

Structural Integrity Associates, Inc.®

Get the facts about metal fatigue ...

SI:FatiguePro4.0

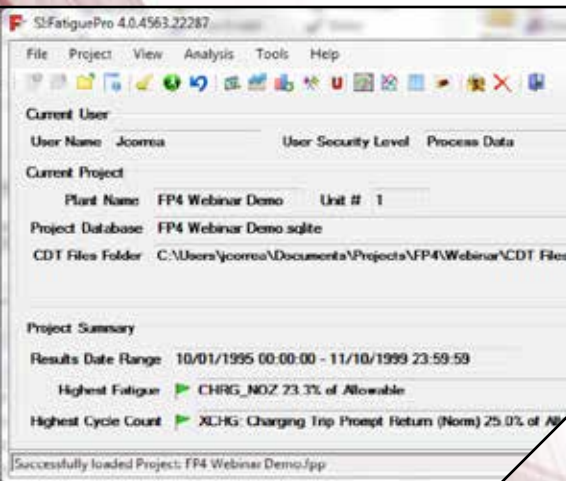
For more than 30 years, nuclear plants around the world have turned to Structural Integrity Associates (SI) for solutions for managing the aging effects of metal fatigue. Our experts play leading roles in industry organizations and develop solutions and software that become nuclear industry mainstays.

FatiguePro is a prime example. In partnership with 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 nuclear plants around the world as part of their Fatigue Management Programs.

SI:FATIGUEPRO 4.0: THE NEXT LEVEL

In its latest evolution, SI:FatiguePro 4.0 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 Transient Library.

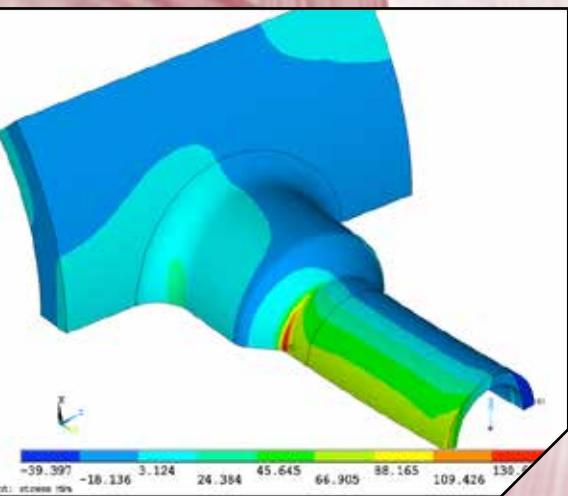
These and other advanced capabilities make SI:FatiguePro 4.0 an essential part of a robust Fatigue Management Program.



APPLICATIONS

Our SI:FatiguePro 4.0 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 4.0 uses advanced event detection logic to count plant transients and their severity, based on raw plant instrument data or manual user input.
- **Stress-Based Fatigue (SBF) Monitoring:** In a key improvement, SI:FatiguePro 4.0 replaces the single-stress term fatigue analysis methodology used in FatiguePro 3.0 with multi-axial stress calculations. Fatigue is computed based on stress histories determined from plant instrument data and uses the fatigue analysis procedures set forth in ASME Subarticle NB-3200.
- The new multi-axial stress calculation for SBF analysis uses the methodology described in EPRI Technical Report 1022876 and addresses NRC concerns about the simplified, single stress term approach, as documented in Regulatory Issue Summary (RIS) 2008-30, "Fatigue Analysis of Nuclear Power Plant Components."
- **Cycle-Based Fatigue (CBF) Monitoring:** SI:FatiguePro 4.0 calculates CBF based on design stress report algorithms, using the plant transients 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. Our latest version allows the user to add and configure new CBF locations without any new programming required.



For more information, please contact:

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- **Environmentally-Assisted Fatigue (EAF) Analysis:** SI:FatiguePro 4.0 uses an EAF multiplier (F_{en}) to calculate environmentally assisted fatigue. For SBF locations, this multiplier is calculated automatically based on NRC approved analysis methodology and industry best practices, using actual plant instrument data. For CBF locations, F_{en} values previously calculated from an EAF analysis may be configured for each load pair.
- **Linear Projection:** SI:FatiguePro 4.0 provides linear projection of cycles and fatigue usage for estimating margin. Upgrades made in version 4.0 allow for more accurate projections than were possible in the past.
- **Simulation Capabilities:** SI:FatiguePro 4.0 offers simulation capabilities for "what-if" scenarios and a new Transient Library for easier transient simulation.
- **Customization:** Like all of our services and solutions, SI:FatiguePro 4.0 is a plant-specific application that can be tailored to meet the unique needs of your plant.

