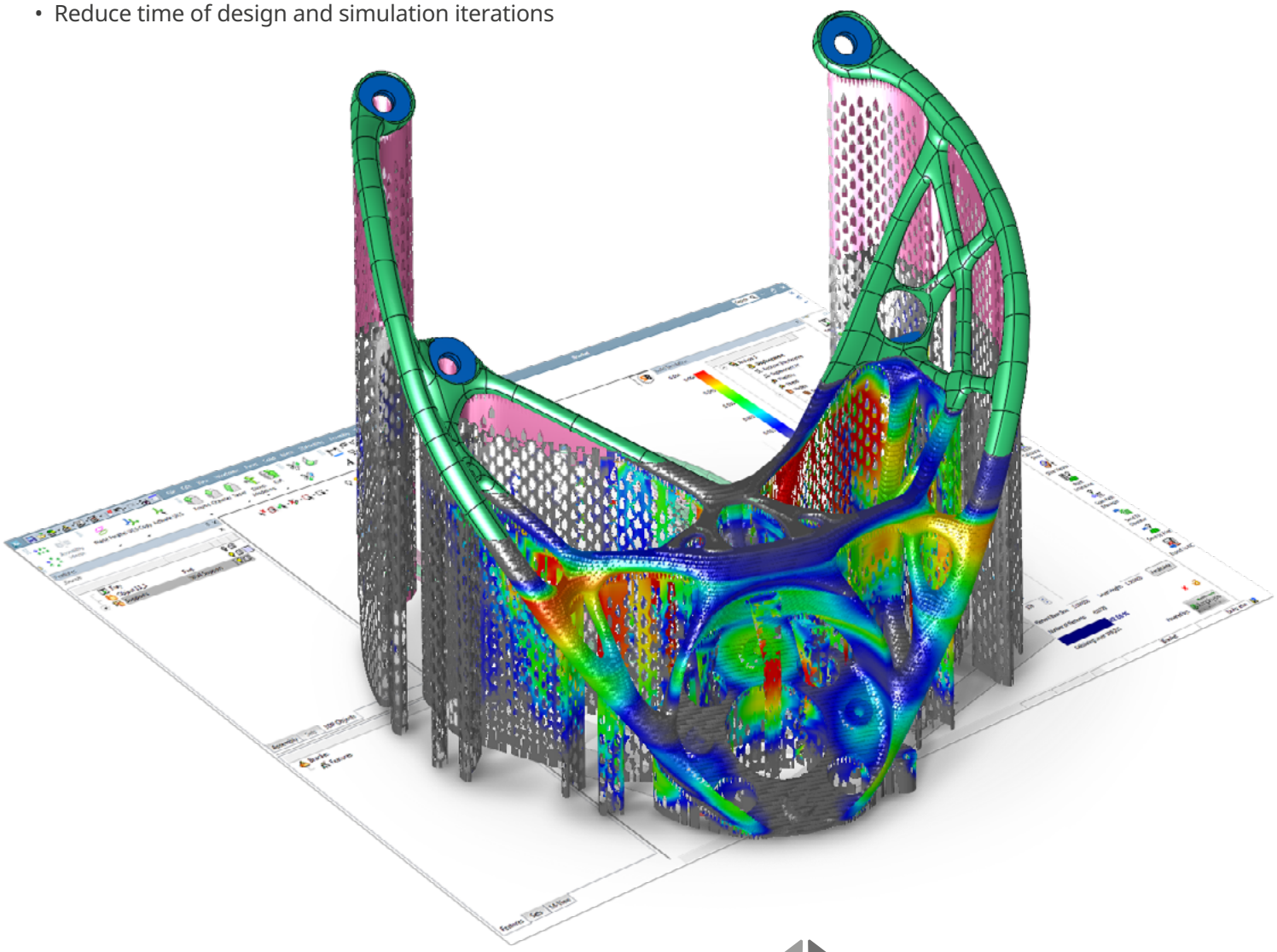
3DXpert™

3DXpert Build Simulation

Get Metal Additive Manufacturing Right the First Time

- Minimize number of build tryouts
- Prevent risk of printer damage
- Design & verify builds in the same environment
- Reduce time of design and simulation iterations



3D SYSTEMS

3DXpert™

3DXpert Build Simulation

Getting a properly printed part out of a metal 3D printer can be a challenge

Achieving the desired metal printed part can often require multiple experimental prints that are both costly and time consuming. The larger the part, the harder it can be to get it right. The reason is not the quality of the printer, but the complexity of the metal printing process and the number of factors that affect it.

