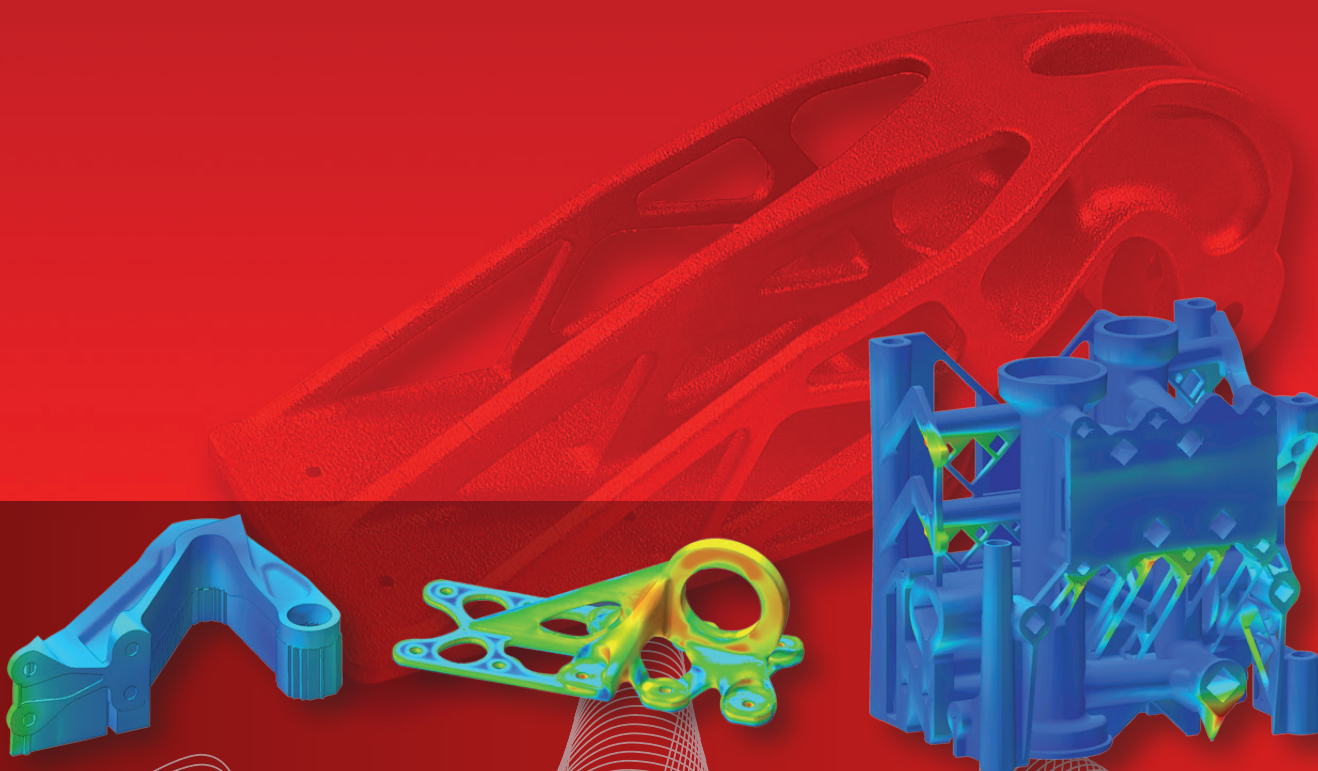


simufact additive

SOFTWARE FOR METAL AM SIMULATION



perfectly printed

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 **simufact**
Simulating Manufacturing
MSC  Software Company

Simufact Additive is a process solution to get parts first time right.

Distortion of parts during the printing and manufacturing process is a major impediment to companies not realizing the full benefits of the additive manufacturing process. An enormous amount of unproductive time and cost spent on trial and error. Simufact Additive is a solution aimed at predicting and resolving distortion during the entire print, heat treatment, cutting and HIP process - before sending a part to the machine.

