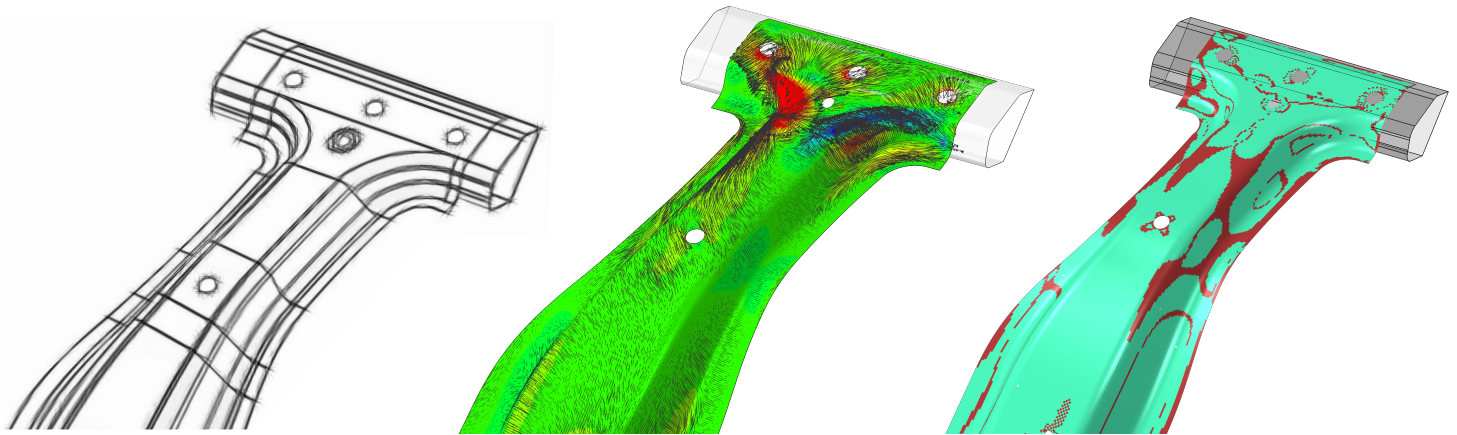




SIMUTENCE

Virtual Composite Solutions

Lightweighting by means of Advanced Laminate Determination



Highly efficient laminate determination
especially for large structures

Optimization procedure independent
from solver for FEA

Consideration of an arbitrary
number of load cases

Determination of unidirectional,
bidirectional and quasi-isotropic layups

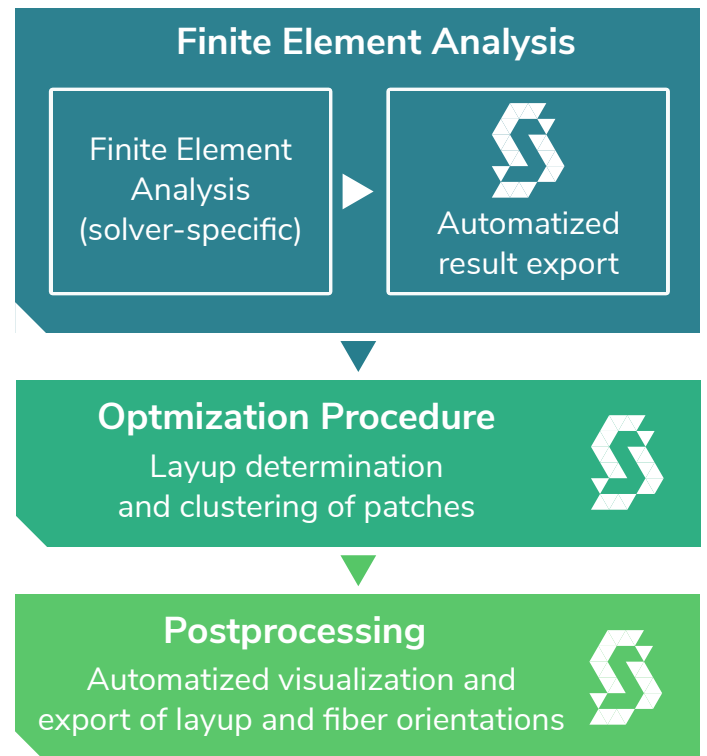
The optimization of stacking sequences is key to fully exploit the lightweight potential for continuous fiber reinforced composites. For many applications, however, the determination of a suitable stacking sequence is challenging, since the part is usually subjected to several load cases. This makes the manual identification of an optimum solution based on Finite Element Analyses (FEA) usually not possible. Besides this, optimization approaches usually require a multitude of FEA to converge in an optimal solution, which makes them time- and cost-expensive for large structures.

