# Materialise 3-matic

Post-Topology Optimization: a Quick Route to a Clean File

Topology optimization is a next generation software tool that reduces the weight of an indicated design space, keeping the material properties and fixed set of loads in mind. Results of these packages are typically organic-looking STL files with a very rough surface quality. Materialise 3-matic offers the STL design tools to start cleaning up the results of the topology optimization software, thus skipping the elaborate step of re-building these organic files in CAD. Therefore, Materialise 3-matic takes a central place in the forward engineering of topology-optimized files.

Before   After
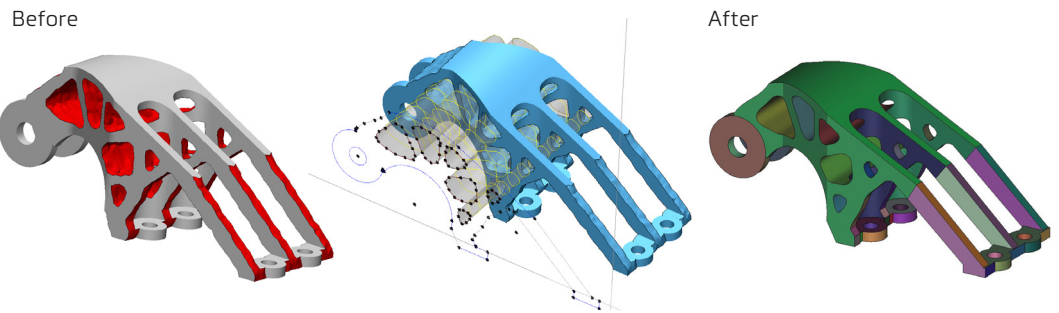
"The combination of topology optimization and Additive Manufacturing methods not only creates expanded possibilities for design, but also introduces interesting new challenges. By working as partners, Altair and Materialise can help the engineering community overcome these challenges, drive innovation and leverage the full potential of Additive Manufacturing."

Dipl.-Ing. Michael Karg, Lehrstuhl für Photonische Technologien, Germany

Steps Towards a Cleaner Part:

Feature Recognition and Mesh Projection

Using this feature, planes, cylinders, and other shapes can be recognized and used to adjust the mesh.

Using Sketches for Quick Redesign

Usually you can recognize an extruded direction in a part. Using sketches, this geometry can be captured from the part, cleaned up and extruded to achieve a cleaner part.

Back to CAD in the Blink of an Eye

The STL data is now clean enough to be exported to an .iges or .step file.
Planes will be exported as analytical planes, extruded surface as an analytical extruded surface.

Want Freeform Results?

On freeform geometry, users can apply surface reconstruction algorithms that will improve the mesh quality, making it easier to further transfer to CAD or immediately to CAM software.

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Use Structures to Reduce Weight Even More

Materialise 3-matic can be easily extended with the possibility to add lightweight structures within your optimized design. Not only can you reduce weight, but you can also cool surfaces, mix gases, and more.

These lightweight structures can be re-analyzed using FEA packages and do not limit the CAM software to produce an even smarter design.
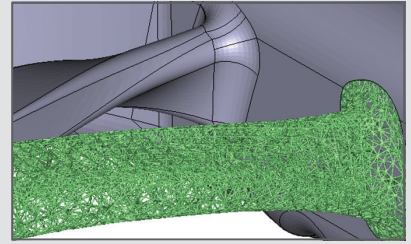
Materialise 3-matic: Your Bridge to Other Packages

Export to FEA

Topology optimization cannot take into account every type of stress on a certain file. If additional simulation is required to meet the design requirements, Materialise 3-matic can export the cleaned and redesigned STL file to a variety of FEA packages, such as Abaqus, OptiStruct and Nastran.
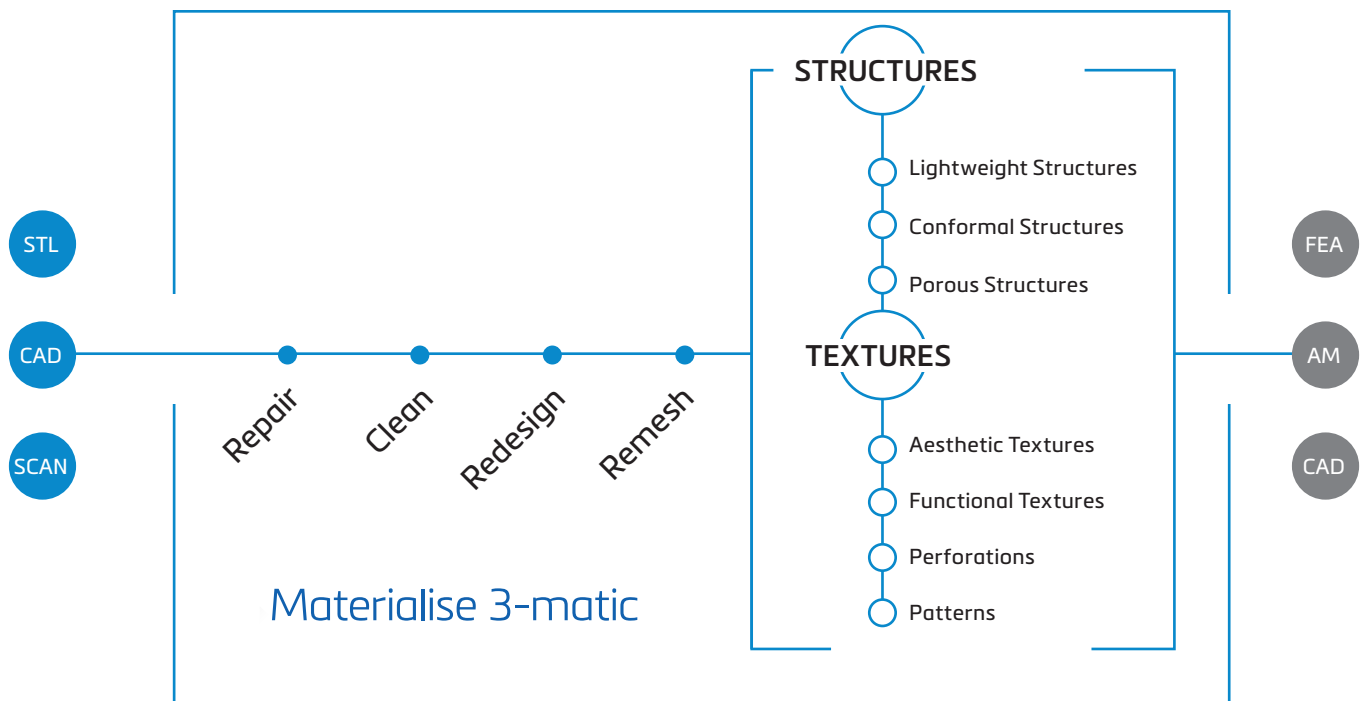
This direct way of handling STL files by Materialise 3-matic allows quick loops to FEA and design changes, without having to convert STL to CAD file everytime. Therefore the Materialise 3-matic remesh module can be used as a pre processor for an even faster FEA simulation.

To a CAD Model

Another module of Materialise 3-matic is the CAD link. This module interprets the STL file and exports the recognized entities as CAD entities and exports the organic surfaces with a minimal amount of CAD patches.

To a Printed Prototype

The features of Materialise 3-matic not only include the biggest STL fixing package and automated STL fixing features, but also an immediate connection to Additive Manufacturing machines via Materialise Magics and the Materialise Build Processor system.

For more information about Materialise 3-matic,
contact us at: software@materialise.be or visit our website software.materialise.com