Typical challenges in Metal Additive Manufacturing

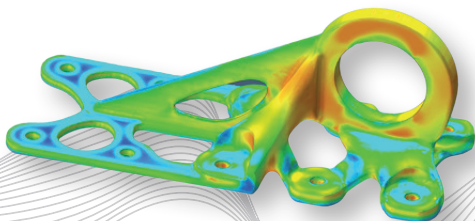
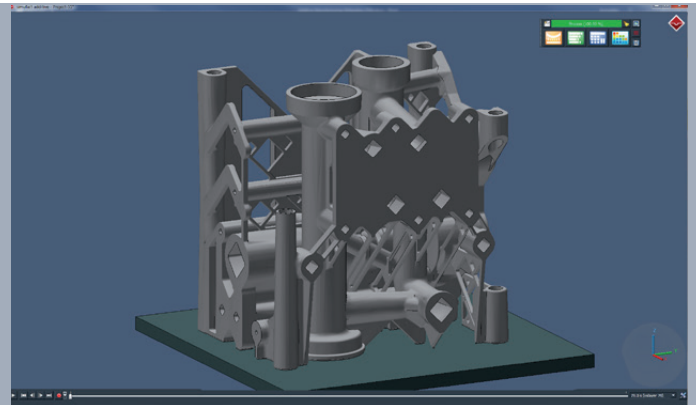
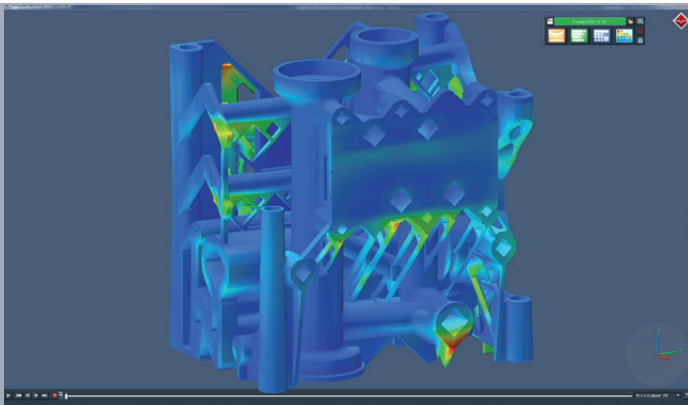
Challenges from a business point of view:

- Large hourly machine costs (due to machine acquisition and power costs)
- Machine availability: Experimental testing on the machines reduces the productiveness
- Relatively high material costs

Challenges from a technical point of view:

There are various influencing factors in the additive manufacturing process with different significance, such as

- Different production methods and their special physics
- Different 3D printers and their machine-specific influence on the production process
- Differing metal powder quality



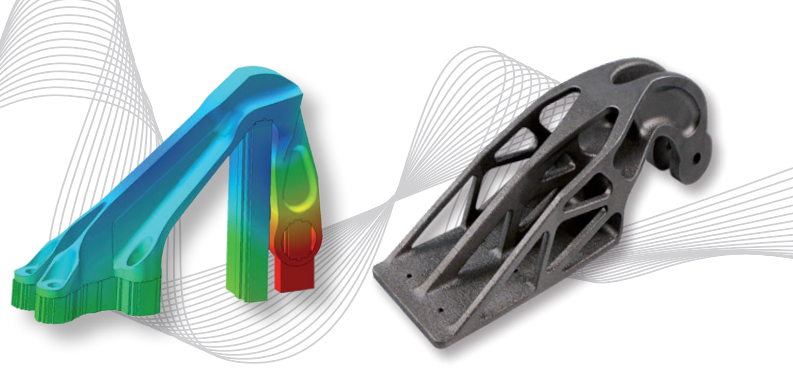
A very high number of machine input parameters (up to 200) is involved in AM processes, all having an impact on the achieved behavior of the final parts. Prior to producing the parts, you have to answer questions like

- What is the best support structure strategy in terms of location and properties?
- What is the best build-up orientation?

Complex physical interactions cause an inconsistent quality of the produced parts.

Non-optimal part design for manufacturing leads to

- Incorrect produced or even failed parts (cracks), due to
 - ... Distortion
 - ... Residual stress



How Simufact Additive can help you solve these issues

Simufact Additive is a powerful and scalable software solution for the simulation of metal-based additive manufacturing processes.

Simufact Additive helps you produce **AM parts first-time-right**:

- Calculate the deformation of the final part and reduce / avoid distortion
- Minimize residual stress
- Optimize the build-up orientation
- Optimize the support structure
- Condition the part after heat treatment, base plate and support structure removal

In the future also

- Predict the microstructure
- Indicate criteria-based part failure

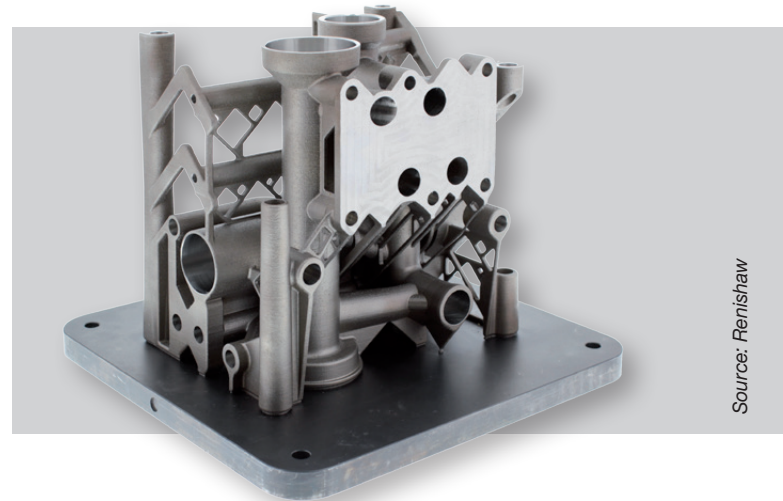
With its initial release, Simufact Additive puts its focus on **Powder Bed Fusion processes** including Selective Laser Melting (SLM), Direct Metal Laser Sintering (DMLS), LaserCUSING®, Electron Beam Melting (EBM), and more. Deposition processes are currently covered by Simufact.welding.

