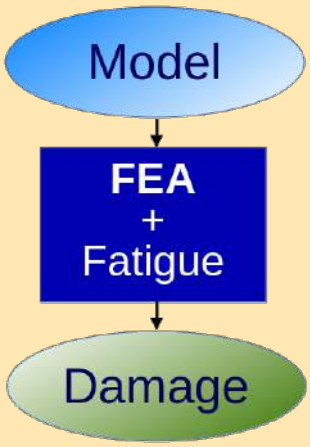
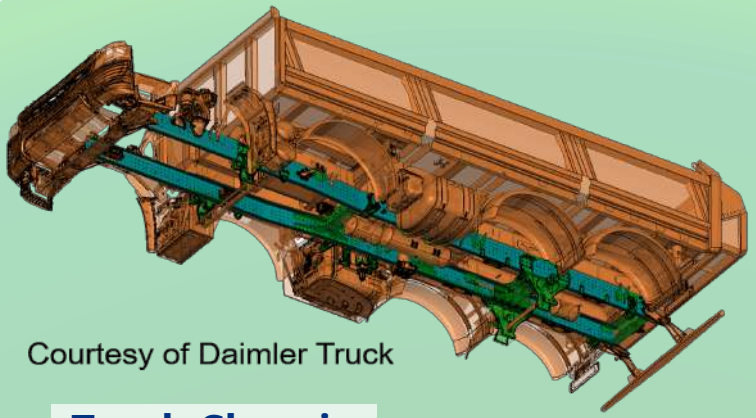
PERMAS

The Finite Element solver

New Approach
Full Integration in General FEA



- Improved Workflow
- No Interfaces - One Database
- Easier Handling
- Faster Solution
- Reduced Disk Space
- Access to Internal Information



Courtesy of Daimler Truck

Truck Chassis Side Rail

Damage Max(Top, Bottom)

	Classic Approach	Full Integration
Performance	Slow file data transfer	One common database HPC infrastructure
Accuracy	Limited stress gradient result Limited mesh size	Normal stress gradient at any location of surface Fine meshes possible
Usability	Error-prone Manual process Unmaintained scripts	Reliable process by software developer (maintained) Easy retention
Fatigue approaches	Many available	Integration compatible with most approaches
Industrial big models	Very limited due disk to and runtime limits	Classes larger models Fits in variant workflow
Optimization	Unthinkable in industrial applications due to complexity of the process and runtime	Enabler for industrial applications

7 900 000 **Nodes**

5 700 000 **Elements**

515 **Structural Modes**

82 000 **Fatigue Solid Nodes**

54 000 **Fatigue Shell Nodes**

174 000 **Time steps**

16 **Torture Tracks**

"Making realistic simulations practical"

For more information about fatigue simulation with PERMAS, visit our website www.intes.fr
or send us an email at point-contact@intes.fr

