

FEMFAT software

FINITE ELEMENT METHOD FATIGUE

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FEMFAT Modules

The fatigue software package FEMFAT consists of designated modules - each for particular use and more powerful if combined.

FEMFAT basic

Standard/Minimum configuration; includes all the interfaces and material database, handles 2 stress states plus one assembly loadcase for life- or safety factor analysis.

FEMFAT heat

For low cycle fatigue analysis of components which are exposed to thermo mechanical loads (e.g. cylinder heads, exhaust manifolds) and suffer from mechanical, creep and oxidation damage.

FEMFAT weld

Module for fatigue analysis of welding seams for steel and aluminum using notch stress method and standards (DIN 15018, EUROCODE 3 and 9, BS 7608, IIW).

FEMFAT visualizer

Fast 3D postprocessor to display FE-models, fatigue results and stresses including a feature to generate animations and to display 3D models in PowerPoint. Unmatched for weldseam definition.

FEMFAT plast

Module to consider the effect of mean stress rearrangement from linear stresses when local plastic deformation occurs.

FEMFAT parallel

Take the advantage to use more than only one CPU of your multicore workstation to speed up your analysis.

FEMFAT laminate

A software module for fatigue life prediction on layered infinite fiber reinforced materials.

FEMFAT spectral

Random response fatigue analysis using PSD (Power Spectral Densities) loads.

FEMFAT strain

A software module for assessing damage from measured strains and comparing stresses from FEA and testing.

FEMFAT max

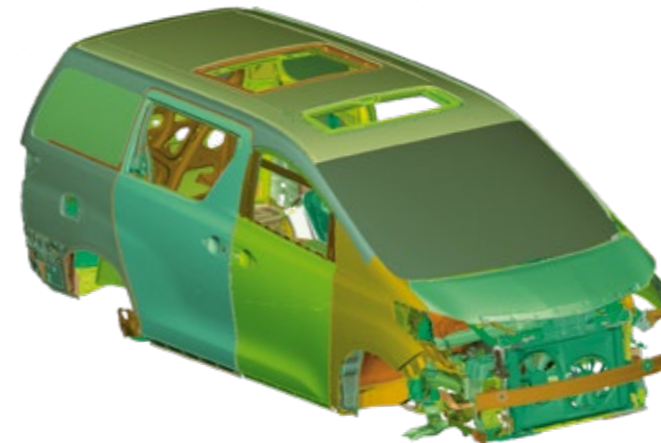
Module for fatigue analysis of MultiAXially loaded components using time histories of loads or series of stress states.

FEMFAT spot

Module for predicting fatigue of spot-joints (welds, rivets) in FE-shell structures.

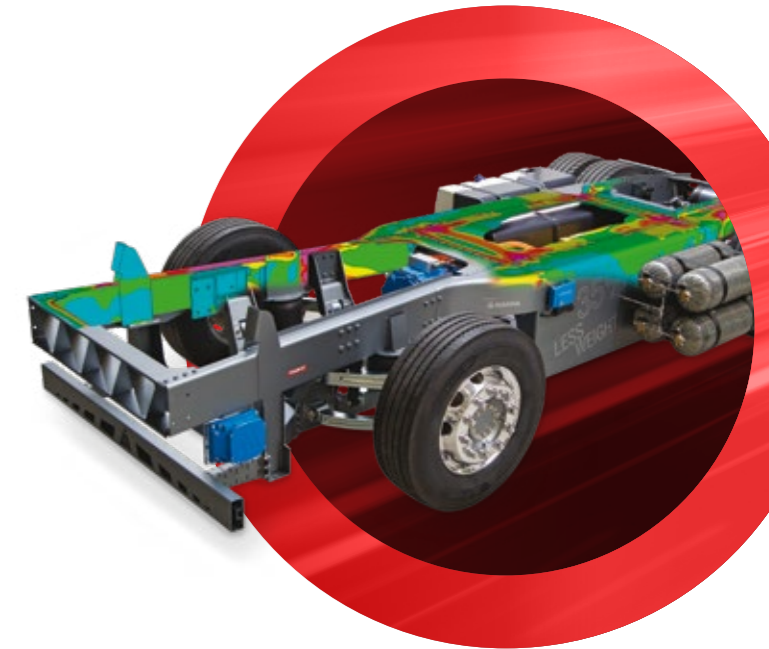
FEMFAT break

A software module for assessing static safety factors in combination with BASIC or MAX.



