FEMFAT LAB

LOAD DATA ANALYSIS software

Head Office:

Austria
Magna Powertrain
Engineering Center Steyr GmbH & Co KG
Steyrer Strasse 32, 4300 St.Valentin
Helmut Dannbauer
Senior Manager Simulation / Testing

FEMFAT Support and Sales
Phone: +43 7435 501 5300
femfat.support.mpt@magna.com

Sales Offices:

Japan
Magna International, Tokyo
Noriyuki Muramatsu
Phone: +81 3 3548 0310
noriyuki.muramatsu@magna.com

China
Magna Powertrain, Shanghai
Aisheng Tang
Phone: +86 21 6165 1662
aisheng.tang@magna.com

Sales Partners:

Rep. of Korea
CAE-Cube
Anyang
Phone: +82 3134 43061 2
tjkim@cae-cube.co.kr

India
Finite to Infinite
Pune
Phone: +91 86 6846 0087
nitin.gokhale@finitetoinfinite.com

Brazil
Virtual CAE
Sao Caetano
Phone: +55 1142 2913 49
femfat.support.brazil@virtualcae.com.br

USA
Computer Aided Technology (CATI)
Ann Arbor, MI
Phone: +1 734 7863 721 101
rober.baack@cati.com

Italy
EnginSoft
Padova
Phone: +39 4977 0531 1
femfat.support.italy@enginsoft.it

France, Belgium & Luxemburg
CIMES France
Valenciennes
Phone: +33 3274 1737 4
support@cimesfrance.com

FEMFAT LAB tools

Text editor and modification of measurement parameters are only some features of this module to complete all benefits of the FEMFAT LAB software.

FEMFAT LAB Method

A lot of sophisticated time and frequency domain methods help the engineer to "understand" and to analyze the measured data. Data counting methods like Rainflow, Level Crossing, Range Count, Time at Level and additional counting methods are included.

A wide range of graphic expenditure possibilities exists, such as three-dimensional plots of Rainflow or Damage matrices, Waterfall or Campbell results. Without any interaction or conversion of the user, various data formats can be processed (RPC, Remus, Diadem …).
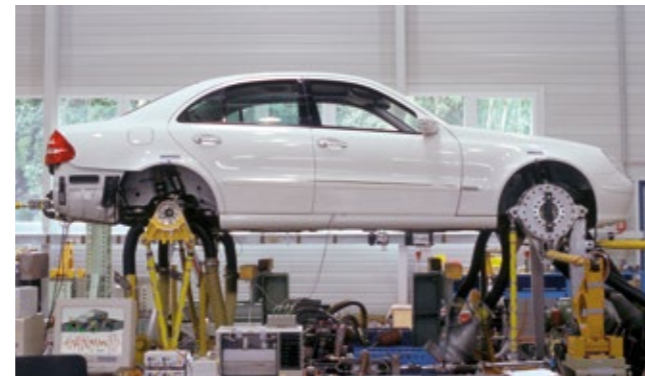
Road load simulation in the fatigue lab

To save significant time and costs during development process, complex multi-axial methods help to compare customer usage to test tracks or to simple test procedures. Further it's possible to reduce the amount of data, taking into account the correct multi-axial phase relationships. For durability calculations a database of material properties can be used.

Benefits overview:

- FEMFAT LAB software visualizes, analyzes and handles large amount of data
- FEMFAT LAB supports several binary data formats without any user interaction
- Application of FEMFAT LAB leads to cost and time saving by combining multiple measurements for analysis
- Multi-axial methods for data reduction lead to reduced calculation time of FEMFAT MAX or test bench testing time
- Software for load data generation
- Excellent convergence between measurement and simulation
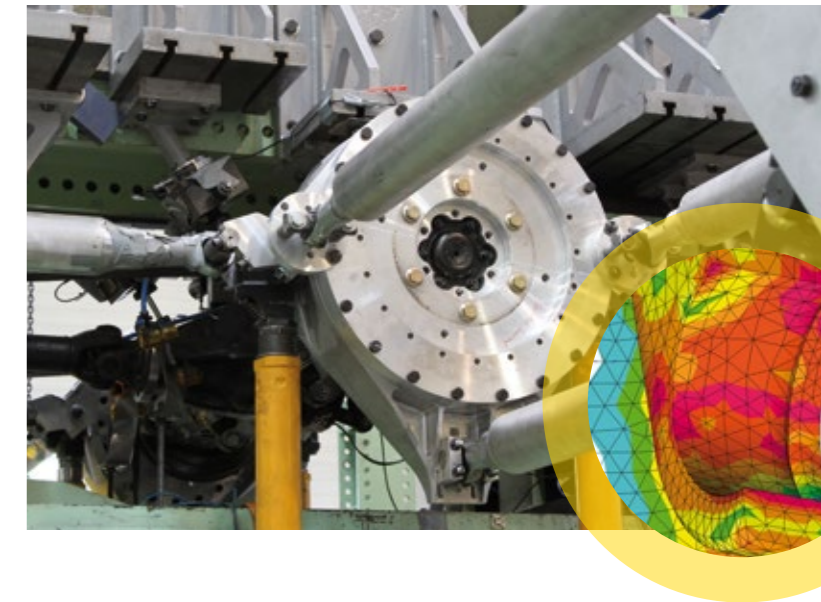- Automatic iteration process with MSC/ADAMS®, SIMPACK®, MotionSolve® and RecurDyn®