SimuOpt competes these challenges. SimuOpt enables to consider an arbitrary number of load cases for stacking optimization and the number of required FEA is reduced to a minimum. For this purpose, no special solver is required. We enable your existing software architecture!

SimuOpt - How it works

SimuOpt covers all steps to evaluate FEA results from multiple load cases for the determination of an optimal stacking sequence for continuously fiber reinforced composites. The incorporation of any Finite Element solver is enabled based on tailored interfaces for SimuOpt. This implies that established simulation software can be used.

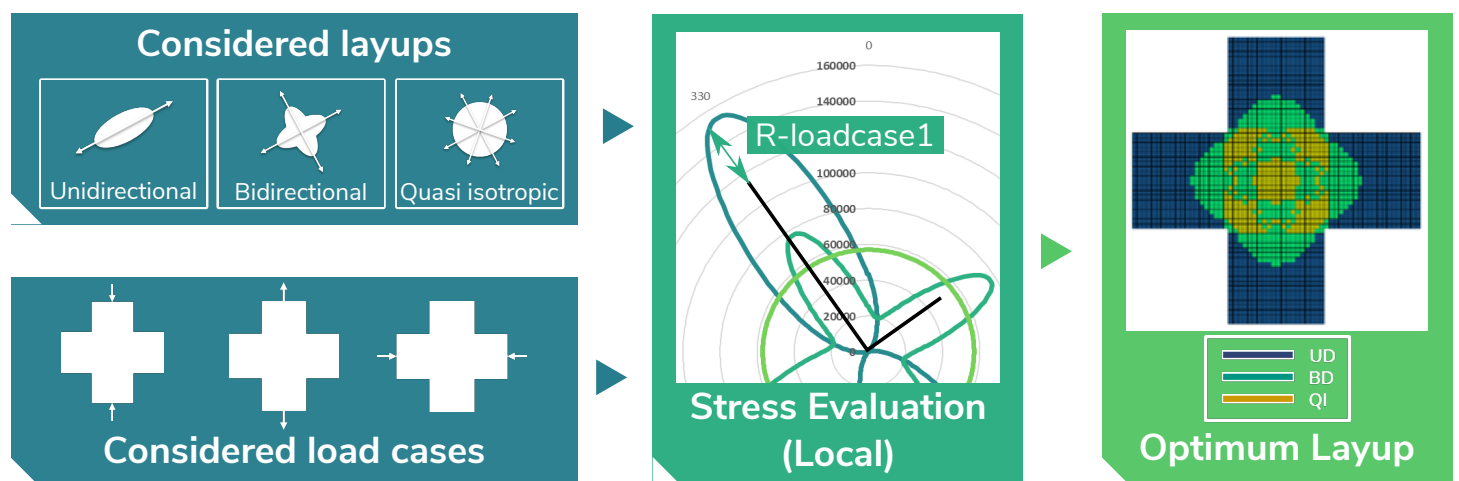
During the optimization step, the optimized stacking sequence is determined based on a reserve factor. Based on this factor, the part is divided into quasi-isotropic, bidirectional, and unidirectional areas (QI, BD, UD). Subsequently, a clustering step combines areas with similar fiber orientations to larger patches, minimizing the number of different stacking sequences. The only material data needed are the elastic properties of the material to be stacked.



Technological Background

The local principal stresses for each load case are evaluated during the stress evaluation. Based on this, the most suitable orientation of the stack is calculated for each element individually for the given load cases. In the next

step, the reserve factor (R) is calculated for each load case and stacking sequence, considering the most suitable stacking orientation. Based on the resulting set of reserve factors, the optimum layup is selected.



We are looking forward to your challenges!
Get in contact with us.

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