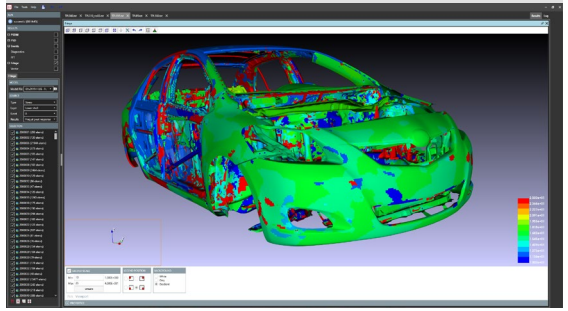
MSC **CAEfatigue – TIME PACKAGE**

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.

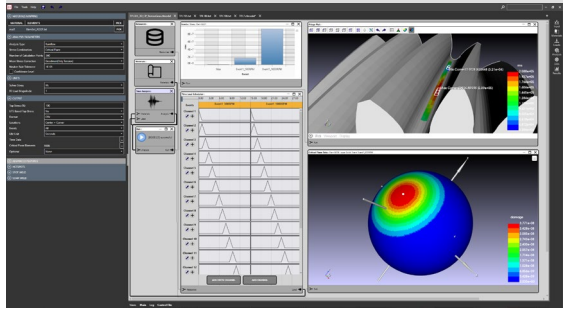
Cf TIME is one of 4 packages within the software that preforms time domain stress-life and/or strain-life fatigue calculations for static or dynamic systems created within Nastran, Abaqus, Optistruct, or Ansys FE environments.

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

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

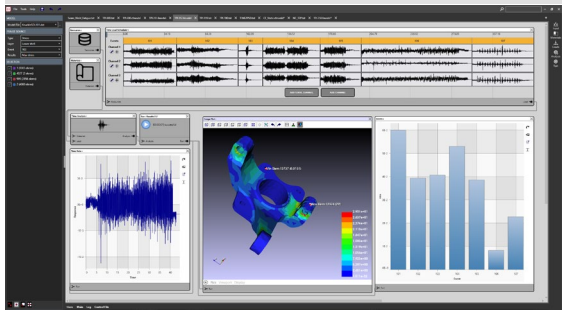
Nastran, Abaqus, Optistruct, and ***Ansys*** are supported for most analysis types.

Features



- ***Modern User-Friendly Process Flow GUI*** retains all the advantages of a batch driven process.
- ***Comprehensive Materials Database*** with Stress-Life and Strain-Life data sets.
- ***S-N and E-N material auto generation*** from static properties.
- ***Non-Linear Stress-Strain Data*** processing available where Neuber is switched off.
- ***3D Critical Plane Output*** using the normal stress on the critical plane for damage.
- ***Unique Loads Scheduler*** to define loads, events and duty cycles.
- New solver algorithms mean ***up to 20 Times Faster t***han competition for larger models.
- Static analysis supported through ***Linear Static Superposition***.
- Dynamic analysis supported through ***Modal Transient Superposition***.
- ***RSP*** and ***Punch*** loading files supported for Modal Transient.
- ***OP2, MNF, HDF5, ODB*** and ***RST*** files supported for modal stresses.
- ***Stress-Life*** and ***Strain-Life*** methods supported.
- ***Goodman, Gerber, Morrow, SWT, Walker*** and ***MMPDS*** mean stress options.
- ***Von-Mises, Absolute Maximum Principal*** and ***Normal Stress*** on Critical Plane supported.

Case Studies

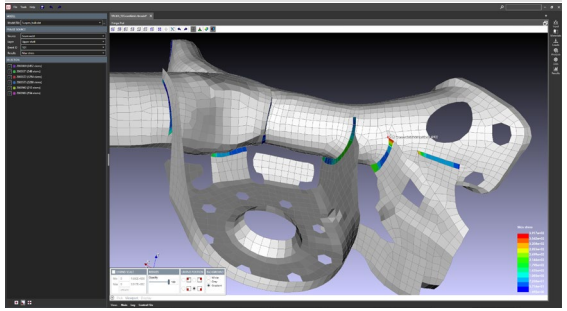


2015, **Time v Frequency Domain Analysis for Large Automotive Systems,** SAE Paper 2015-01-0535. Pioneering work done with ***Booz Allen Hamilton*** on fatigue of large automotive system (truck cab) done in both the time and frequency domain.

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

2019, ***Loads Conditioning for Frequency Domain Analysis***: NAFEMS WC 2019 paper NWC19-378. Work done with ***FCA, Michigan***, on the topic of loads conversion (FFT) from time to frequency domain.

Typical Use Cases



- ***Linear Static Superposition - a***pply **unit or time history loads** in multiple directions (consecutively) to obtain stress time response data and associated fatigue response.

- ***Modal Transient Superposition*** - combine modal loads (RSP or Punch) with modal stresses (OP2, MNF, ODB or RST) in order to create transient dynamic stress time histories, and resultant fatigue life results.

- ***Non-Linear Time History Reconstitution***- combine arbitrary load combinations with non-linear stresses (OP2, ODB, RST) to create non-linear transient dynamic stress time histories, and resultant fatigue life results. (Note Neuber must be switched off).

- ***Critical Plane Damage Sphere*** output. Calculate damage on multiple 2D or 3D critical planes and visualize output on damage sphere.

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