Interfaces:

- RPC
- Remus
- ASCII
- DIADEM
- FEMFAT
- Microsoft Office (WinWord/Excel)
- User specified data formats can be included.
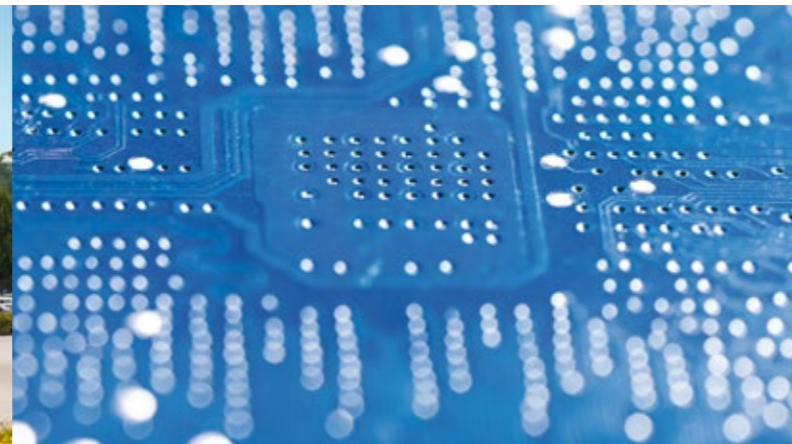

FEMFAT LAB

:BY MAGNA POWERTRAIN

Load Data Analyses

Binding Link between Test Track, LAB and CAE

femfat.magna.com

FEMFAT LAB is the binding link between test track, laboratory and CAE. It's a powerful software solution to visualize and analyze large amount of data. **FEMFAT LAB** analyzes time histories with millions of data points and hundreds of channels within seconds. Anomalies like drift, mean shift, spikes can be removed automatically or manually. Using the "project philosophy" of **FEMFAT LAB** time can be saved, because same operations for several files are carried out automatically without any user input.

FEMFAT LAB supports several binary data formats without any user interaction, application of FEMFAT LAB leads to cost and time saving due to the combination of multiple measurements for analysis, multi-axial methods for data reduction lead to reduced calculation time of FEMFAT MAX and test bench testing time, compatible to FEMFAT MAX and FEMFAT BASIC, MSC. ADAMS®, SIMPACK®, MotionSolve® and RecurDyn®

- Binding link between test track, lab and CAE
- Analyses of large amount of data
- Time saving by applying the same operations to multiple files automatically

FEMFAT LAB time

characterizes data (time-plot, visual time editor, filter signal, ...) for multiple statistic values, mathematical and logical functions are included in formula compiler, merge channels and extract data, conversion to several data formats, GPS.

FEMFAT LAB fatigue

enables level-crossing, range-count, multi-dimensional rainflow counting, 3 dimensional time at level counting, includes editor for rainflow matrices and life time prediction results. Fatigue analysis are based on miner prediction. Features damage equivalent Peak/Valley data reduction for FE and test bench investigations as well as test track mix up.
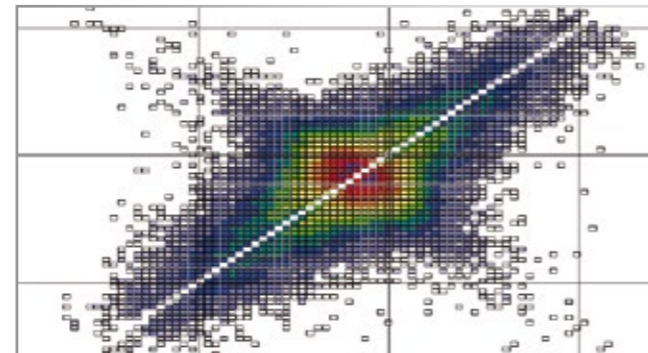

FEMFAT LAB fatigue: 3D visualization of a rainflow matrix

FEMFAT LAB frequency

Plain and easy interpretation of engine influences on your system as well as elimination of individual harmonics of your data ensure best application results. Spectral analysis gives information about frequency content and behavior (e.g. eigenfrequency) for interpretion of structural stochastic loads. Calculated results can be displayed and compared in graphical diagrams (Waterfall, Campbell, ...).

