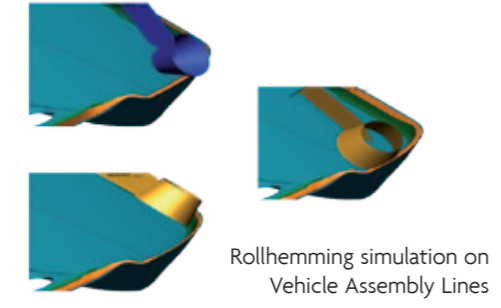


**PSA PEUGEOT CITROËN use PAM-STAMP 2G for Successful Rollhemming Simulation on Vehicle Assembly Lines**

PSA PEUGEOT CITROËN "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

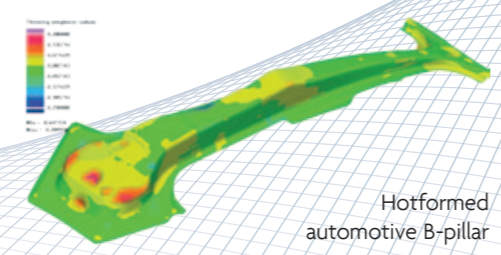


Rollhemming simulation on Vehicle Assembly Lines

**Tecnia-Labein successfully use PAM-STAMP 2G to optimize the process design of an industrial hotformed part**

tecnia "PAM-STAMP 2G has enabled a fast design of the hotforming tooling, and due to the high level of accuracy of the results, it has allowed the validation of the tooling and simulation results with the experimental tests."

Iñigo Aranguren /Marian Gutiérrez, Automotive Unit, Tecnia-Labein

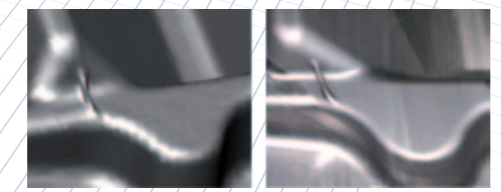


Hotformed automotive B-pillar

**Superform USA relies on PAM-STAMP 2G to iteratively design complex tools and prove feasibility virtually**

Superform USA "Thanks to PAM-STAMP 2G, we have been able to predict with accuracy the stamping process of slider rails and flange. We've used it to predict and manage the thickness distribution, stress, strain and cracks apparition during forming and distortion after springback. Simulation results being identical to the real parts, PAM-STAMP 2G helped us modify tool design and achieve high quality for die tooling and seat components."

A.J. Barnes, Technical Vice President of Superform USA

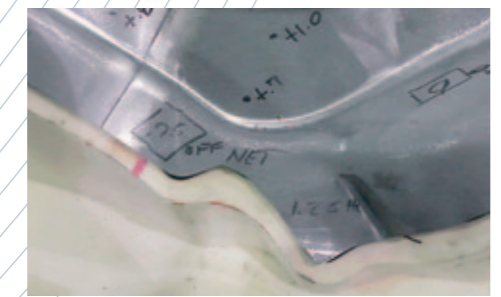


Remarkable correlation between simulated and actual wrinkle

**Atlas Tool, Inc. stamps out Springback with PAM-STAMP 2G**

ATLAS TOOL, INC. "Advanced high-strength steels and particularly dual-phase steels are being utilized more and more by OEMs to improve safety, reduce weight and lower cost. The use of an advanced incremental simulation tool enables us to overcome the formability challenges posed by these materials and meet our customers' requirements in as little time as possible. We believe our expertise with PAM-STAMP 2G is a significant competitive advantage."

Mark R. Schmidt, Atlas Tool's President

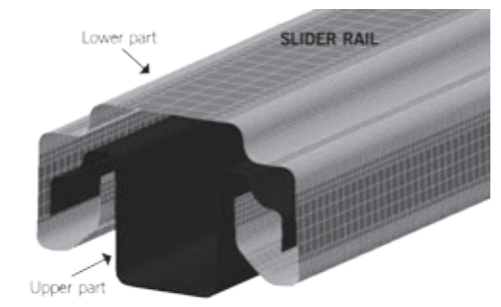


First part on gauge dimensions

**With PAM-STAMP 2G, FAURECIA reduces the tooling time to design seat components by 20%.**

faurecia "Thanks to PAM-STAMP 2G, we have been able to predict with accuracy the stamping process of slider rails and flange. We've used it to predict and manage the thickness distribution, stress, strain and cracks apparition during forming and distortion after springback. Simulation results being identical to the real parts, PAM-STAMP 2G helped us modify tool design and achieve high quality for die tooling and seat components."

