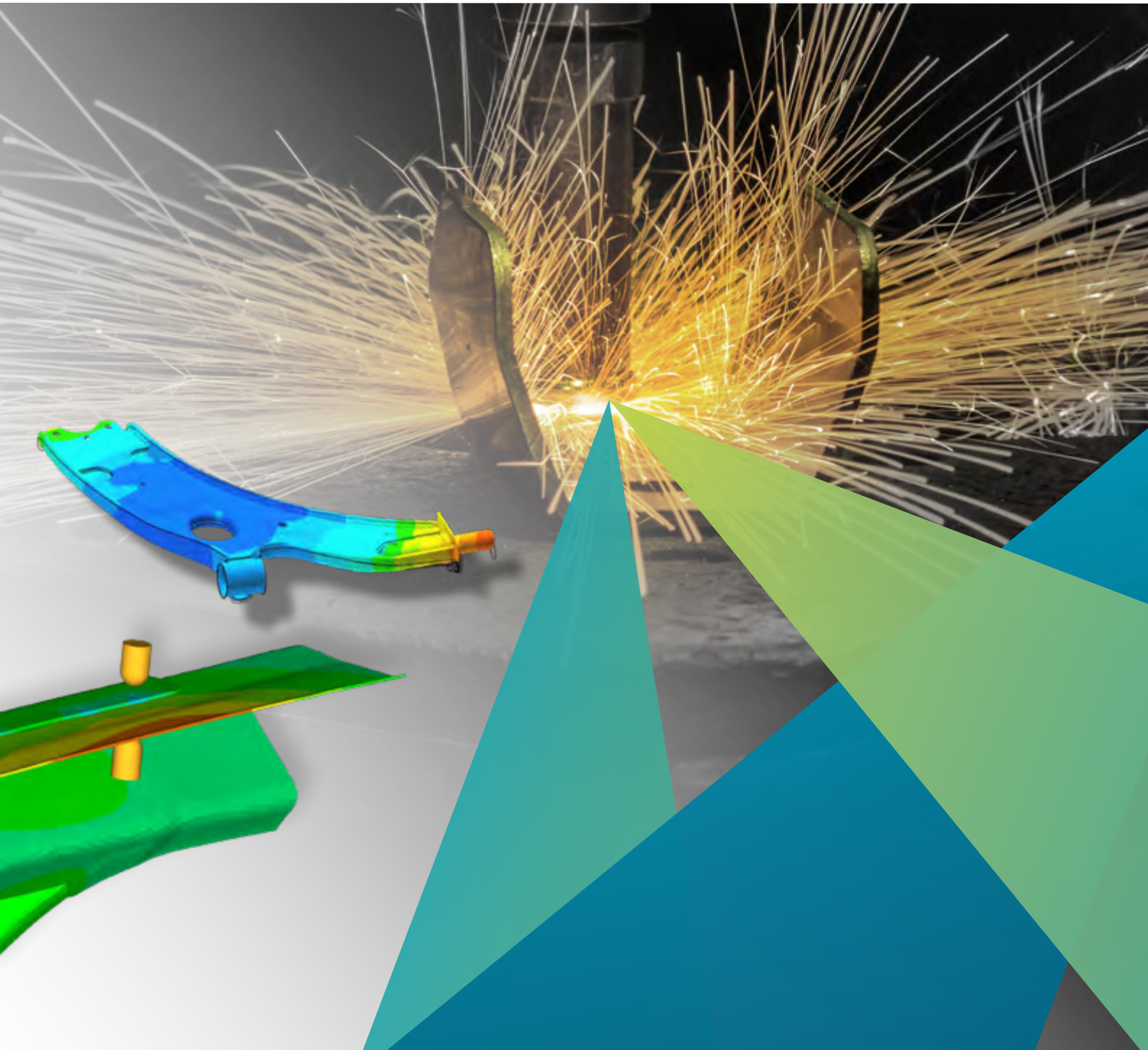


Simufact Welding

Simulations software for welding processes



Identify the optimal process parameters

Avoid welding distortions and stresses

Find answers to process stability issues

Simufact Welding predicts distortions and residual stresses by virtually try-outs and helps the user to determine appropriate strategies to minimise them. It is the only simulation software which automatically considers the complex contact situation between the components, which in turn allows conclusions about the properties of the weld seam, in particular its strength, to be drawn. Simufact Welding achieves this by calculating the microstructural properties within the heat-affected zone, which also gives the user a valuable insight into identifying welding defects, such as hot cracks in the simulation, and how to avoid them in practice.