REGULATORY VALUE

SI:FatiguePro 4.0 facilitates plant licensing activities by providing up-to-date and continuous assessment of fatigue usage in all critical vessels and piping. For plants seeking license renewal, SI:FatiguePro 4.0 can help ensure that structural limits are maintained throughout the period of extended operation.

Ultimately, plants that implement SI:FatiguePro 4.0 now will require significantly less effort later for License Renewal and Second License Renewal. The massive amount of historical operating data provided by SI:FatiguePro 4.0 allows for less-limiting assumptions later. The software also offers refined EAF analysis to support resolution of future environmental fatigue issues.

Beyond licensing, SI:FatiguePro 4.0 is the best approach available today for addressing NRC issues described in RIS-2008-30, RIS-2011-14 and Bulletins 79-13, 88-08, 88-11.

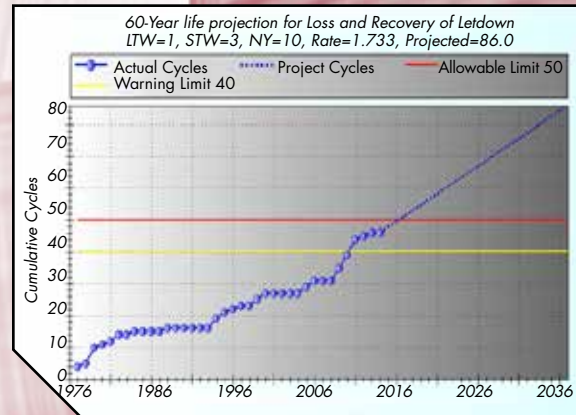
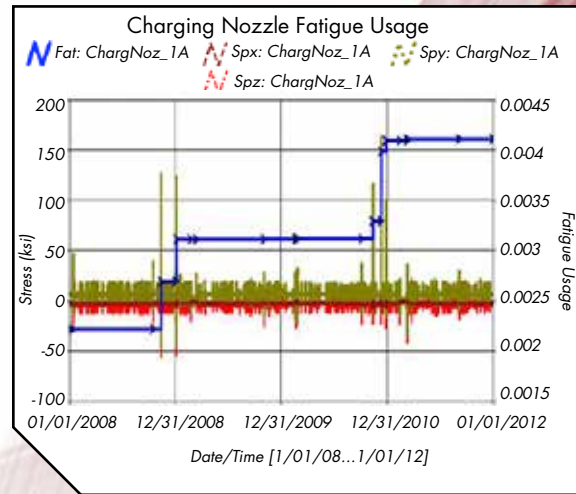
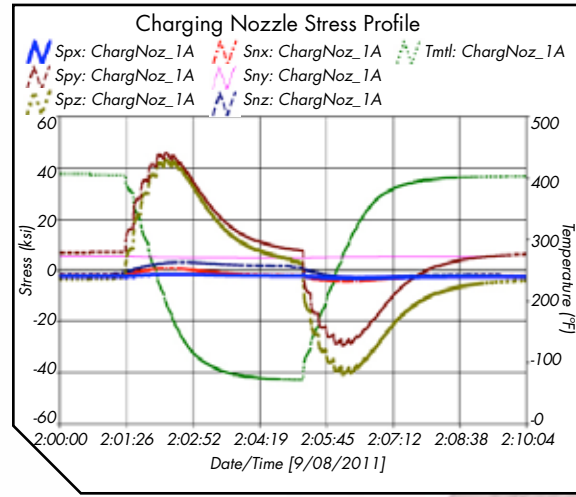
BEYOND SI:FATIGUEPRO 4.0

Along with advanced software tools like SI:FatiguePro 4.0, we offer a full menu of metal fatigue management services and specialties:

- Environmentally assisted fatigue (EAF) analysis
- ASME Code Section III fatigue evaluations
- Cycle and fatigue monitoring using FatiguePro 3 and SI:FatiguePro 4.0 software
- License Renewal and Subsequent License Renewal support
- Fatigue Management Program consulting
- Historical cycle counting reconstruction
- Fatigue management handbooks
- Fatigue repair support
- Modification design to extend component life
- Flaw tolerance and inspection services

READY TO LEARN MORE?

Call **1-877-4SI-POWER** or visit us online at **structint.com** to learn how Structural Integrity can help your plant manage metal fatigue.



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