

the optimization company



The Structural Optimization System



FE-DESIGN is a leading full-service **optimization solution partner** for numerical simulation, precise optimization and automation.

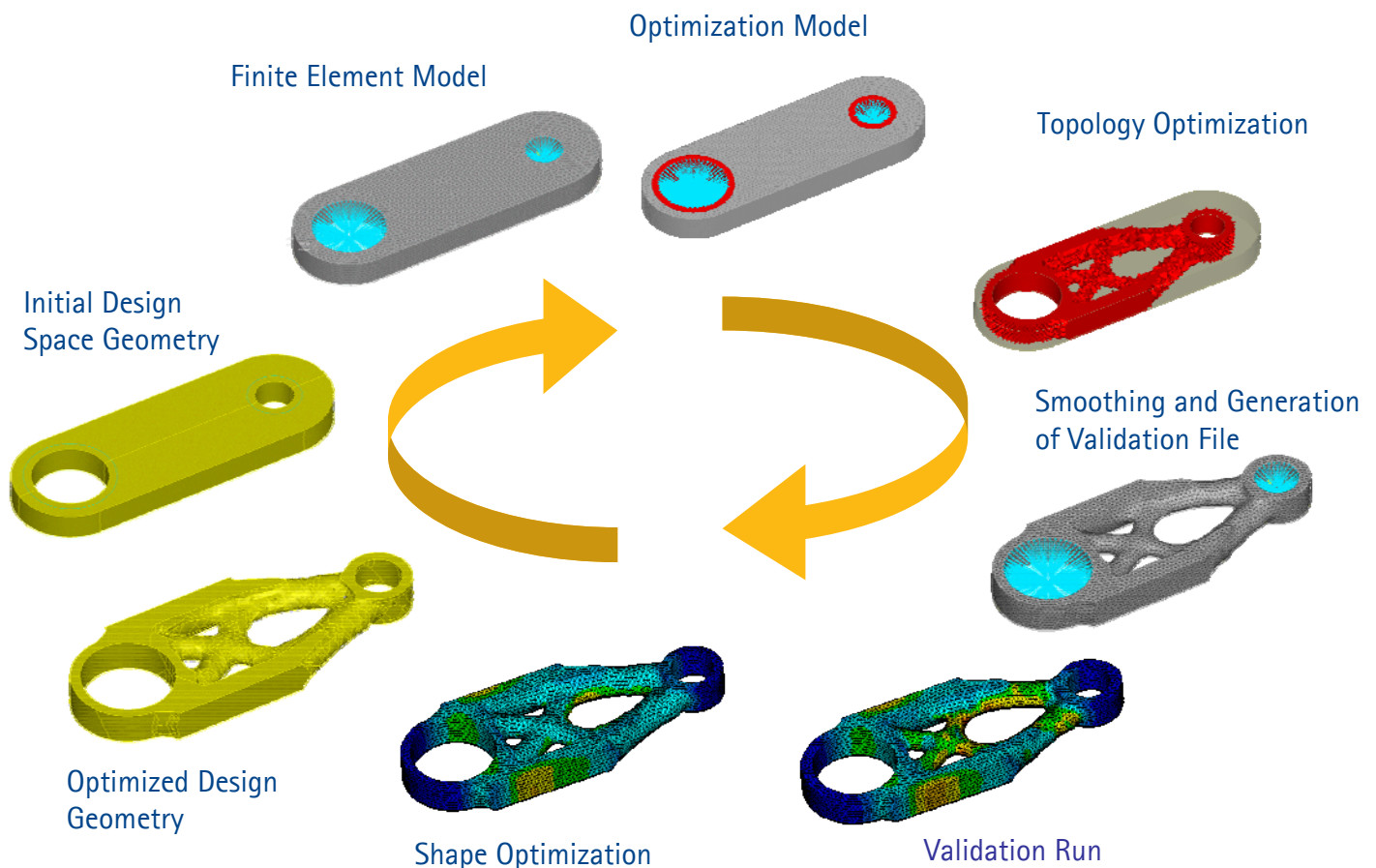
FE-DESIGN supports customers to develop products **faster, better, more reliable and cost-saving** by providing best-in-class optimization technology, software and services and integrating them into the **virtual product development process**.

