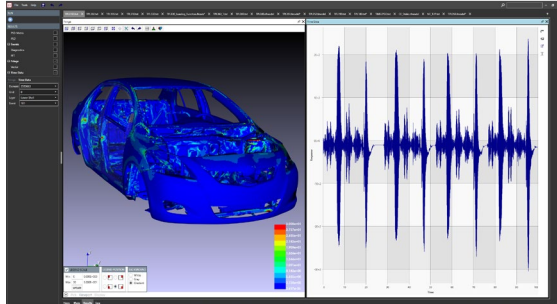# MSC **CAEfatigue – Industry Solutions for General Industries**

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.

The *Cf Software* contains 4 packages that fully cover the requirements for fatigue and durability analysis in the aerospace industry.
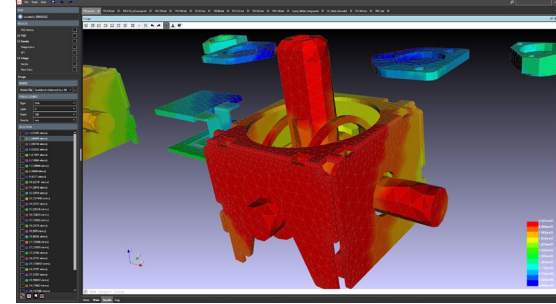
- Cf TIME
- Cf RANDOM
- Cf FREQUENCY
- Cf PREMIUM

Cf PREMIUM includes all the capabilities of *TIME, RANDOM* and *FREQUENCY*.

Features
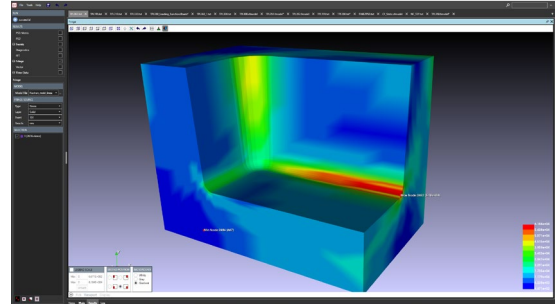
- New solver algorithms mean *up to 20 Times Faster t*han competition for larger models.
- Static analysis supported through *Linear Static Superposition*.
- Dynamic analysis supported through *Modal Transient Superposition*.
- *Stress-Life* and *Strain-Life* methods supported.
- *Goodman, Gerber, Morrow, SWT, Walker* and *MMPDS* mean stress options.
- *Von-Mises, Absolute Maximum Principal* and *Normal Stress* on Critical Plane supported.
- *S-N and E-N material auto generation* from static properties.
- *Sine-On-Random* mixed loading analysis.
- *Narrow Band on Random* loading analysis.
- *Simultaneous sines with/without random* (e.g., MIL-HBK-810).
- Weld fatigue using *BS7608*.
- *Seam Weld Fatigue* using Volvo Chalmers approach in either time or frequency domain.
- *Spot Weld Fatigue* using *Rupp (ACM2)* approach.

Concept

Fatigue analysis is the study of whether the material within a part or system will have durability under the influence of time varying loading. The time varying loading may or may not cause dynamic response and the stresses and/or strains which result, along with appropriate material properties, form the basic ingredients of a fatigue analysis.

The Cf technology can be used "stand-alone" with almost any FE solver (e.g., Nastran, Ansys, Abaqus, Optistruct) or as an embedded solution (MSC Nastran, Marc) to evaluate durability (fatigue damage) and represents the state-of-the-art solution for such analysis.

The Cf technology is based on 3 core concepts, [1] advanced performance, [2] advanced capabilities, [3] advanced User experience.

Typical Use Cases
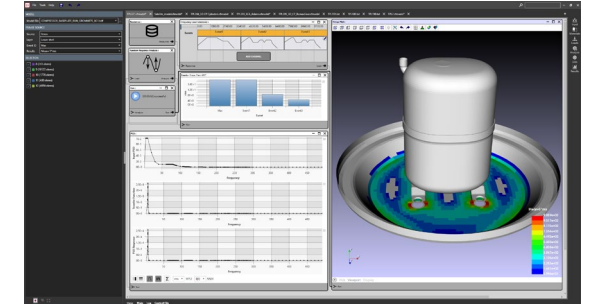
- Aerospace Systems subjected to random or time varying loads (e.g., *Landing Gear*).
- Automotive parts and systems subjected to random or time varying loads (e.g., *Radiators, Cooling Systems*).
- All *Ground Vehicle* Systems such as excavators, military vehicles etc.
- *HVAC systems* subjected to vibration loads, with or without additional deterministic loads.
- *Wind Energy* systems including the rotor and all drive systems.
- *Offshore Platforms and Systems* subjected to wave, wind or mechanical loading.
- *Ships* subjected to wave, wind or mechanical loading.
- *Marine Systems* such as subsea pipeline systems.
- *Rail Systems* subjected to track loads.
- *Consumer Products* like power tools and washing machines subjected to vibration loads.
- *Printed Circuit Boards* durability.
- Longevity of *Medical Products*.

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