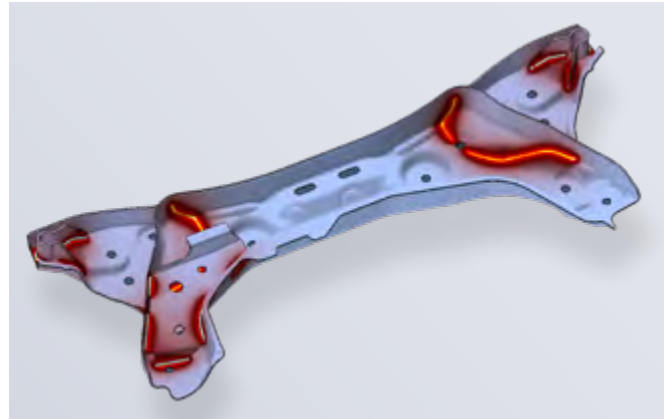
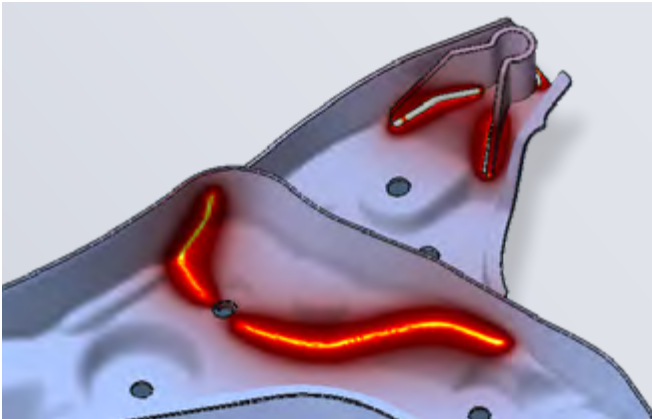
Simufact Welding assists in finding the optimal clamping devices based on the implementation of real tool geometries, while considering clamping forces and stiffness. Besides the clamping concepts, also the suitable welding sequences can be identified with Simufact Welding. The software predicts the final contour of the assembly and helps to achieve serial production with minimum tolerances. A new visualisation concept ensures that the entire welding process, with all its process steps, can be reviewed immediately, influencing factors can be visualised and different variants are comparable at a single glance.

Further welding processes can be simulated with Simufact Welding such as resistance spot welding (RSW), direct energy deposition (DED) as well as dedicated modules for stress relief heat treatment and cooling and clamping processes for the investigation of further subsequent processes after the actual welding process.

Speeding-up the design of optimal welding processes

As a modern simulation tool, Simufact Welding has been designed for use in design departments, method planning, or process development. Simufact Welding in the hands of a welding production expert or of a development engineer not only leads to a better understanding of the processes but also helps reducing

the number of expensive and time-consuming physical tryouts. Optimised production processes with higher product quality, shorter development cycles thanks to a faster process development, faster conducted feasibility studies, these are the advantages of process simulation with Simufact Welding.



Eight reasons why Simufact Welding can innovate your manufacturing:

Employ Simufact Welding and ...

1. identify critical distortions, i.e. with respect to assembly, bulging, imbalances, and clearances
2. investigate and optimise clamping tools even before an investment in tools has been made
3. identify optimal welding directions and welding sequences
4. investigate the influence of unclamping on welding distortions and residual stresses
5. gain knowledge about the development of the heat affected zone
6. use a tool which supports you during planning of welding processes
7. innovate your process design:
 - virtually test and evaluate different variables without and avoid extremely expensive real tryouts
 - examine the material behavior during the welding process
8. verify the quality of welding seams, i.e. by calculating nugget sizes, brittle metallurgical phases, hardness, and effects of preheating.

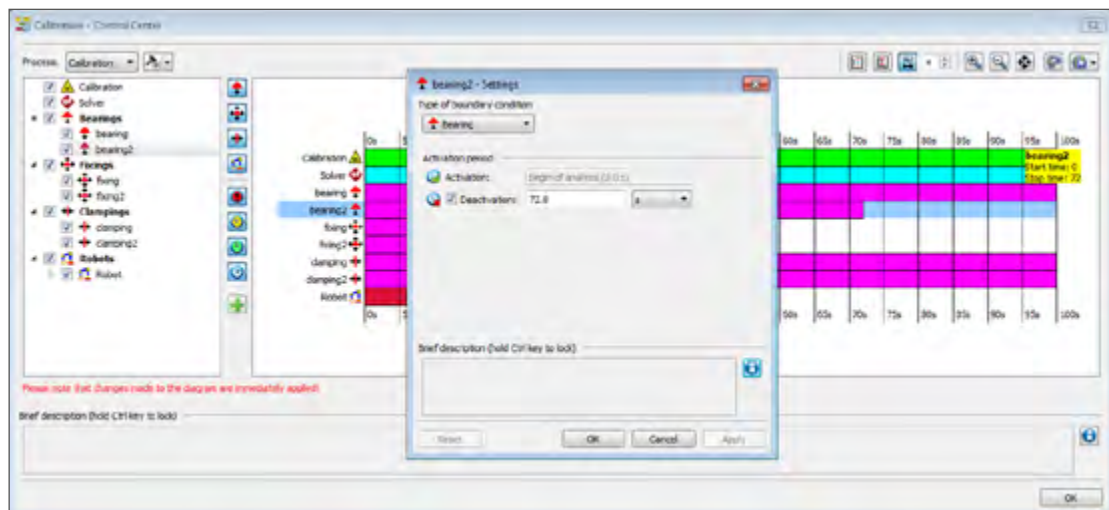
More efficient modelling through improved user-friendliness

