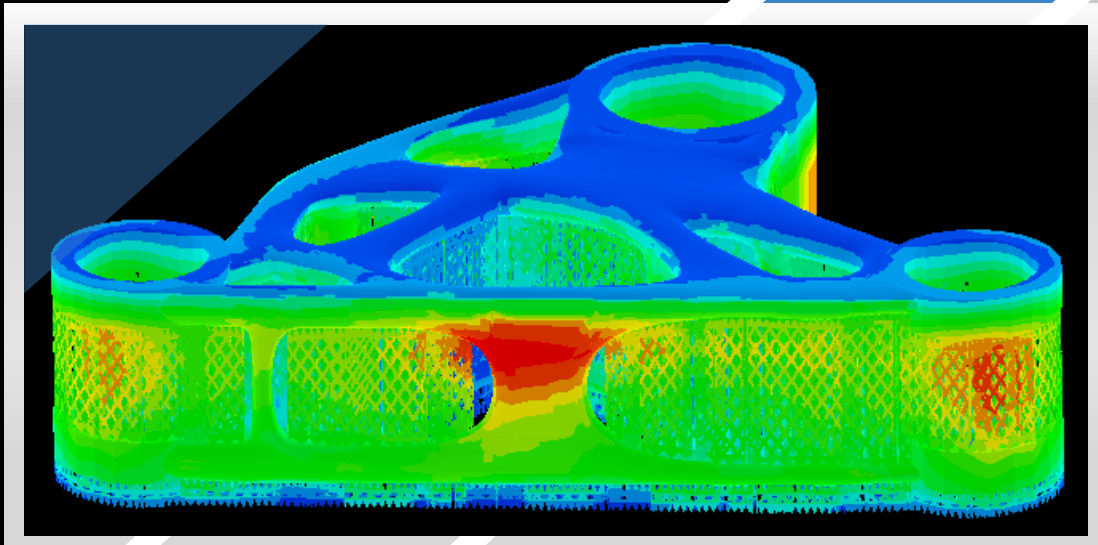
AdditiveLab



AdditiveLab

Metal Additive Manufacturing Simulation.

Product Brochure

www.additive-lab.com

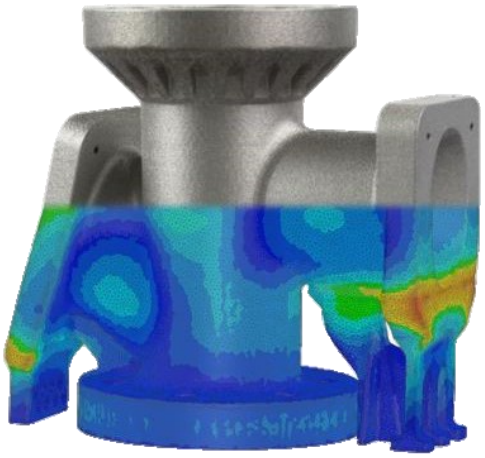
Simulation for Metal AM.

The use of Metal Additive Manufacturing (AM) to replace traditionally manufactured parts has gained increased attention in the last decade. Highly complex parts manufactured with AM allow for optimized designs tailored to specific application needs. These AM parts enable high efficiency, better performance and eventual cost cuttings compared to traditionally manufactured parts.

The AdditiveLab software solutions help in successful production of complex AM parts by providing simulation technology that can predict potential manufacturing outcomes of AM processes and give better insight into production behaviour. With the AdditiveLab software, failure-prone regions can be identified and machine parameters can be optimized to increase the manufacturing success, and subsequently, save time and money.

AdditiveLab RESEARCH.

Metal powder bed fusion process simulation.

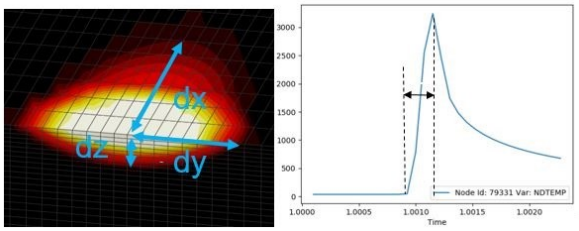


Deformations predicted as red zones in AdditiveLab via mechanical analysis. (Case study based on VTT pipe test geometry).

Clear insight.

AdditiveLab RESEARCH provides mechanical simulations via a simple user-interface and highly automated model preparation processes, reducing the state-of-the-art AM process simulation to only a few clicks.

The visual feedback of simulation results in AdditiveLab allows to quickly identify *critical regions*: regions that suffer from large deformations, localized stress concentrations, recoater collisions, cracks and excessive temperatures.



The temperatures in a cross section cut to measure the melt pool dimensions (left) and the temperature vs. time plot queried at the center of the simulation model.

Powerful.

AdditiveLab RESEARCH enables simulation engineers to perform AM process simulations from micro to entire build-configuration scales. It supports a variety of simulation modules including thermal and thermo-mechanically coupled analyses with fast execution times thanks to multi-core CPU support.

The integrated Python API gives users full access to all the extensively documented simulation features and functions. It empowers users to write their own scripts to automate and innovate.