TOSCA Structure – The Optimization Suite for Structural Optimization

TOSCA Structure is a modular software system for non-parametric structural optimization that enables topology, shape and bead optimization in combination with standard finite element solvers. The setup is very simple as no model parameterization is necessary and existing input files can directly be used for optimization.

TOSCA Structure is the right optimization tool to:

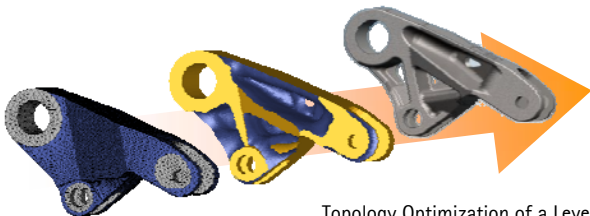
- Decrease development time by eliminating the number of trial and error cycles in the design process
- Improve designs getting higher stiffness, lower mass, stress reductions
- Utilize existing CAE knowledge and IT-environment in conjunction with efficient optimization using TOSCA Structure.



TOSCA Structure modules

TOSCA Structure.topology

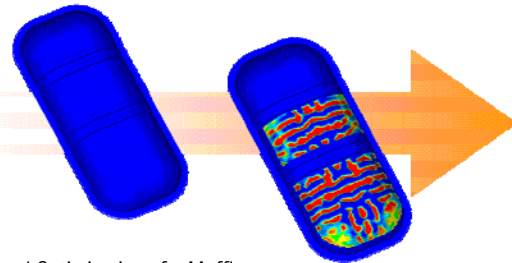
Topology optimization - conceptual designing yielding lighter and stiffer structures.



Topology Optimization of a Lever
(Images Courtesy of JCB)

TOSCA Structure.bead

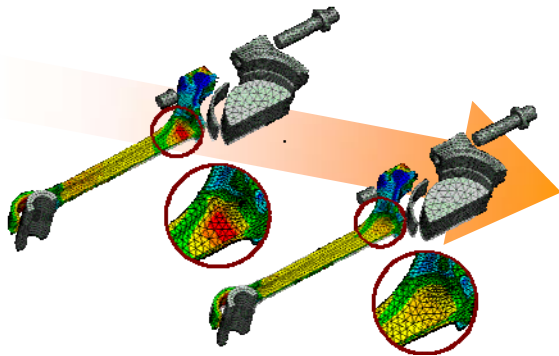
Bead optimization - improving the static and dynamic properties of shell structures.



Bead Optimization of a Muffler
(Images Courtesy of Tenneco)

TOSCA Structure.shape

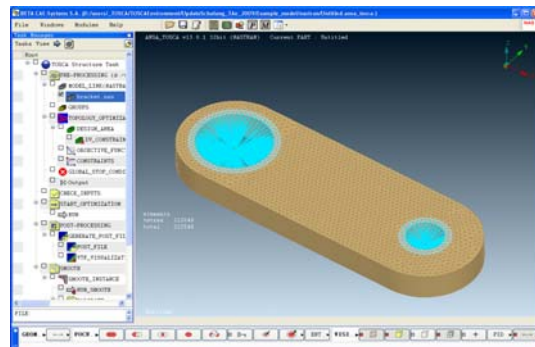
Shape optimization - minimizes the stresses or damage by automatically modifying the surface geometry and mesh smoothing.



Shape Optimization of a Connection Rod
(Images Courtesy of Ford Werke AG)

TOSCA ANSA environment

Graphical user interface - supports intuitive setup for optimization tasks and an automatic generation of verification runs.



TOSCA Structure for high level optimization applications

TOSCA Structure advanced.LIFE

- Shape optimization based on results of fatigue simulation using standard fatigue solvers.

TOSCA Structure advanced.NONLINEAR

- Shape optimization of contact areas to yield a homogeneous contact stress distribution.
- Topology and shape optimization using non-linear material behavior.
- Topology and shape optimization based upon geometric non-linear analysis.

Key Notes for optimization solutions with TOSCA Structure

Acceleration of product development process

- Fewer design cycles
- Reduced number of prototypes and physical tests
- Savings in weight and material
- Increase of product durability
- Shorter time-to-market ensures important challenge advantages

High quality designs

- Gain higher Stiffness, lower mass, stress reductions
- Develop reliable and competitive products

Seamless integration

- Use your existing CAE knowledge and IT-environment
- Gain a high quality of calculated results
- Save previous investments

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