Simufact Welding is a simulation tool for hands-on professionals working with welding technology. The software is aligned to the practical needs of our users. Simufact Welding is practice-oriented, fast and easy to learn. The user can focus on the engineering-related details of the welding process instead of dealing with the software.

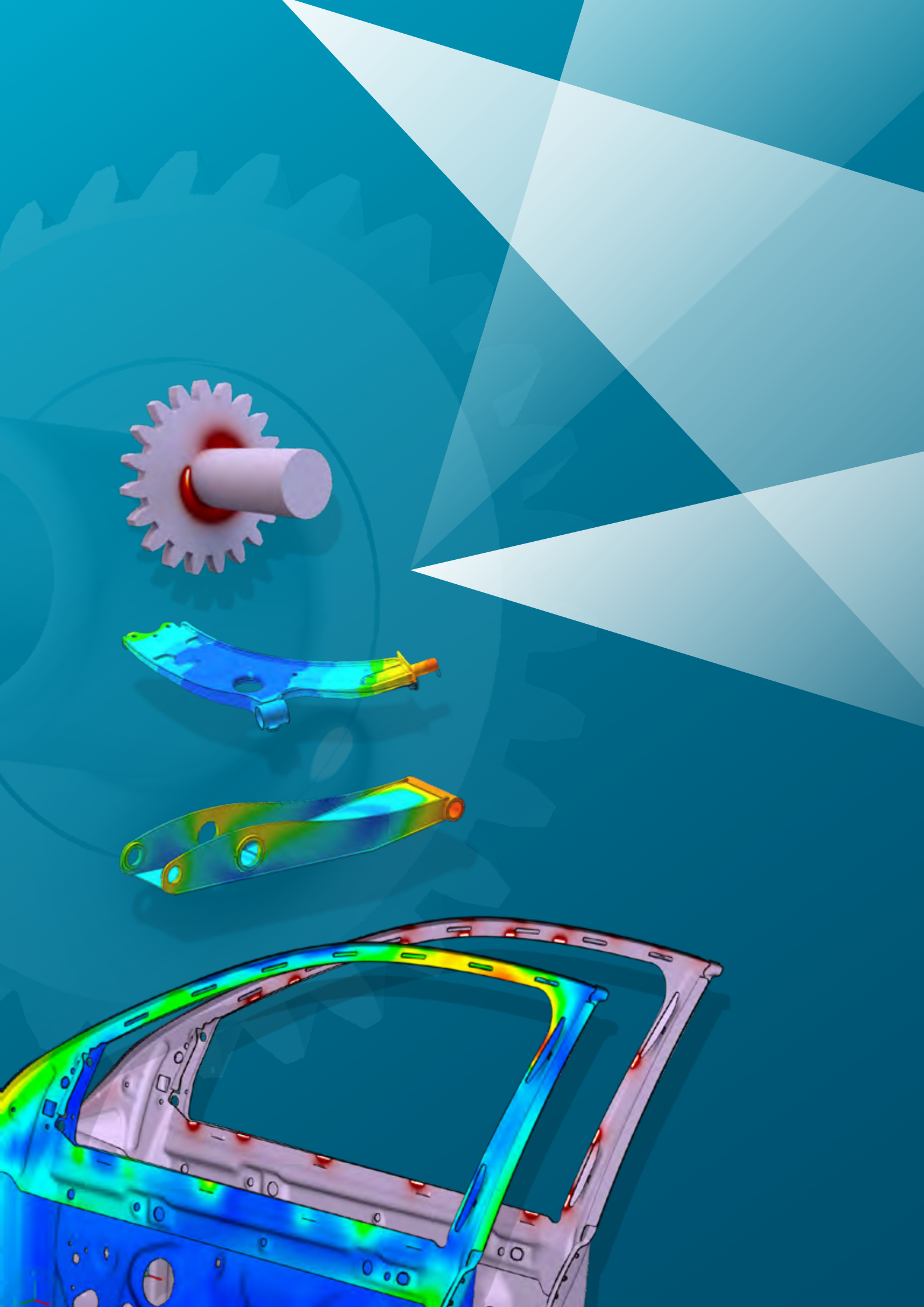
The pre-processing, such as importing CAD geometries, meshing and setting up the simulation model, the calculation as well as the post-processing, such as the evaluation of the results can all be performed one graphical user interface (GUI) of Simufact Welding. Many of the steps to set up a simulation model can be done intuitively and interactively in the model view directly. Due to open interfaces an exchange of results between all Simufact products as well as a comprehensive mapping of process chains is guaranteed. This functionality can be used, for example, to consider the forming history and its impact to the assembly during and after the welding process.

