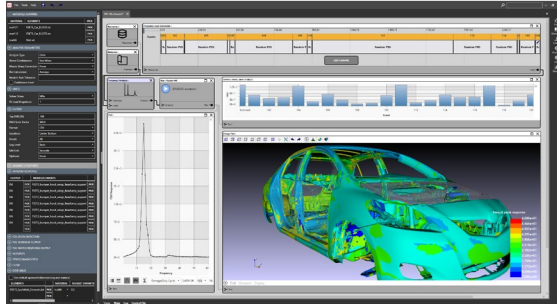




MSC CAEfatigue – FREQUENCY PACKAGE

Product Overview



CAEfatigue (Cf) is a package of software products that cover the topics of Fatigue, Random Response, Loads Management and Test Design. It is a **modern alternative** to existing software, which is both **Customer Driven** and **Technically Innovative**. The software also provides an embedded **Technical Transfer** training package with 100's of hours of training by Dr Neil Bishop.

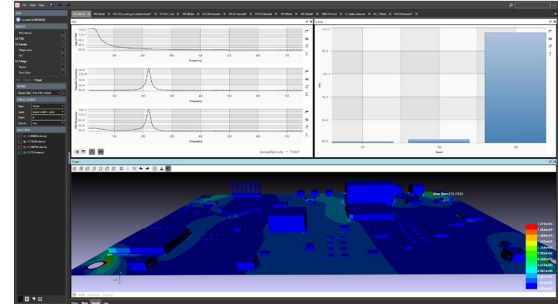
Cf FREQUENCY is one of 4 packages within the software that preforms frequency domain Stress-Life an/or Strain-Life fatigue calculations with static or dynamic systems created within Nastran, Abaqus, Optistruct, or Ansys FE environments.

- Cf TIME
- Cf RANDOM
- Cf FREQUENCY
- Cf PREMIUM

Cf is unique in offering a **Process Flow GUI** and **Control File GUI for batch runs**.

Nastran, Abaqus, Optistruct, and **Ansys** are supported for most analysis types.

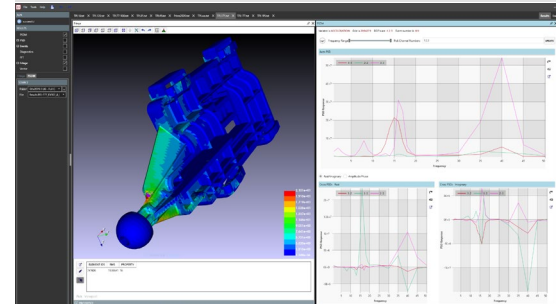
Features



All the Features of Cf RANDOM plus,

- **Comprehensive Materials Database** with Stress-Life and Strain-Life data sets.
- **S-N and E-N material auto generation** from static properties.
- **Stress-Life** and **Strain-Life** methods supported.
- **Goodman, Gerber, Morrow, SWT, Walker** and **MMPDS** mean stress options.
- **Freq-at-Peak-Response** highlights dominant loading frequency.
- **Complex Equivalent Stresses** include Signed Von-Mises, and Absolute Maximum Principal, **X, Y and Z** stress output.
- Weld fatigue using British Standard **BS7608**.
- **Seam Weld Fatigue** using Volvo Chalmers approach.
- **Spot Weld Fatigue** using **Rupp (ACM2)** approach.
- **User Weld Fatigue** using defined stress tensor for none circular spot welds.
- **Dirlik, Steinberg** and **Narrow Band** stress PDF formats supported.
- **Stress clipping** based on RMS stress.
- **Full standard duty cycles** (loads, events, sequences) supported.

Case Studies



2016, **A Comparative Study of Automotive System Fatigue Models Processed in the Time and Frequency Domain**, SAE Paper 2016-01-0377. Very important time v frequency domain benchmarks study done with **Ford, Dearborn and Ford Brazil**.

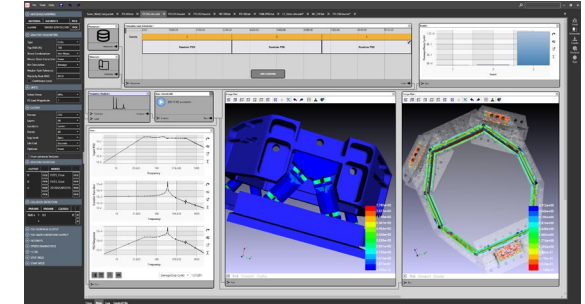
2016, **Modern Methods for Random Fatigue of Automotive Parts**, SAE Paper 2016-01-0372. Work done with **Hella, Germany** on frequency domain fatigue analysis of headlamps.

2017, **Simultaneous Durability Assessment and Relative Random Analysis Under Base Shake Loading Conditions**, SAE Paper 2017-01-0339. Work done with **FCA, Michigan**, on fatigue and random response (collision detection) for exhausts.

2018, **Frequency Domain Fatigue Analysis of Exhaust Systems**, SAE Technical Paper 2018-01-0396. Work done with **Eberspaecher, Germany**.

2019, **Two-Wheeler Fatigue and Random Response**, NAFEMS Paper NWC19-375. Work done with **HeroMotoCorp, India**.

Typical Use Cases



- Apply **Base Shake** in X, Y, Z directions (consecutively) then calculate fatigue damage.
- **Fatigue (Durability) Calculations** using user defined load schedules.
- Determine **Collision Probabilities (Rattle)** between parts.
- Push loads from the input location to “internal” locations (**Loads Cascading**)
- Development of **Enveloping Functions** to simplify testing.
- **Reduction of Test Durations** using Loads Conditioning toolkit.
- “**What If**” scenarios using notch function to simulated adjustments to the FRF data.

