

I-DEAS® Durability software provides a set of analytical tools to predict the strength and fatigue safety of products subjected to prescribed cyclic loading. Both uniaxial and biaxial stress cycles are considered for predicting the durability of a product designed for infinite life.

I-DEAS Durability software predicts the durability of a structure using linear or nonlinear stress results from I-DEAS Model Solution™, I-DEAS Variational Analysis, or external solvers.

Durability for Linear FE Model

All linear static loads may be applied to the FE model simultaneously as cyclic loading. The combined stresses are calculated by superposition of the static stresses to the loads. You can use I-DEAS Model Solution, I-DEAS Variational Analysis, or external software (e.g., Nastran, Abaqus, or Ansys) to generate stress results for analysis.

For quick design iterations, the sensitivity “Reanalysis” of strength and fatigue safety may be used to compare design changes to part dimensions, as well as element physical and material properties. The stress sensitivity has to be first calculated in I-DEAS Optimization™ and accessed directly in I-DEAS Durability software for durability reanalysis calculations.

Durability for Nonlinear FE Model

The stress results generated by I-DEAS or external nonlinear solvers (e.g., Nastran, Abaqus, or Ansys) can be used directly to define a loading path of an event for durability analysis.

Capability Summary

- Strength, which is normalized with respect to yield strength, ultimate strength, and/or other engineering criterion, is displayed as a contour plot. The strength result is used to determine which parts of the FE model are over- or under-designed to sustain the maximum load in the designed duty cycles.
- Fatigue safety, which is calculated using the most conservative stress cycles (in terms of mean stress and stress amplitude) in the loading, is also displayed as a contour plot. The software first identify the uniaxial or biaxial stress cycles, and use either Goodman or Gerber approaches to calculate the fatigue safety results. The fatigue safety result is used to determine which parts of the FE model are over- or under-designed to sustain cyclic loading in the designed duty cycles.

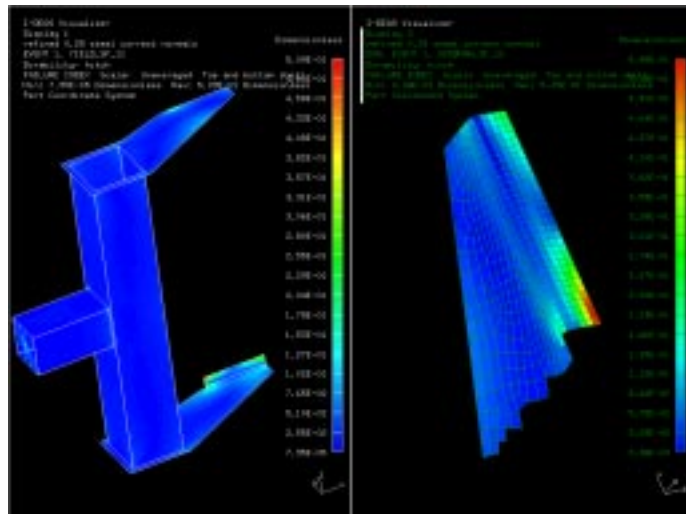
- You can combine the strength and fatigue safety results to investigate the combined failure modes of material strength (maximum stress) and fatigue (cyclic stress).
- If you use I-DEAS Optimization or I-DEAS Variational Analysis to generate the stress results, you can perform a quick “what-if” re-analysis for new designs without resolving the FE model.

Prerequisites

Core Simulation

For More Information

For more information, contact your local SDRC representative or call 1-800-848-7372.



Yield Safety Factor contour display of the entire hitch, and a Fatigue Safety Factor contour display of the flange region of the hitch.