FEMFAT LAB vi

Dynamic simulation depends in a large part on the used input data. Inputs from test bench or test track measurement often are not available or are extremely expensive to generate. Virtual iteration represents a well-rounded solution to this problem.
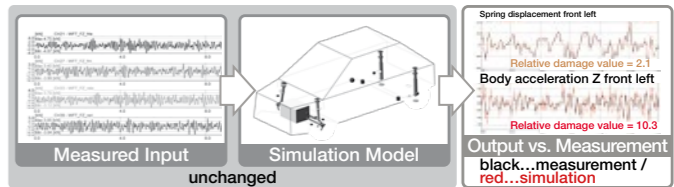

Measurement

Virtual Iteration · MBS Model

Fatigue analysis with FEMFAT
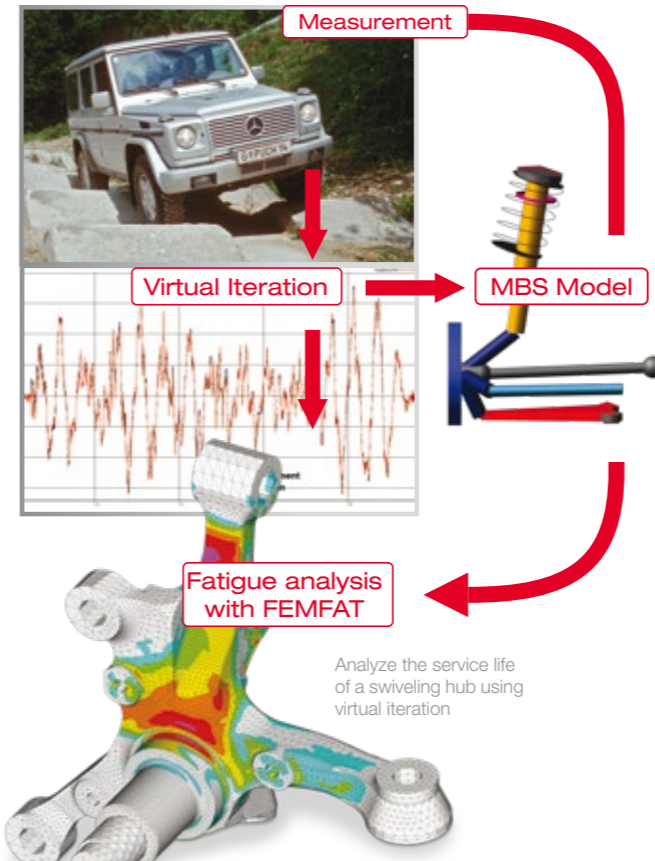
Analyze the service life of a swiveling hub using virtual iteration
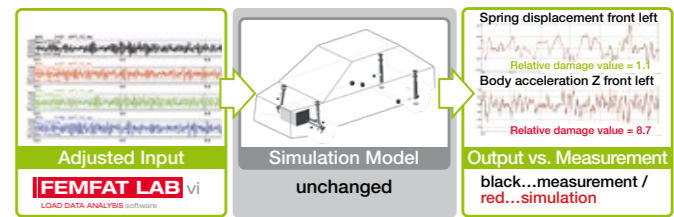
FEMFAT LAB mi

Dynamic simulation based on road load data requires an accurate model to get well correlation between simulated and measured signals. However model parameters are sometimes inaccurate, estimated or uncertain but influence the results. Model improvement provides an automatic process with reasonable run-times to manage this issue:

- MBS-model parameters improved based on road load data measurements
- A diagnose tool assists to identify the relevant parameters
- Excitation is well known - measured or computed by Virtual Iteration (vi)

Usual dynamic simulation process

Measured Input · Simulation Model · Output vs. Measurement

unchanged

Spring displacement front left
Relative damage value = 2.1
Body acceleration Z front left
Relative damage value = 10.3
black...measurement / red...simulation

Virtual iteration

Adjusted Input · Simulation Model · Output vs. Measurement

FEMFAT LAB vi · unchanged

Spring displacement front left
Relative damage value = 1.1
Body acceleration Z front left
Relative damage value = 8.7
black...measurement / red...simulation

Model improvement

unchanged

Measured or Adjusted · Adjusted Model Parameters · Output vs. Measurement

FEMFAT LAB vi · FEMFAT LAB mi

Spring displacement front left
Relative damage value = 1.1
Body acceleration Z front left
Relative damage value = 1.3
black...measurement / red...simulation