Potential failures that might occur during the metal additive manufacturing process include: material failure (tears, cracks), deformation deviating from the desired geometry, builds separating from the build plate and further distortions and warpage after a part is removed from the build plate or supports are taken off.

Moreover, if the deformation that occurs at each layer during the build process is not taken into account, the printer's re-coater can be in risk of damage.

3DXpert Build Simulation provides simulation and analysis tools as an integral part of the design environment, enabling users to accurately and easily discover and fix manufacturing issues before a part is sent to print. **3DXpert Build Simulation** is part of **3DXpert**, an all-in one software solution to streamline the entire metal additive manufacturing workflow, from design to final part.

Minimize Build Tryouts

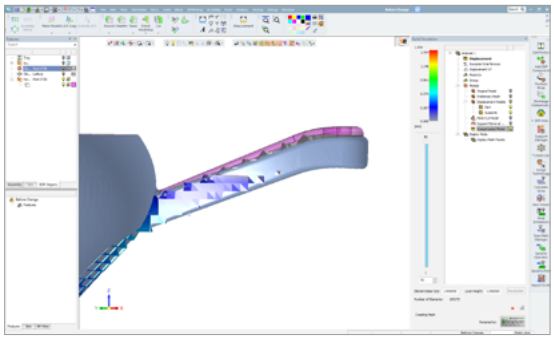
3DXpert Build Simulation helps users discover issues and address problems that might otherwise occur during the printing or the post-processing phases.

Build Phase

Having improperly designed or insufficient supports might result in deformation, causing the part to deviate from the desired geometry and permissible tolerances, or even lead to part damage, such as cracks.

Use 3DXpert Build Simulation to:

- Predict where deformation might occur
- Predict where supports might fail
- Predict where material might fail due to plasticity
- Minimize residual stress
- Get a compensated model that can replace the original in order to print the desired part

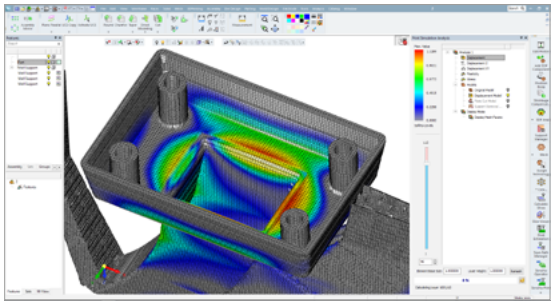


The orignal model, calculated model and the compensated model (to be printed in order to compensate for displacement)

Having too many supports or overly engineered supports might result in part stress and material failure. Moreover, in addition to wasted material and longer printing time, it can make the support removal process more difficult and expensive, thus increasing the cost of the build.

Use 3DXpert Build Simulation to:

- Predict and fix areas with excessive strain
- Improve surface quality by removing unnecessary supports



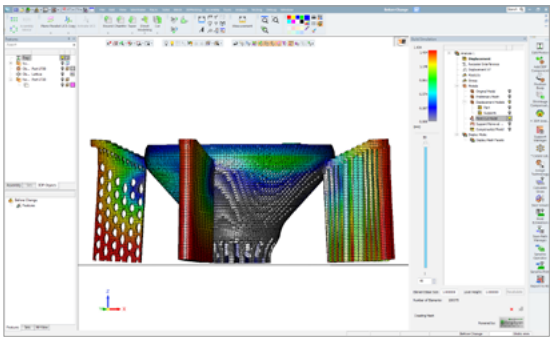
Displacement analysis

Post Processing Phase

After printing, the part goes through several treatment processes that might result in further deformations. These processes include heat treatment, cutting the part off the plate and removing supports.

Use 3DXpert Build Simulation to:

- Predict the displacement created after cutting the part off the plate
- Predict displacements and stresses after removing supports
- Predict the impact of heat treatment and stress relief on the printed part

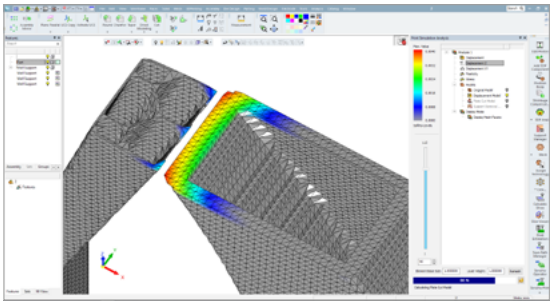


Deformation of different support types after they are cut off the plate

Prevent Risk of Printer Damage

The cooling and shrinking that occurs after each layer is printed may cause the metal to rise above the powder bed level. These raised tips could damage the re-coater or even cause the roller to stop its motion.