The creation and assignment wizards for geometries, materials and marginal boundary conditions allow for a faster and automated assignment of objects to the chosen processes. Wizards (or assistants) are software functions that support the user in data input with the help of dialogues. The wizards help to make data input more ergonomic during the pre-processing for the definition of the welding process. Simufact Welding supports automated process design based on already computed processes as well as the automatic assignment of computation results.

Process optimisation with process control center (interactive Gantt diagram)



Simufact Welding employs Gantt diagrams to visualise process times. Gantt diagrams visualise the time sequence of process steps as bars on a time axis. With Simufact Welding the former static Gantt diagram becomes an interactive process control center (PCC), which can be used to optimise welding sequences, cooling and clamping and release times. Within the PCC, the visualised tools and robots can be faded in and out, grouped, or sorted as required. The PCC also provides functions to compare and export results allowing for the optimal documentation of process variants.



The modular concept of the Simufact Welding product line offers specific modules which enable you to simulate a wide range of welding processes.



Transfer of simulation results to subsequent processes

The process specific application modules allow you to simulate single production steps. If you combine the modules across applications and products, it enables you to connect various manufacturing steps two entire process chains and to simulate these as a whole.

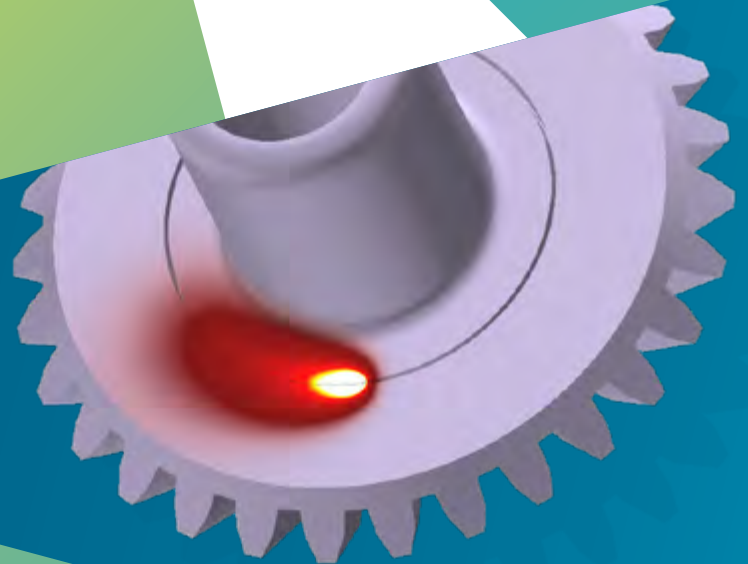
The results of previous manufacturing processes are passed to subsequent processes leading to an increased accuracy in the simulation results. It is even possible to export the simulation results to third-party products, for example for fatigue and crash simulations.

Reach your aim more quickly with process specific functions

Simufact Welding has a modular architecture. The modular concept helps you choose the relevant functions that most exactly fit to your manufacturing processes. Simufact Welding consciously sets apart from competitor's products by offering deeper process specified functions, rather than following the approach of having 'general-purpose-tools' that cover all functions.

The dedicated application modules provide you process specific functionalities for all areas of welding processes. The modules allow for the simulation of single manufacturing steps and can be combined to simulate entire process chains. Additional modules offer you a wide range of further valuable functions for the daily use of the software, such as acceleration of calculations by leveraging multi-core parallelisation.

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Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Simufact, part of Hexagon's Manufacturing Intelligence division, applies simulation and process knowledge to help manufacturers optimise metal forming, mechanical and thermal joining and additive process quality and cost. Learn more at [simufact.com](https://www.simufact.com). Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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