

Strength Assessment According to FKM Guideline



What is S-Life FKM?

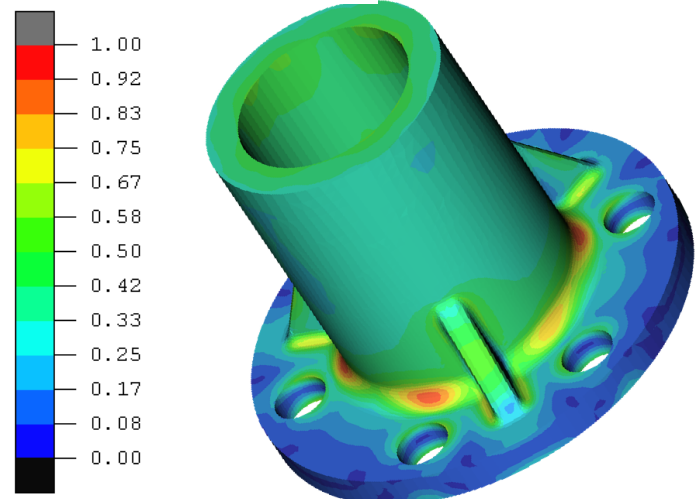
S-Life is a software that enables an easy and automatic assessment of FEM simulation results according to the German FKM guideline [1]. The software is used as a postprocessor. With S-Life at the push of a button the computed stresses will be processed in such a way that an assessment of the static and fatigue strength according to the FKM guideline is carried out. The software is applicable for components made of steel, cast iron and aluminum materials. As result of the assessment the static and cyclic utilization ratios will be displayed as contour plot.

[1] N.N: Analytical Strength Assessment of Components in Mechanical Engineering in its 7th revised edition, Forschungskuratorium Maschinenbau, VDMA Verlag, Frankfurt am Main, Germany, 2020.

Benefits

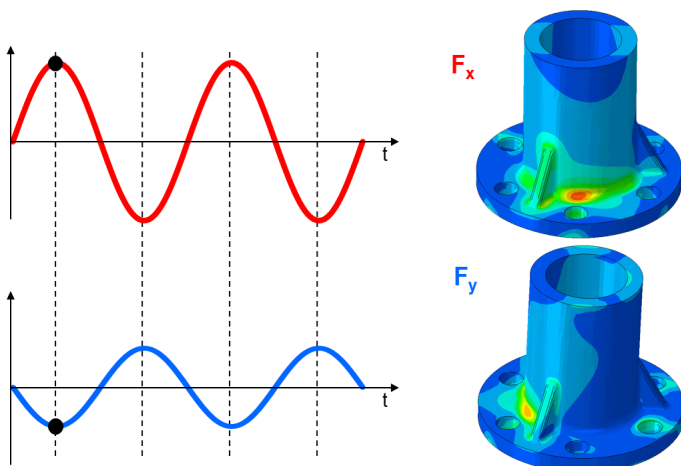
- Unambiguous strength assessment through systematic approach
- Usage of plastic reserves through consideration of stress gradients
- Comprehensive documentation of the results of the strength assessment through complete numerical report for the reference node
- Significant time savings in comparison to manual assessment of individual node values
- Prevention of errors through easy automated usage
- Easy identification of the critical hot spot through contour plot of utilization ratios
- Automated determination of the critical load case combination if multiple loads are applied

cycl. utilization ratio a_{bk}



Features

- Interfaces: Abaqus, ANSYS, MSC Nastran, MSC Marc, Simcenter Nastran, OptiStruct & Radioss
- Integrated and extendable material data base with more than 1500 grades
- Automatic identification of critical load case combinations
- Static and fatigue strength assessment according to FKM guideline based on the concept of local strength
- Output of static and cyclic utilization ratios as contour plot
- Comprehensive reporting of nodal results
- Consolidation of results from different FEA



Strength Assessment According to FKM Guideline

What is the FKM Guideline?

The FKM guideline is a German guideline with the complete title "Analytical Strength Assessment of Components Made of Steel, Cast Iron and Aluminum Materials in Mechanical Engineering". It is a comprehensive guideline with approx. 230 pages describing the static and fatigue strength assessments based on local stresses, thus it is applicable for results obtained by FEA. Unlike standards like the ASME, the FKM is not product- or industry-specific, rather it is applicable in a most general manner. The concepts outlined in the guideline have its origins back in the 1960s, whereas its first edition was published at the beginning of the 1990s. Now it is in its 6th revised edition from 2012. As of today, the FKM guideline is the de-facto standard at least in German-speaking countries, when it comes to strength assessment of machine parts. However, due to its volume and the complexities of the concepts applied, an automated solution is indispensable.



S-Life FKM Top Use Cases

Challenge:

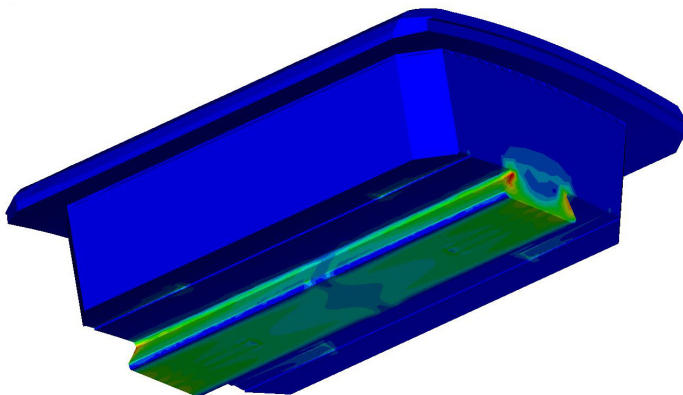
- Reliable assessment of component strength required

Solution:

- S-Life FKM conducts a comprehensive strength assessment, static and fatigue alike according to the German FKM guideline reflecting state of the art strength evaluation of machine parts

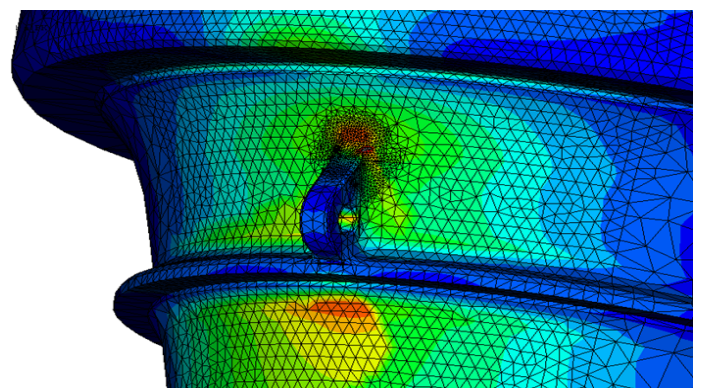
Results:

- Comprehensive strength assessment
- Component optimization
- Analysis documentation
- Reduced evaluation & documentation effort



"We use S-Life FKM to evaluate our FE analyses of generator rotors. The intuitive and fast handling reduces considerably our evaluation and documentation effort."

Lukas Speckner
Computational Engineer
Stork Technical Services GmbH, Germany



"Our Mills are dynamically severely loaded. S-Life enables us to conduct a comprehensive strength assessment and component optimization in a simple and fast way. The program also facilitates the documentation of the analysis."

Jörg Bettenworth
Head of Forward Development
Loesche GmbH, Germany