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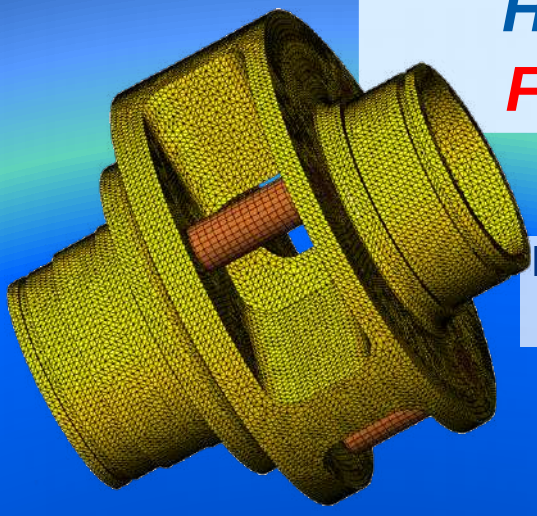
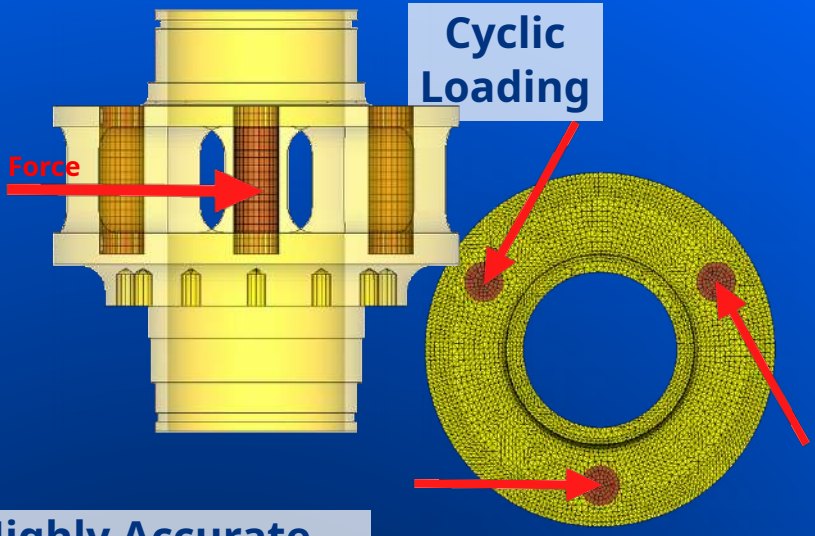
High Performance Fatigue Analysis

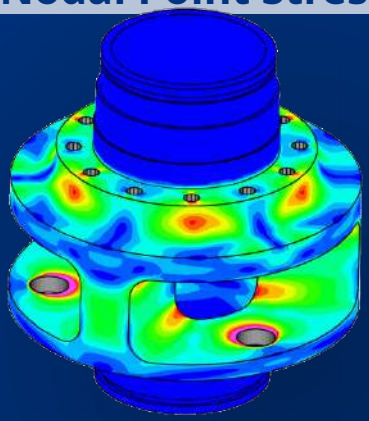


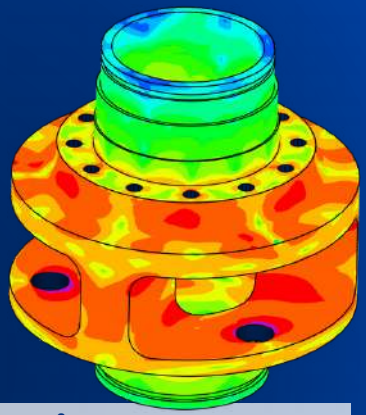
Planetary Gear Housing



Cyclic Loading

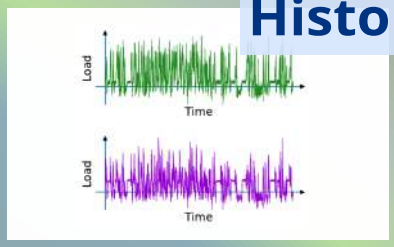
Highly Accurate Nodal Point Stresses



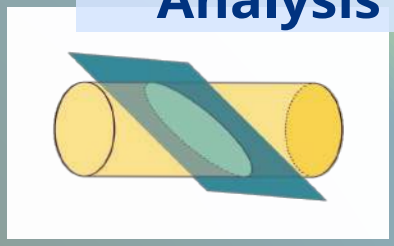


Fatigue Damage < 1

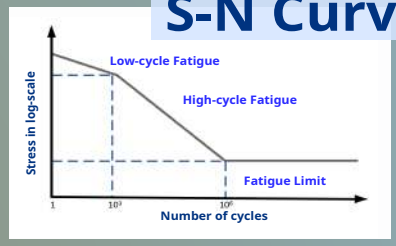
Loads History



Critical Plane Analysis



Local S-N Curves



Rainflow Counting

Extended Feature

Optimization under Fatigue Constraints