Vincent Retillaud, Tracks Product Line Bending Process manufacturing Engineering Manager, Faurecia



Upper part

SLIDER RAIL

Lower part



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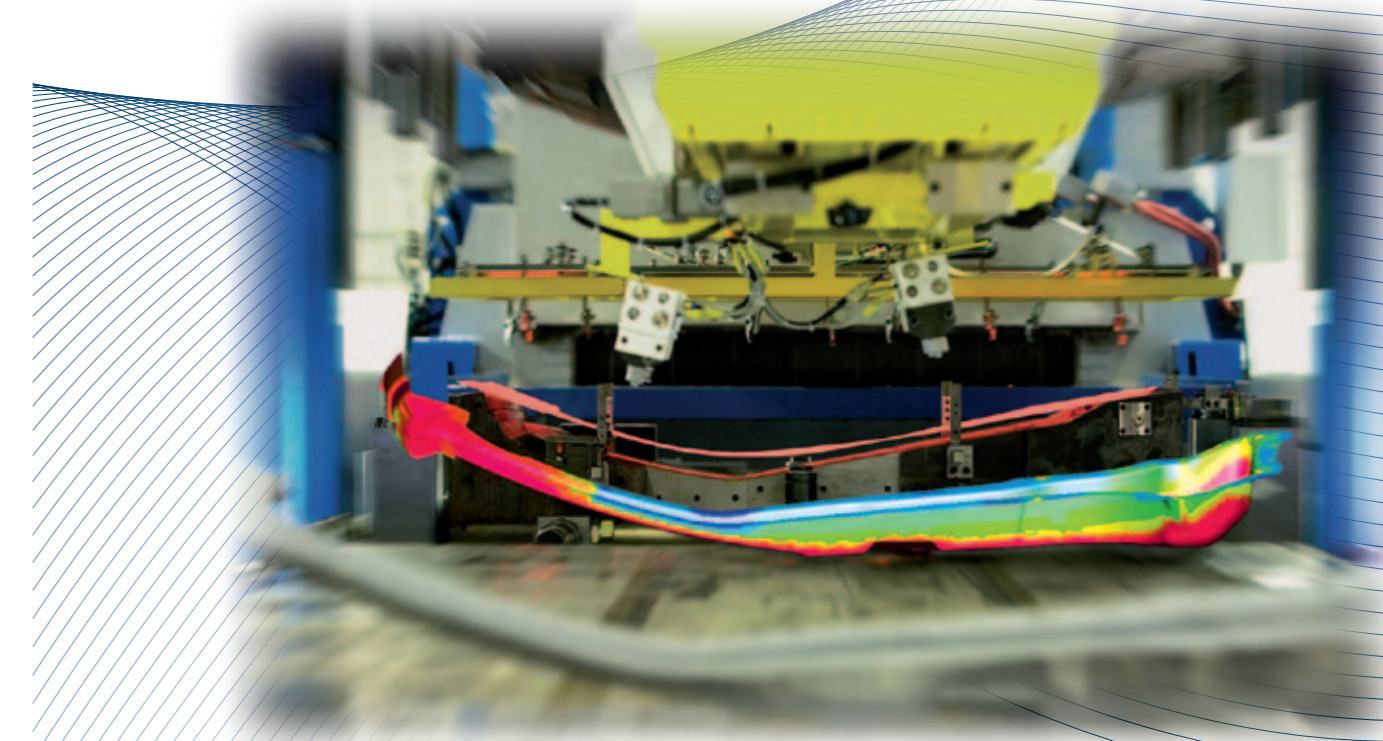
**ABOUT ESI GROUP**

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](http://www.esi-group.com).



**Sheet Metal Forming Simulation Suite**

PAM-STAMP 2G



Courtesy of AP&T



# Sheet Metal Forming Simulation Suite

A single software suite for all your metal forming needs: PAM-STAMP 2G is a dedicated solution for sheet metal forming, with the appropriate tools adapted to the context of your project.

## PAM-STAMP 2G

PAM-STAMP 2G is a complete, integrated, scalable and streamlined stamping solution. It covers the entire tooling process including quotation and die design with formability and try-out validation, springback prediction and correction. It provides solutions-oriented tools for automotive, aerospace, and general stamping processes.

### Benefits

- Speeds up part and die design and improves stamping process quality
- Reduces costs, by using die development methods validated by industrial users to deliver dies right the first time
- Masters springback in the manufacturing process and delivers fast and accurate die compensation
- Supports a wide variety of materials; Aluminium, Titanium, Dual Phase, Trip, Boron etc.
- Ensures trouble free manufacturing through virtual tests

### Part Feasibility / Cost Estimation

At the beginning of a project, **initial feasibility** is generally assessed based on the component geometry. The 'inverse' solver available in PAM-DIEMAKER for CATIA V5 and in PAM-STAMP 2G estimates the feasibility of the part shape itself. Such an inverse calculation can be performed in a matter of minutes, allowing quick iteration with product designers to improve the part shape for forming.