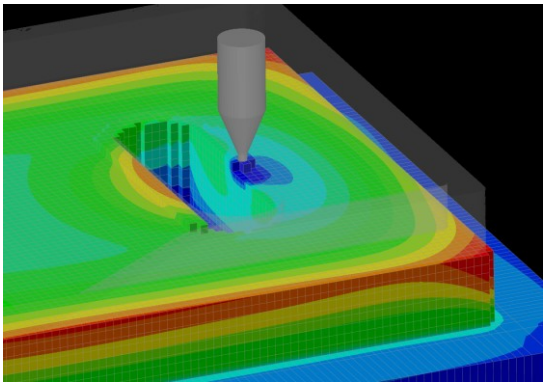
AdditiveLab DED.

Metal Direct Energy Deposition, WAAM process simulation.

Simulation for DED.

AdditiveLab DED enables simulation engineers to perform AM process simulations on technologies that produce via Direct Metal Deposition process by wire or powder feed. Often referred to as DMD, DED, WAAM and LMD. The AdditiveLab DED software helps to cut back the trial-and-error tests by providing simulation technology that can predict potential manufacturing outcomes of DED processes.

AM machine printing a part via DED process. (Ref BeAM machines, www.beam-machines.com).



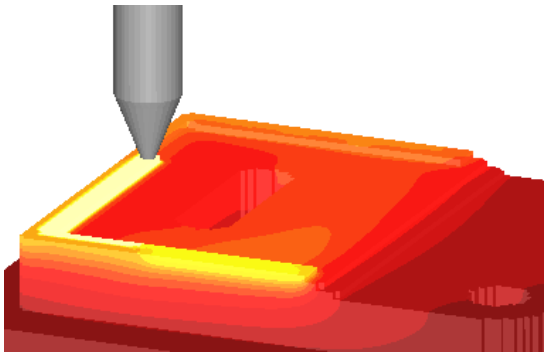
AdditiveLab DED process simulation predicting displacement zones of the part to be produced.

Predict and Prevent.

AdditiveLab DED empowers users to understand, predict and optimize manufacturing outcomes. The simulation results in AdditiveLab allow identification of *critical regions*: regions that suffer from large deformations, and localized stress concentrations.

Heat Management.

AdditiveLab DED enables thermal simulations of the AM build process. The results enable analysis of time-dependent temperature fields, which help mitigate the risk of lack of fusion and overheating during production.



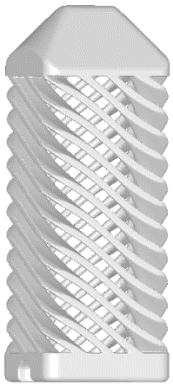
AdditiveLab DED process simulation predicting temperature profiles of the part to be produced.

Case Study:

Prediction of Excessive Deformations and Simulation-Guided Production.

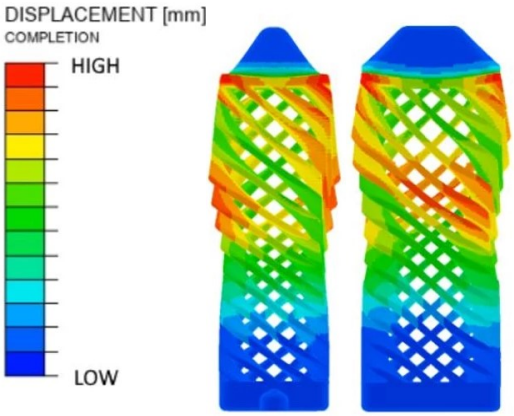
Challenge 1:

Simulate the AM process of an innovative spinal fusion cage design and predict critical deformations observed in production.



Original Spinal Cage design.

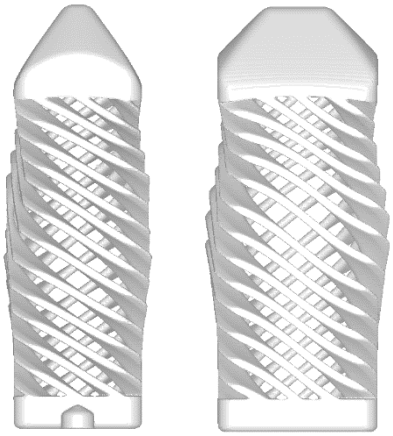
Production result of Spinal Cage showing the Displacement distribution; left: lateral view, right: frontal view (Courtesy of Tangible Solutions).



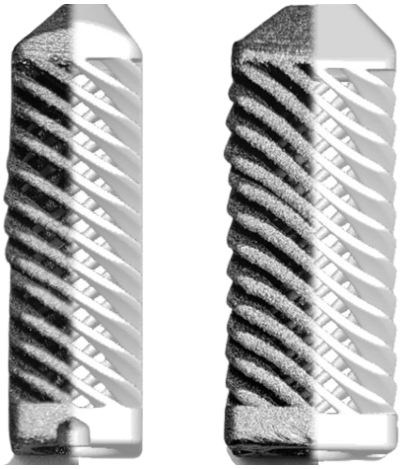
Simulation of Spinal Cage showing the Displacement distribution via AdditiveLab mechanical analysis; left: lateral view, right: frontal view.

Challenge 2:

Generate a Counter-Deformed design based on predicted deformations that leads to successful production.



Simulation driven Counter-Deformed design of Spinal Cage via AdditiveLab; left: lateral view, right: frontal view.



Production result of Counter-Deformed Spinal Cage showing the Displacement distribution; left: lateral view, right: frontal view mapped against original part design (Courtesy of Tangible Solutions).