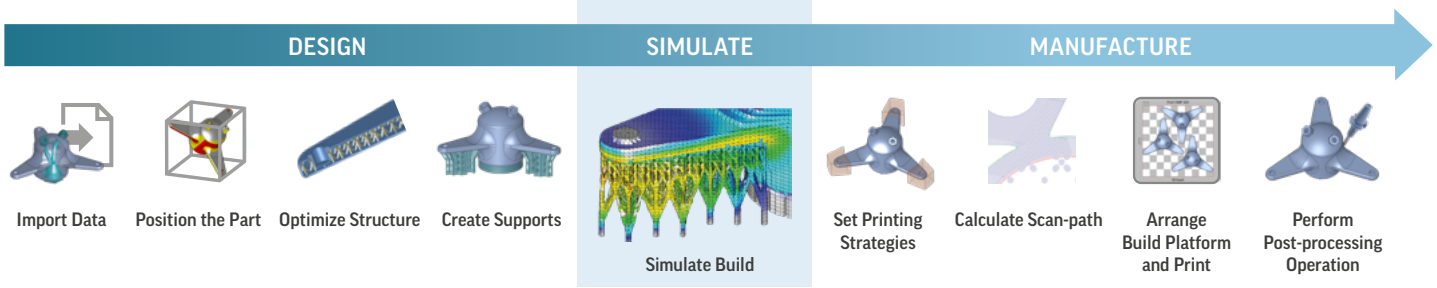
Use **3DXpert Build Simulation** to predict where metal is likely to rise above the next deposit layer and cause damage to the printer, enabling you to take the appropriate corrective action.



Recoater interference analysis

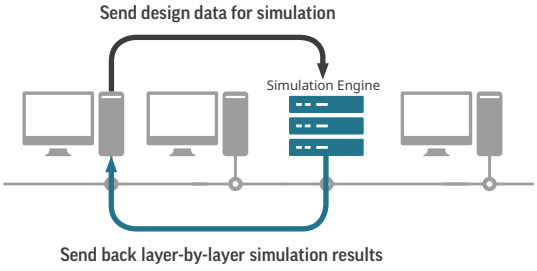
Unified Design & Verification Environment

As part of the **3DXpert** software suite, **3DXpert Build Simulation** is an integral part of the design environment. It allows you to easily make modifications and fix your design based on simulation results without the need to go back and forth between multiple software solutions. You can then re-run the simulation to verify your changes, and save the analysis results with the design file.



Reduce Time of Design and Simulation Iterations

Layer-by-layer simulation results are immediately fed back to you. Upon detection of a problem, you can immediately fix it without having to wait for the entire simulation to finish, thus reducing iteration times. The simulation calculations require immense computing power, so **3DXpert Build Simulation** allows you to offload these calculations to a single dedicated computer that can be shared with other **3DXpert** users in your premise. While you are free to continue working, the simulation keeps running and each layer's simulation results are immediately sent back to you.



3DXpert - From Design to Manufacturing

3DXpert is the only all-in-one software solution for metal additive manufacturing. It eliminates the need to go back and forth between different software solutions, streamlines your workflow and provides you with full flexibility and control over the entire production cycle, from design to manufacturing.

Increase your productivity and lower cost of operations by:

- Improving data quality and integrity with the ability to work with native CAD data (solid & surfaces/b-rep), eliminating the need to convert files into mesh
- Easily making changes at any stage using history-based parametric CAD tools by working in a hybrid (Mesh, Solid and Lattice) modeling environment
- Accelerating print time while maintaining part integrity using the patent-pending 3D Zoning capability. Easily assign different print strategies to different areas of a part and seamlessly merge them into a single scan-path
- Minimizing part weight or applying conformal surface textures with lightning-fast creation and editing of micro lattices, using structure optimization tools
- Generating optimal scan-paths with unique printing strategies that take into account the design intent and part geometry
- Programming post-processing operations (e.g. drilling and milling) in the same software being used for the entire process

3DXpert Build Simulation is a key element in the 3DXpert workflow, enabling you to get successful prints while eliminating time consuming and costly iterations.

3D SYSTEMS

Find out more at: www.3dsystems.com/software/3dxpert

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