**Cost estimation** is generally done at this stage, again with the help of the inverse solver. It provides the flattened blank shape, from which the cost of the raw material can be determined.

From quick die design....



### Fast Die Design

Produce representative die geometries fast to evaluate different die concepts quickly and easily. Perform interactive die adjustments and modification to rectify any identified forming issues. PAM-DIEMAKER for CATIA V5 is a dedicated solution for rapid die design, offering powerful process oriented functions for each step in the die design process.

### Formability Assessment

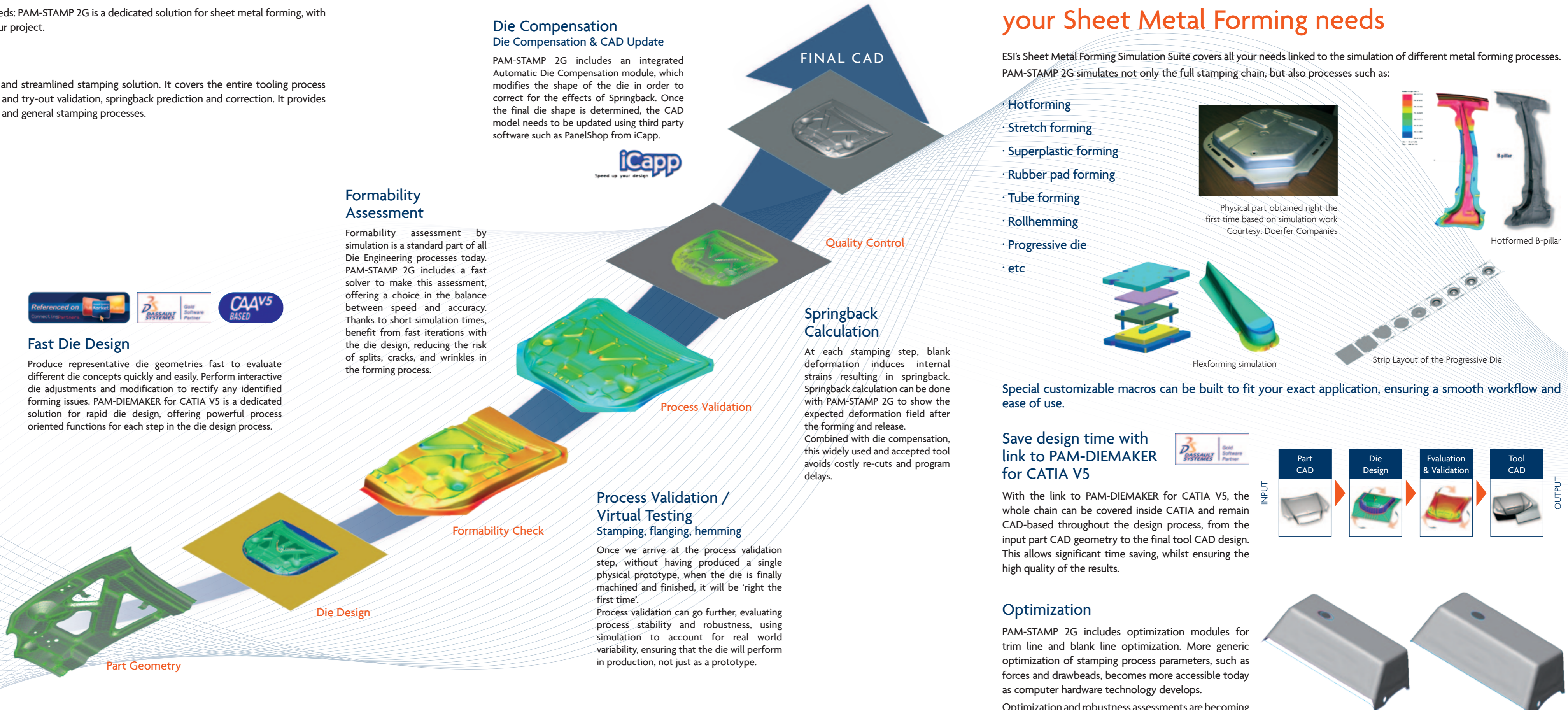
Formability assessment by simulation is a standard part of all Die Engineering processes today. PAM-STAMP 2G includes a fast solver to make this assessment, offering a choice in the balance between speed and accuracy. Thanks to short simulation times, benefit from fast iterations with the die design, reducing the risk of splits, cracks, and wrinkles in the forming process.

### Die Compensation Die Compensation & CAD Update

PAM-STAMP 2G includes an integrated Automatic Die Compensation module, which modifies the shape of the die in order to correct for the effects of Springback. Once the final die shape is determined, the CAD model needs to be updated using third party software such as PanelShop from iCapp.



