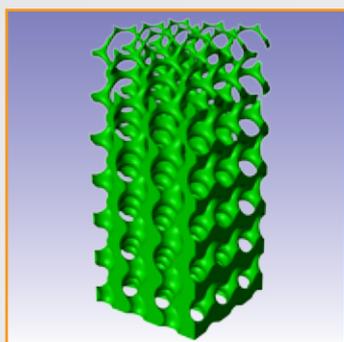




SIMPLEWARE SOFTWARE FOR LATTICE STRUCTURE GENERATION



Simpleware *ScanIP+CAD* software can be used to fill 3D models with lattice structures. Lattices are used to reduce material weights and customise the mechanical properties of industrial parts sourced from CAD and/or image data. Adding lattices to parts offers a solution for manufacturers working with parts that require complex internal features. Replacing the internal solid volume of a part with a lattice reduces weight without compromising functionality. Simpleware software is able to generate smoothly blended interfaces between a lattice and surrounding walls/solids for robust model design.



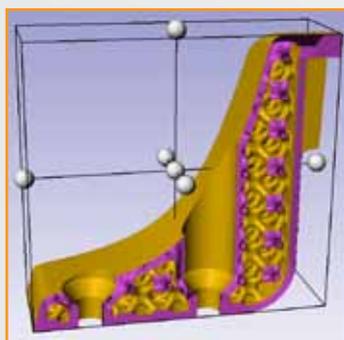
Courtesy of BAE Systems
Advanced Technology Centre

Lattice Benefits for Industry

Lattices reduce the weight of parts without compromising their stiffness or flexibility. Simpleware provides robust and easy-to-use lattice generation tools, as well as industry-leading capabilities for exporting complex models as volume meshes for Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD). This allows for the unique generation and simulation of Additive Manufacturing parts.

Simpleware Services

Simpleware provides complete services for generating lattice structures from CAD and image data, as well as consultancy on processing data for Additive Manufacturing. Simpleware can also offer bespoke development to customise the software for specific user requirements. Send data through a secure system for processing and conversion to a high quality model. We can also arrange for a part to be scanned if required.



Key Features and Benefits

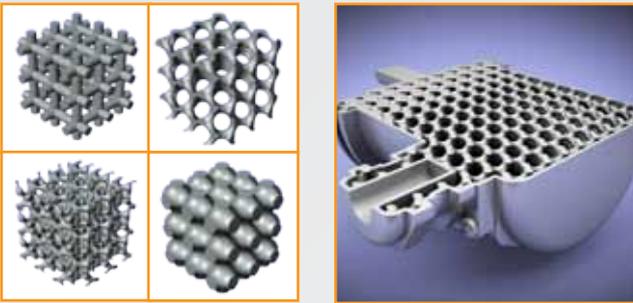
- » **Generate lattice structures for parts:** lattices suitable for CAD and 3D image data
- » **Wide range of customisation options:** wall thickness, volume fractions, cell types...
- » **Optimise part structures:** reduce part weight and maintain functionality
- » **Export to Additive Manufacturing processes:** models compatible with leading systems
- » **Automatic cavity closing:** fill closed cavities below a specified volume
- » **Volume meshing for FEA and CFD simulation:** analyse mechanical properties
- » **Generate blended junctions:** between lattice and enclosing walls
- » **Wide range of applications:** aerospace, automotive, life sciences...

ADD LATTICE STRUCTURES TO MODELS

Users of Simpleware software can easily add lattice structures to CAD models. Options are also available to add lattices to models produced from scan data sources such as CT and MRI. Multi-part models with lattice structures can be exported as watertight STL files for Additive Manufacturing.

Lattice generation is:

- » Based on periodic functions
- » Able to produce structures with specific volume fractions
- » Supported by robust cavity closing functions
- » Able to maintain the exterior geometry of parts
- » Able to create blended junctions between lattice and enclosing walls
- » Compatible with multi-material Additive Manufacturing



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INDUSTRIAL APPLICATIONS

There are a wide range of applications for models using lattice structures. These include developing new parts for the automotive and aerospace industries, where the ability to customise weight, wall thickness and other properties before manufacturing can result in significantly improved performance.



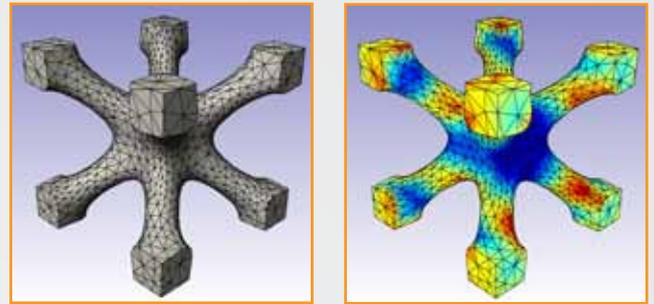
Lattices can also be used to improve impact absorption, while manufacturing parts with cavities means that material consumption can be reduced. In addition, lattice structures have applications to the life sciences through the research and development of new implant designs.

VOLUME MESHING FOR FEA AND CFD

Simpleware software can be used to generate volume meshes of 3D models with lattice structures suitable for Finite Element (FE) and Computational Fluid Dynamics (CFD) analyses. This functionality allows users to run a wide range of simulations on models with lattices, which can include analysing stiffness, elasticity, and fluid-structure interactions.

Volume meshes can be generated with:

- » Conforming interfaces with shared nodes between parts
- » Additional FE elements (contact surfaces, node sets, shell elements...)
- » Specialist CFD meshing options (boundary layer meshing, fluid/solid regions...)
- » Meshed cavity regions
- » Dedicated file exports to all leading FE and CFD solvers (COMSOL, Abaqus, ANSYS...)



About Simpleware

Simpleware develops industry-leading image processing software solutions for 3D image data visualisation, analysis and model generation.

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