

Topology optimization in additive manufacturing

- Components with optimized-structure geometries
- Maximum weight reduction (lightweight construction)
- Minimizes material consumption





Topology optimization makes it possible to give objects such as tools or components for lightweight construction more efficient basic shapes. It enables modification of geometries with consideration of defined framework conditions and stress restrictions, thus combining maximum functionality with minimum material consumption and the lowest possible weight. The optimization process to date has always been very lengthy and demanding, and requires both deep levels of expertise and specialized software.

Topology optimization made easy with PROTIQ

PROTIQ's innovative online tool has made topology optimization significantly simpler and faster. Using this web application is as intuitive as using a configurator. Within just a few minutes, the ideal geometry for the component will be calculated, taking into account individual conditions and restrictions. The result: Bionically shaped objects that

visually recall, for example, the roots of a tree. These unique geometries result from the fact that material is provided only where tensions arise in the component. This means that the material is used in the most efficient way possible.

New possibilities for product development

PROTIQ is setting new trends in product development with its combination of online topology optimization, additive manufacturing, and a wide range of materials to choose from. As 3D printing – unlike conventional manufacturing methods – is not tethered to process-related restrictions in terms of shape, product developers can, for the first time ever, fully adapt the design of the components to suit their functionalities. This digital, online optimization process offers companies an economical and time-saving opportunity to totally rethink product design.

Advantages of topology optimization and 3D printing on the PROTIQ platform

- ✔ Requirement-oriented product development
- ✔ Resource-saving through material savings
- ✔ Huge time savings in defining the optimization configuration and goal
- ✔ Maximum weight reduction (lightweight construction)
- ✔ Intuitive user interface with the possibility of guided input

Online topology optimization from PROTIQ



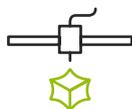
Step 1: Configuration

Determine the scope of design for your 3D model and define a variety of load cases. This ensures that optimized structures will be developed where the flow of force requires them.



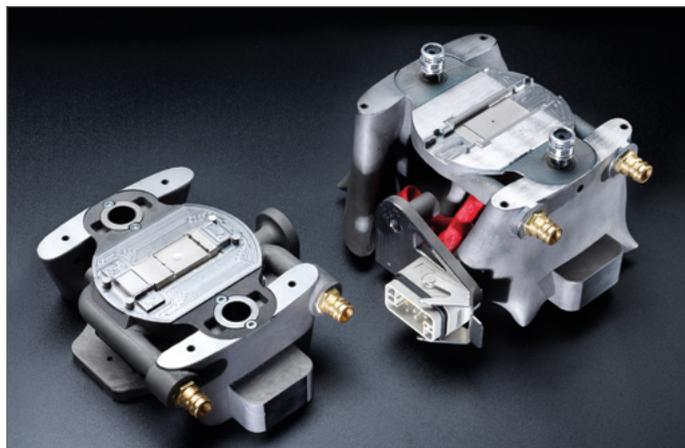
Step 2: Optimization

The software then analyzes the forces on the model and where tensions arise in the component. All areas that are not affected by the load and that have no further use are then removed from the 3D model in the next step.



Step 3: Result

The optimized component combines maximum functionality with the lowest possible weight and material costs. The shape is reminiscent of the bionic structures that appear in nature. After optimization, you can order the 3D object online directly from PROTIQ and have it printed. You will then receive the finished product in just a few working days.



▶ Test our online topology optimization process:
www.protiq.com/en/topologyoptimization



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