The macroscopic approach enables simulation results in minutes providing an accurate prediction of distortion and stress.

Achieve your business goals with Simufact Additive

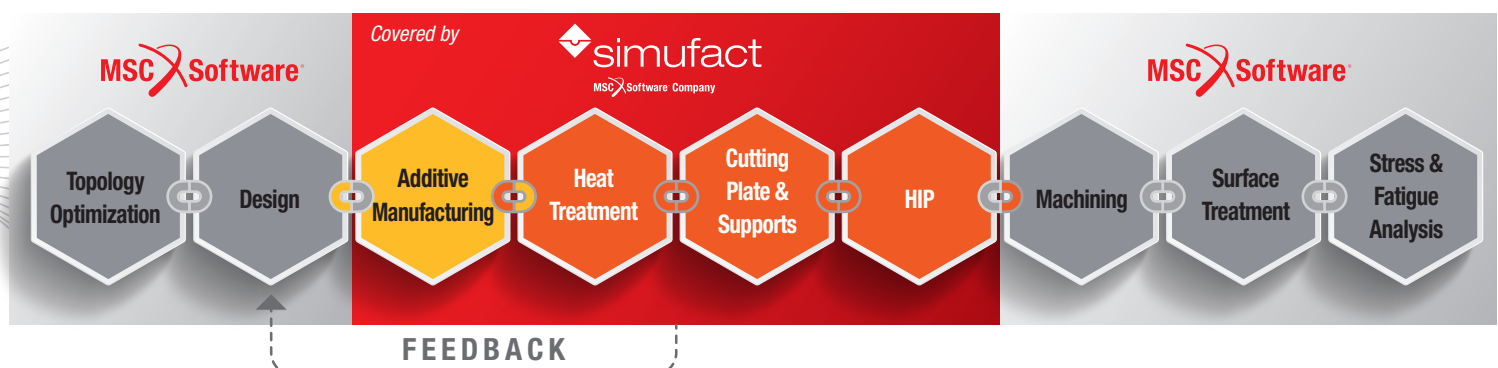
Replace time-consuming testing with simulation methods! Employ Simufact Additive process simulation and save time and money:

- **Shorten your learning process dramatically**
- **Run more variations prior to the production**
- **Shorten time-to-market**
- **Increase machine/manpower availability and productivity**
- **Reduce material and energy consumption costs**



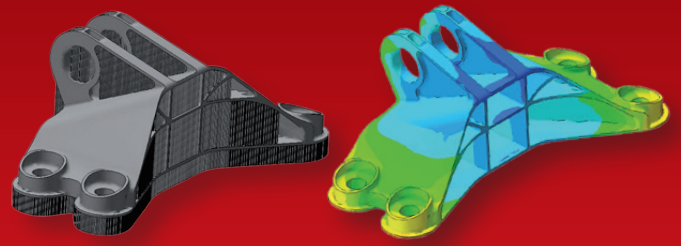
Source: Renishaw

AM process chain



simufact additive

+ 5 reasons why Simufact Additive will lead the way



1 Pain killer

Simufact Additive helps you **solve the No. 1 issues** with 3D metal printing:

- Reduce/avoid distortion
- Minimize residual stress
- Optimize the build-up orientation and the support structures

2 Strong concept

Simufact Additive's **multi-scaling approach** combines the best approaches in one unique software solution – from an extremely fast mechanical method to a fully thermo-mechanically coupled transient analysis with highest accuracy in simulation results.

3 Special purpose software

Simufact Additive **is a specialized software solution** dedicated to **AM process simulation**.

4 Best-in-class GUI

Simufact Additive comes with an intuitive and user-friendly GUI ensuring an extraordinary user experience. The flexible GUI concept allows machine and application-specific dialogs aligned with the real process work flow.

5 Sophisticated Technology

Simufact Additive is based on MSC's proven MARC solver technology

- Leading solution for non-linear numerical simulations
- Covering a broad range of physics
- Further dedicated advancement for AM purposes

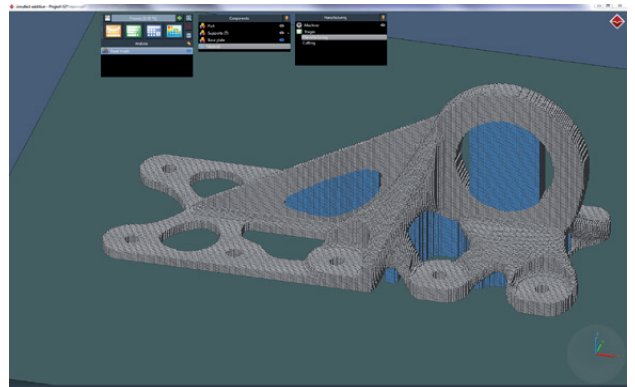
Best-In-Class GUI for AM process simulation

Simufact Additive comes with a best-in-class GUI ensuring an extraordinary user experience:

- User-friendly, intuitive use
- Fewer icons for a better usability
- Context sensitive, use right mouse click
- Prepared for application- and machine-specific dialogs
- Support of complex models
- GUI is oriented to real AM workflow

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