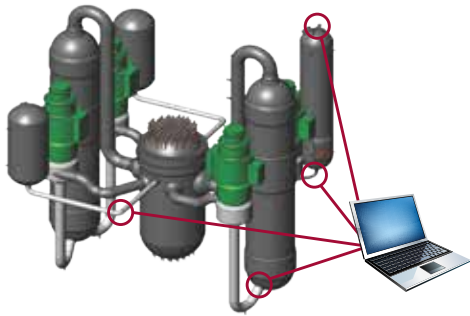


# SI:FatiguePro4

## GET THE FACTS ABOUT METAL FATIGUE ...



For more than 30 years, plants around the world have turned to Structural Integrity Associates (SI) for solutions for managing the aging effects of metal fatigue. Our experts play leading roles in industry organizations and develop solutions and software that become industry mainstays.

FatiguePro is a prime example. In partnership with the Electric Power Research Institute (EPRI), Structural Integrity developed this advanced fatigue monitoring software system to automatically track fatigue usage and transients using existing plant instrumentation. Today, our software is used in applications around the world as part of their Fatigue Management Programs.

### SI:FatiguePro 4: THE NEXT LEVEL

In its latest evolution, SI:FatiguePro 4 offers many improvements, most notably new Stress-Based Fatigue algorithms which use multi-axial stress calculations and integrated Environmentally-Assisted Fatigue calculations. Other upgrades include better cycle and fatigue usage projections, more flexibility with report generation, and a Thermal Transient Library.

These and other advanced capabilities make SI:FatiguePro 4 an essential part of a robust Fatigue Management Program.

### APPLICATIONS

Our SI:FatiguePro 4 predictive and analytical software uses existing instrumentation to provide real-time fatigue monitoring, including effects such as thermal, pressure, tension, bending and environment. Capabilities include counting, monitoring, analysis, linear projection and simulation.

- **Automated Cycle Counting (ACC):** SI:FatiguePro 4 counts and categorizes plant transients into design basis transients based on raw plant instrument data or user input. SI:FatiguePro 4 uses pattern-recognition logic specific to each event type monitored to determine when an event has occurred. The software also allows users to add events for analysis manually.
- **Stress-Based Fatigue (SBF) Monitoring:** SI:FatiguePro 4 replaces the single-stress term fatigue analysis methodology used in EPRI FatiguePro 3.0 with multi-axial stress calculations. Fatigue is computed based on stress histories determined from plant instrument data. The methodology considers component geometry, material, and operating conditions and combines thermal, mechanical, and pressure stresses to determine total stress.
- **Cycle-Based Fatigue (CBF) Monitoring:** SI:FatiguePro 4 calculates CBF based on design stress report algorithms, using the monitored events, counted by the ACC module rather than the design number of transients. Fatigue usage is continually updated as additional transients are identified by the ACC module.



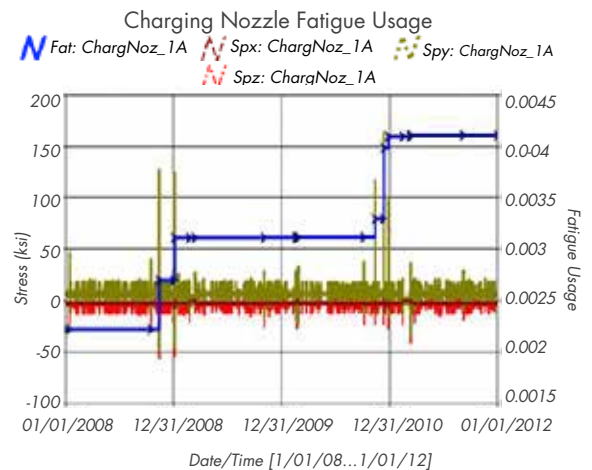
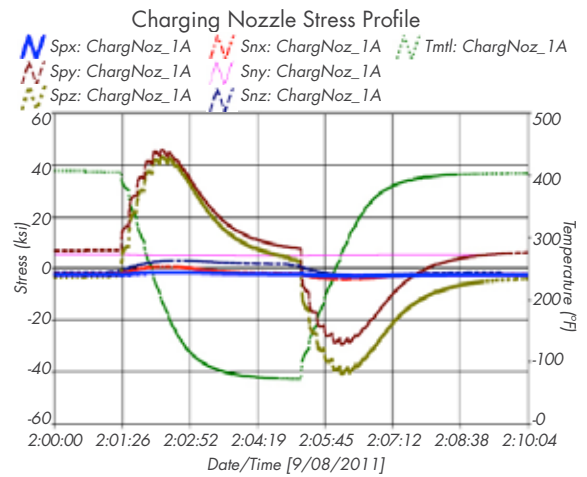
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- **Fatigue Crack Growth (FCG):** SI:FatiguePro 4 calculates the growth of postulated cracks in monitored components to support flaw tolerance and ASME Section XI Appendix L evaluations.
- **Environmentally-Assisted Fatigue (EAF) Analysis:** SI:FatiguePro 4 uses an EAF multiplier ( $F_{en}$ ) to calculate environmentally assisted fatigue. For SBF locations, this multiplier is calculated internally based on NUREG methodology, using actual plant instrument data.
- **Linear Projection:** SI:FatiguePro 4 provides linear projection of cycles and fatigue usage for estimating margin into the future.
- **Simulation Capabilities:** SI:FatiguePro 4 offers simulation capabilities for “what-if” scenarios and a new Transient Library for easier event simulation.
- **Customization:** Like all of our services and solutions, SI:FatiguePro 4 is a plant-specific application that can be tailored to meet the unique needs of your plant.
- **Hydrogen Fueling Stations:** SI:FatiguePro 4 is used to monitor hydrogen fuel tank arrays in hydrogen fueling stations to show that the operating conditions are less-severe than the design condition. This allows the life of the tanks to be extended.



## REGULATORY VALUE

SI:FatiguePro 4 can be used for management of critical assets damage accumulation and to mitigate concerns by regulators and insurance companies. This package has been used successfully in the nuclear industry for many years to mitigate concerns of the NRC regarding critical components undergoing fatigue issues.

SI:FatiguePro 4 can help ensure that structural limits are maintained throughout the original design life of the equipment and to support life extension beyond the original design. The historical operating data provided by SI:FatiguePro 4 allows for fewer limiting assumptions than were used in design. The software also offers refined EAF analysis to support resolution of environmental issues.

SI:FatiguePro 4 is directly applicable to applications such as high pressure wellhead equipment, which requires Load Monitoring from the Bureau of Safety and Environmental Enforcement (BSEE) and also to alleviate concerns that major insurance companies and other state inspectors may have.

## BEYOND SI:FatiguePro 4

Along with advanced software tools like SI:FatiguePro 4, we offer a full menu of metal fatigue management services and specialties:

- Environmentally assisted fatigue (EAF) analysis
- Fitness for Service Analysis utilizing API 579-1 / ASME FFS-1
- Cycle and fatigue monitoring using FatiguePro 3 and SI:FatiguePro 4 software
- Life Extension Support beyond Design Life
- Fatigue Management Program consulting
- Fatigue management handbooks
- Fatigue repair support
- State of the Art Inspection Services for minimizing Detectable Flaw Size
- Design Evaluation / Modification to extend component life
- Flaw tolerance and inspection services