FEMFAT software

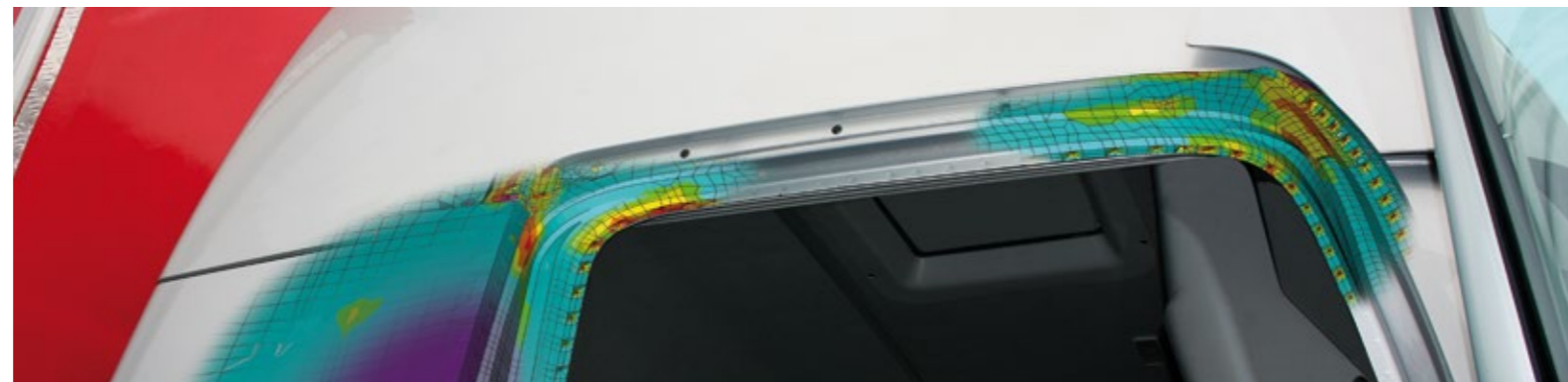
BY MAGNA POWERTRAIN



Fatigue Analysis Software

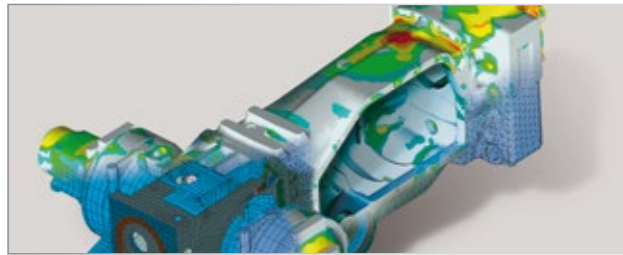
Finite Element Method
based Fatigue Analysis

femfat.magna.com



Finite Element Method Fatigue

FEMFAT performs fatigue analyses in combination with widely used finite element programs. Interfaces to multibody, optimization and measurement systems ensure full and convenient integration into the customers' CAE processes. FEMFAT provides engineers with reliable information on the fatigue life of structures to improve critical locations and/or reduce the total weight at an early stage of the design process, long before time-consuming and expensive tests are scheduled. This results in high quality prototypes and less testing effort.

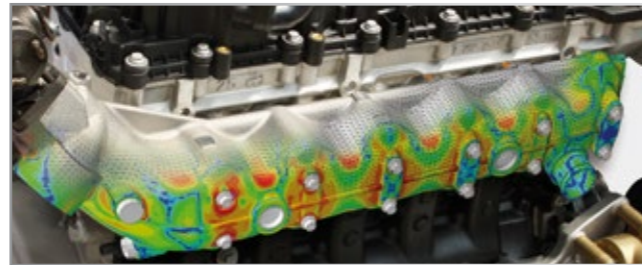


FEMFAT takes many important and interacting fatigue influences into consideration; e.g. local material properties, notches, mean stresses, surface roughness, surface treatments (thermal, mechanical), boundary layers, temperature fields, local plasticity, technological sizes, effective plastic strain, fiber orientation in FRP and CFRP etc. In addition special behavior of welds, spot welds, self piercing rivets and laminates are considered. Multi-axial loading in time and frequency domain, as well as low cycle fatigue from temperature loading. Any fatigue problem in vehicle and machinery industry can be investigated.

Method, Theory and Validation

The methods used in FEMFAT are based on

- The latest scientific findings of the German FKM guideline
- The work of Huck/Thrainner/Schutz (synthetic S/N curves)
- The local stress-strain model (TU Darmstadt)
- The R1MS concept for the assessment of welding seams
- ECS-proprietary methods, for example computing the notch influence in terms of the relative stress gradient



More than 1000 successful fatigue-related projects at the Engineering Center Steyr and many more at our customers sites demonstrate the applicability and validity of the methods. All usage provides valuable feedback for our software development.



Conclusion

FEMFAT is a comprehensive tool that provides quick and reliable answers concerning the release of components. FEMFAT combines know how from the special fields Finite Element Method, characterization of material properties and fatigue testing. Its graphic user interface guides the user step by step. Very few modifications to the default settings are required to carry out a fatigue analysis.

FEMFAT Interfaces

- Abaqus • ADAMS • ADVC • ANSYS • COSMOS • CREO
- DIADEM • DIGIMAT • HYPERMESH • I-DEAS • LS-DYNA
- MARC • MEDINA • MoldFlow • MotionSolve • NASTRAN
- nCode • Optistruct • PATRAN • PERMAS • Pro/MECHANICA
- Radioss • RPC • SIMPACK • TECMAT • TOSCA



Supported Hardware Platforms

- Intel/AMD x64, 64Bit, Windows 10 or higher, Windows Server 2012 or higher / using LM-X v4.9.3 licensing
- Intel/AMD x64, 64Bit, Linux glibc 2.17 or higher (RedHat Enterprise Linux 7 or higher, Suse Linux Enterprise 12 or higher) / using LM-X v4.9.3 licensing

Your Benefits

Efficiency and high quality are an absolute must for all our customers, from ALSTOM to YAMAHA.

And this is exactly what FEMFAT stands for as a leading fatigue analysis code. Not only the automotive industry benefits from highlights like:

- Fatigue life, damage and safety factors for all types of load
- Comprehensive FEM-interfaces/material database
- Open SPOT and WELD database
- FEMFAT Datacrypt for the encryption of ASCII files (e.g. confidential material data set) into binary format
- Direct and fast visualization
- Assess linear or nonlinear FEM stresses from static or dynamic analysis
- More than 500 material datasets and material generator
- Interfaces for importing load histories from multi body simulations and measurements
- Full choice of influence parameters on fatigue analysis
- Renewables Certification by GL Industrial Services GmbH
- Faster results by parallelized analyses
- Flexible licensing: purchase, lease or internet license (pay per use)

