Pro/ENGINEER® Fatigue Advisor

DESIGN FOR DURABILITY

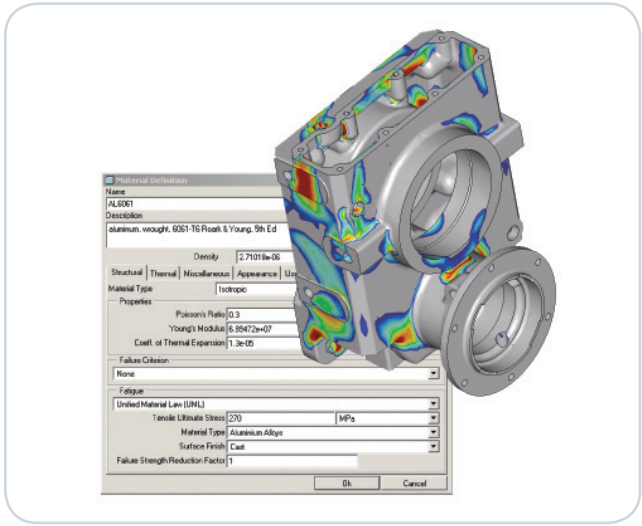
With 80 to 90% of all structural failures resulting from fatigue, think of the advantage you'd have if you could evaluate your designs for durability right from the outset of the design process. With Pro/ENGINEER Fatigue Advisor, you can clearly understand the life of your product to avoid surprises such as warranty costs and underperforming products down the road.

Metal components subjected to repeated cycles of loading and unloading can fail even though the maximum stresses developed are well below safe static values. This failure – commonly known as fatigue failure – can be thoroughly evaluated using Pro/ENGINEER Fatigue Advisor.

Pro/ENGINEER Fatigue Advisor is a unique product, intended specifically for designers who need to understand the durability of their products. Not only does Pro/ENGINEER Fatigue Advisor give you an up-front assessment of your product's durability, but it also enables you to understand the impact that design changes have on the fatigue life of the component.

Pro/ENGINEER Fatigue Advisor provides the tools necessary to design for durability and quality. As an integral part of the Pro/ENGINEER product family, it can be used throughout the design process, from concept through detailed design. By giving engineers feedback on the fatigue life of their designs early in this process, they can engineer the life of the product into the design, rather than handle unforeseen issues during a lengthy and costly prototype testing phase.

Intended for up-front use by design engineers, Pro/ENGINEER Fatigue Advisor makes it easy to set up models for evaluation. The material properties necessary can either be computed from the Pro/ENGINEER material definitions by specifying information such as surface finish and treatments applied, or by importing the full fatigue materials property definitions, if available. Next, the load history, which will be applied to the simulation, is defined for a selected static analysis. And, lastly, the simulation is executed. All model definition is part of the Pro/ENGINEER model and, as such, updates associatively as the model undergoes design iterations.



With Pro/ENGINEER Fatigue Advisor, you can easily estimate the number of load cycles your model can sustain before failure.

The output of the fatigue analysis includes product life, damage to the model, factor of safety, as well as a confidence of life plot. The confidence of life plot provides a quick go/no-go assessment of the simulated life of the component against a user-defined goal. Pro/ENGINEER Fatigue Advisor's seamless integration with Pro/ENGINEER Mechanica also allows you to use the results in design studies such as sensitivity or optimization studies. Using results from a Pro/ENGINEER Fatigue Advisor analysis extends the range of optimization to include examples such as minimizing the weight of a component, while maintaining the fatigue life within a predefined range.

Key Benefits

- Reduce product warranty costs by creating more durable products
- Eliminate lengthy, costly physical prototyping phases of design validation
- Improve product quality and durability using embedded optimization technology
- Identify design issues requiring improvement early, when the cost of change is minimal
- Design with more confidence throughout the product lifecycle

Pro/ENGINEER Fatigue Advisor

Features and Specifications

Results of Fatigue Analysis

- Accurately predict the life of the product by determining the number of cycles to failure
- Understand the damage to product, expressed as the ratio between accumulated fatigue cycles and the total number of cycles to failure
- View Factor of Safety results for information on the extent to which the amplitude of the load can be increased without compromising the target design life
- Represent Confidence of Life as a fringe display showing the ratio between the calculated life and the target design life

Leverage all post-processing and reporting capabilities of Pro/ENGINEER Mechanica

- Examine results in fringe plots or other formats available within Pro/ENGINEER Mechanica
- Export information to HTML for sharing results throughout your organization

Load history definition tools

- Constant Amplitude (peak-peak, zero-peak, user-defined)
- Variable Amplitude (populate a table manually or by importing from file)

Fatigue material properties

- Computed from Pro/ENGINEER materials library using Unified Material Law (UML)
- Imported from file

Data interoperability with FE-Fatigue from nCode International provides scalability for expert analysis

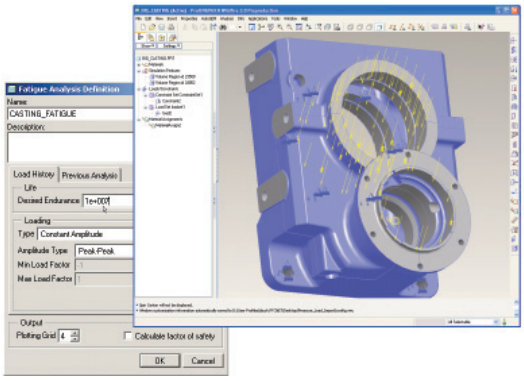
Access to override internal defaults enables fatigue experts to control advanced configuration and use less conservative solution settings

Support for fatigue-specific measures

- Achieve desired measure result values through Optimization studies, or investigate 'what-if' scenarios via Sensitivity studies
- Track incremental improvements accurately

Ability to model surface finish and treatment effects on the durability of the design

With the confidence of life plot, you can quickly examine the ratio between the calculated life and the target design life.



Completely integrated with Pro/ENGINEER, Pro/ENGINEER Fatigue Advisor gives you a familiar interface for setting up and analyzing your fatigue model.

Language Support

- English, German, French and Japanese

Platform Requirements

- Microsoft Windows (XP, 2000)
- UNIX platforms (Solaris, HP-UX)

For specific operating system levels, visit:
www.ptc.com/partners/hardware/current/support

The Pro/ENGINEER Advantage

The Pro/ENGINEER family delivers an advantage over other CAD/CAM/CAE products due to the power of associativity; any change in the design is automatically reflected in the analysis performed by Pro/ENGINEER Fatigue Advisor, without any translation of model information between applications. By eliminating the data translation step, you not only save time, but you also avoid the chance of introducing translation errors in your design. This application integration is especially powerful in simulation modules, where addressing design flaws can be an iterative process. With full associativity across CAD, CAM and CAE functions, Pro/ENGINEER gives you an advantage that no other application offers.

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