming, Full Cycle Simulation Body Side

This presentation will demonstrate the current features of Ansys Forming and the new LS-Dyna solver enhancements for sheet metal forming.

We will demonstrate some of the features of Ansys Forming for setup and analysis of sheet metal forming simulations.

- Easy-to-use, Ansys Forming redefines stamping simulation setup for LS-Dyna
- Ansys Forming speaks the language of a method engineer
- Ansys Forming + LS-Dyna → fast, accurate, reliable and stable

- The GUI is state of the art and efficient
- Pre-defined workflow, less user errors due to guided job definition
- Complex tool movements and all kind of operations possible
- Material Library (Cooperation with TKS and VoestAlpine)
- Realistic springback/clamping simulation in final measurement operation
- Special functionalities to analyze surface defects of outer panels (Image 2)
- A trim line development simulation which finds the correct trim line in just a few iterations

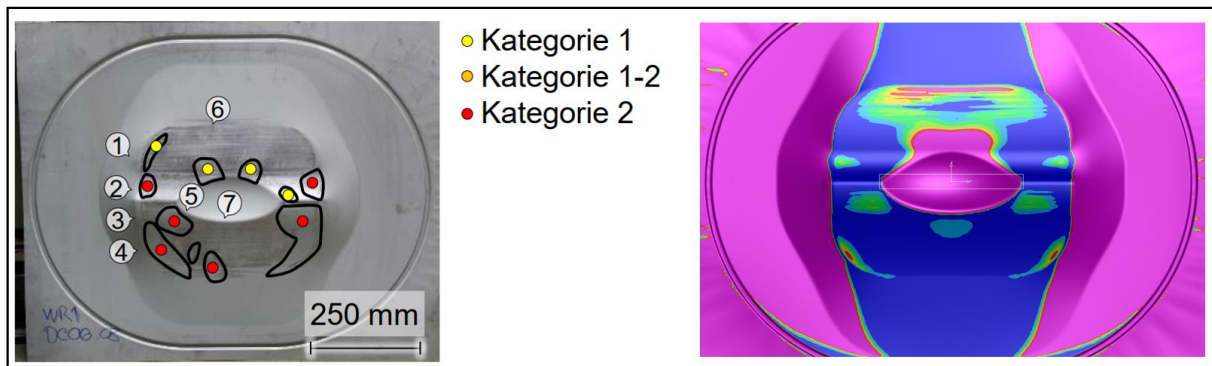


Image 2: Real Part CR5, Stone Length 250mm [1], Ansys Forming Stone Length 250mm

The focus of the Ansys Forming software lies on high accuracy for final validation of the forming process. Based on some practical examples, the usability of the Ansys Forming GUI and the advantages of the LS-Dyna solver will be demonstrated.

Ansys Forming and the LS-Dyna solver show very realistic:

- Dynamic effects, cracks and wrinkles for sensitive parts, HHS, UHHS, Aluminium
- Non-symmetric issues for symmetric parts, e.g. wrinkles, springback and surface defects

Furthermore, we will discuss the future roadmap for Ansys Forming.

Keywords Ansys Forming, *Sheet Metal Forming Simulation, LS-Dyna*

Literature

- [1] A. Weinschenk, „Simulative und experimentelle Untersuchungen zur Detektion und Prävention von Einfallstellen in Außenhautbauteilen“, Dissertation TU München 2020