PSA PEUGEOT CITROËN use PAM-STAMP 2G for Successful Rollhemming Simulation on Vehicle Assembly Lines

PSA PEUGEOT CITROËN

THE PROCESS

Rollhemming is a sheet metal assembly process where the edge of one sheet is rolled over the edge of another to ensure a tight junction.

THE STORY

PSA Peugeot Citroën carmaker agreed to a collaboration with ESI to develop a simulation tool based on PAM-STAMP 2G for the new rollhemming process which was quickly replacing their traditional table-top hemming process. The result is a realistic simulation tool fit for field use to assist in the decision making process.

THE BENEFITS

- Truly collaborative work answering a real-life industrial need
- Process-oriented custom tool
- Provides preventive and software corrective process options

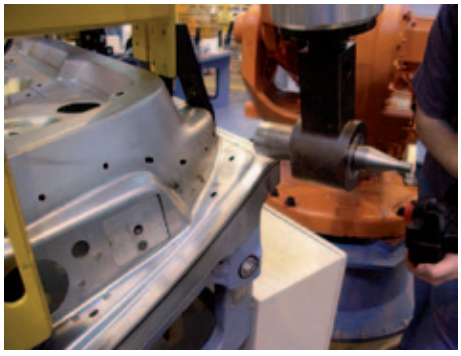
"The most significant state-of-the-art physical parameters identified by PSA's hemming specialists were integrated into PAM-STAMP 2G. Validated through real-life industrial cases, this new tool has quickly become essential to guarantee successful product definition and process reliability."

Patrice Auger
R&D Manager for Assembly Processes
PSA-Peugeot-Citroën

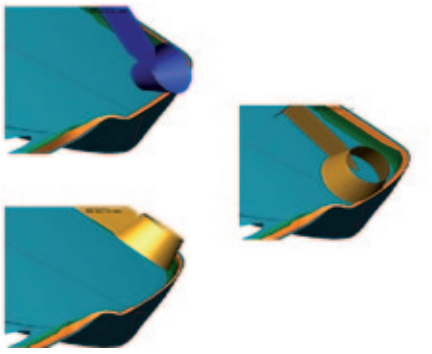
A NEED BORN OF PROCESS TRANSITION

When it became clear that rollhemming would soon replace traditional table-top process for the assembly of vehicle opening panels, PSA Peugeot Citroën immediately saw the need for an appropriate simulation tool. And since such a tool was not readily available on the market, it found in ESI the perfect partner to join in the challenge of developing one based on its proven PAM-STAMP 2G solution.

As the technology was recent, PSA Peugeot Citroën did not have significant experience to build on. The expected output of this 1.5-year long collaboration was to anticipate major sheet metal behavior defects including unwanted deformations and folds.



Rollhemming of a door



Complex trajectories

The simulation tool had to be able to perform complex trajectories and accommodate various roll profiles in order to render accurate material shaping. This would ultimately allow precise design of doors, hoods, back-lids, trunks and other components early in the development phase of future vehicles.

A COLLABORATION TO BUILD A CUSTOMIZED PROCESS-ORIENTED SIMULATION TOOL

To achieve this goal, PSA Peugeot Citroën shared with ESI its real industrial data and its actual industrial needs. Technical engineers at PSA also carried-out the necessary physical prototype testing to establish and fine-tune the correlation between workshop reality and digital simulation.

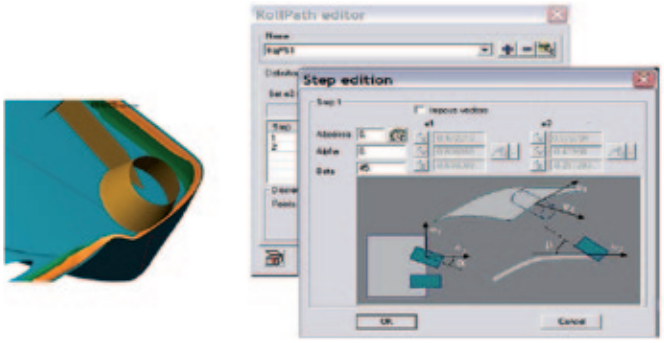
This collaboration based on mutual exchange and understanding led to a clearly process-oriented software solution with input parameters such as roll profile, roller angle, and trajectory, providing answers to real problems and not just numerical cases. The product effectively addresses the needs of an experienced hemming professional seeking ways to improve his process. It is truly a product tailored for an engineer designing or fine-tuning a hemming station.

INDUSTRIAL APPLICATIONS

First, rollhemming simulations were performed on the wing of a vehicle currently under development, on which the borders were closed too tightly according to product design. After reviewing the trajectory through simulation, it was decided to reshape the stamped sides and to readapt the rollhemming trajectory, which resulted in a side closing compliant to the target.

A more delicate challenge was then addressed: on the tip of the wing, a very tight radius was generating unwanted burrs and folds. **With the help of PAM-STAMP 2G, several iterations were carried out working on side height and roller trajectory to end up with an assembly closer to the target and without folds or burrs. This simulation served as basic input to set up the process, without ever requiring a physical tool.**

Wing tip simulation before and after optimizations



Straightforward user-friendly interface

"We are now able to test several product/process configurations with PAM-STAMP 2G and provide very early orientation to our technical choices. Previously, we would have had to wait to perform tests with physical tools, which would sometimes come a bit late for in-depth changes. The benefit is clearly decision aid to define more robust processes early in the design process"

Joëlle Garabed, Technical Leader of the Digital and Simulation Stamping Department, PSA Peugeot Citroën

THE PARTNERSHIP CONTINUES

As Phase 1 – the collaborative project described above –comes to an end, PSA Peugeot Citroën has trained its assembly personnel as well as upstream designers to take advantage of this new tool earlier in future vehicle developments. Other teams are also at work to integrate this simulation in the standard industrialization process. The software development achieved is available in PAM-STAMP 2G Version 2009. This leads naturally to a Phase 2 of further collaborative development with ESI to increase the solution's possibilities and reinforce post-treatment.

ABOUT ESI GROUP

ESI is a world-leading supplier and pioneer of digital simulation software for prototyping and manufacturing processes that take into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product's behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment's impact on product performance. ESI's products represent a unique collaborative and open environment for Simulation-Based Design, enabling virtual prototypes to be improved in a continuous and collaborative manner while eliminating the need for physical prototypes during product development. The company employs over 750 high-level specialists worldwide covering more than 30 countries. ESI Group is listed in compartment C of NYSE Euronext Paris. For further information, visit www.esi-group.com.

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