...to final process validation



Part Geometry

Die Design

Formability Check

Process Validation

### Springback Calculation

At each stamping step, blank deformation induces internal strains resulting in springback. Springback calculation can be done with PAM-STAMP 2G to show the expected deformation field after the forming and release. Combined with die compensation, this widely used and accepted tool avoids costly re-cuts and program delays.

### Process Validation / Virtual Testing Stamping, flanging, hemming

Once we arrive at the process validation step, without having produced a single physical prototype, when the die is finally machined and finished, it will be 'right the first time'.

Process validation can go further, evaluating process stability and robustness, using simulation to account for real world variability, ensuring that the die will perform in production, not just as a prototype.

Quality Control

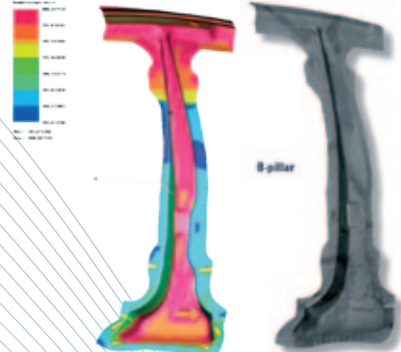
# One Simulation Suite for all your Sheet Metal Forming needs

ESI's Sheet Metal Forming Simulation Suite covers all your needs linked to the simulation of different metal forming processes. PAM-STAMP 2G simulates not only the full stamping chain, but also processes such as:

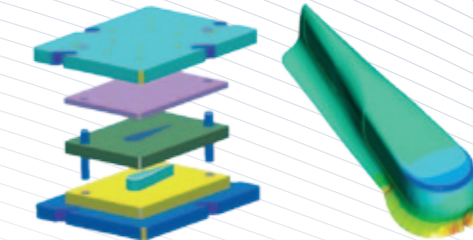
- Hotforming
- Stretch forming
- Superplastic forming
- Rubber pad forming
- Tube forming
- Rollhemming
- Progressive die
- etc



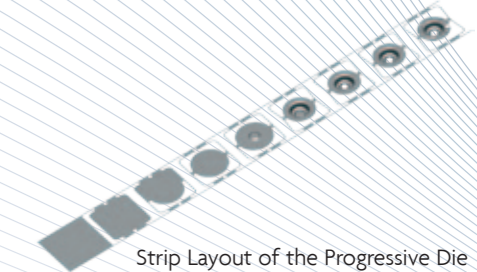
Physical part obtained right the first time based on simulation work  
Courtesy: Doerfer Companies



Hotformed B-pillar



Flexforming simulation



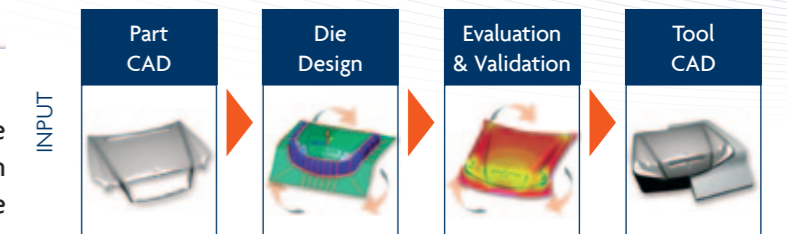
Strip Layout of the Progressive Die

Special customizable macros can be built to fit your exact application, ensuring a smooth workflow and ease of use.

### Save design time with link to PAM-DIEMAKER for CATIA V5



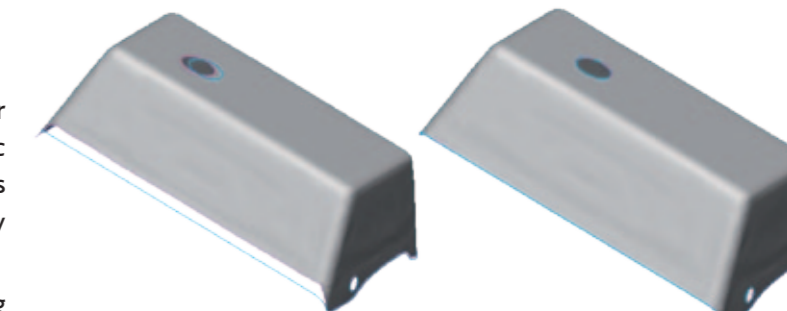
With the link to PAM-DIEMAKER for CATIA V5, the whole chain can be covered inside CATIA and remain CAD-based throughout the design process, from the input part CAD geometry to the final tool CAD design. This allows significant time saving, whilst ensuring the high quality of the results.



### Optimization

PAM-STAMP 2G includes optimization modules for trim line and blank line optimization. More generic optimization of stamping process parameters, such as forces and drawbeads, becomes more accessible today as computer hardware technology develops.

Optimization and robustness assessments are becoming a logical extension of forming simulation.



Before and after trim line optimization