Signal™ Fitness-For-Service

Highlights

- Developed and supported by industry experts for increased user confidence
- Mitigates safety risks by performing rapid Level 1 and 2 Fitness-for-Service assessments
- Easy to learn and use software with integrated help and example problems
- Increases profitability by improving plant reliability and avoiding unplanned downtime

Signal Fitness-For-Service (FFS) is an easy to use software tool developed by experts for performing fitness-for-service and fracture mechanics analyses on fixed and rotating equipment. It gives engineers the ability to reduce operational and safety risks through its comprehensive adherence to industry standards.

A proven solution developed by experts

Clients who use Signal FFS can feel confident in completing Level 1, 2 and 3 assessments. Signal FFS development is led by Dr. Ted Anderson, an internationally recognized expert on structural integrity and a principal author of the API 579/ASME FFS-1 standard. The software implements this standard and performs crack assessments in accordance with the British Standards BS 7910 procedure. Signal FFS is backed by Quest Integrity's expertise, knowledge and technology in mechanical integrity management.

Reduces operational and safety risk

Operational and equipment safety is a top priority and Signal FFS helps mitigate the associated risk. It provides rapid Level 1 and 2 Fitness-for-Service assessments across a broad array of piping, pressure vessels and tanks. The most common Level 3 assessments are also supported. Signal FFS provides the quantitative support you need to make decisions to run as-is, repair or replace flawed equipment, reducing the risk of operational failure.

Easy to learn and use

Easy to use software provides an intuitive wizard interface that guides you through assessment calculations and reduces the learning curve. Each assessment input value is provided in detailed, yet simple descriptions. Fully worked API 579 example problems are installed and ready to use so you can follow the calculation steps. An integrated Help function includes the background and applicability of each assessment.

Improves profitability

With Signal FFS, your facility can avoid costly unplanned downtime. Fitness-for-service assessments are performed quickly and accurately, allowing you to schedule future inspections and repairs. Assessment solutions allow you to optimize your equipment yields based on remaining life estimates using aggressive operating conditions.
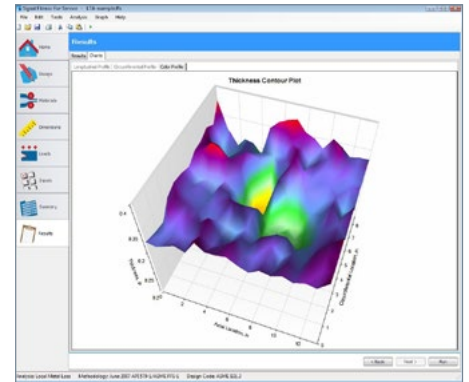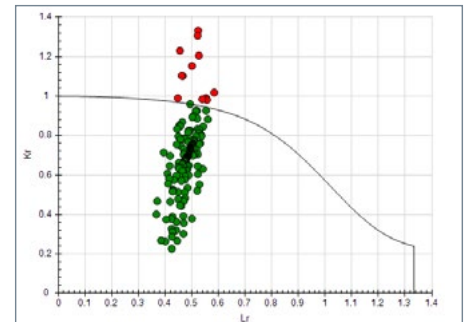

Figure 1. 3D Metal Loss Profiles

Figure 2. Advanced Probabilistic Monte Carlo FAD Analyses

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Specifications

General Capabilities

- Intuitive, up-to-date Microsoft Windows® interface with an ultra-fast learning curve
- Online help and plain English description of inputs
- Parametric capability for sensitivity analysis or for evaluating multiple cases in batch mode
- Monte Carlo probabilistic analysis
- Spreadsheet template input and command-line automation
- Multiple report formats (PDF, Word®, Excel® and HTML)
- Cut and paste measurement data from external Excel files

Assessment Methods

Brittle Fracture: API 579* Part 3, Level 1 and 2 assessments

General Metal Loss: API 579 Part 4, Level 1 and 2 assessments

Local Metal Loss: API 579 Part 5, Level 1 and 2 assessments

Pitting Corrosion: API 579 Part 6, Level 1 and 2 assessments

Hydrogen Blisters, HIC and SOHIC Damage: API 579 Part 7, Level 1 and 2 assessments

Crack-Like Flaws: API 579 Part 9, Level 1 assessment

Crack-Like Flaws (Advanced):

- API 579 Part 9, Level 2 assessment: Fatigue, environmental and creep crack growth analysis
- Constant amplitude, and variable amplitude fatigue options
- Crack growth incorporates the FAD method for life prediction
- Critical flaw size and critical load calculation
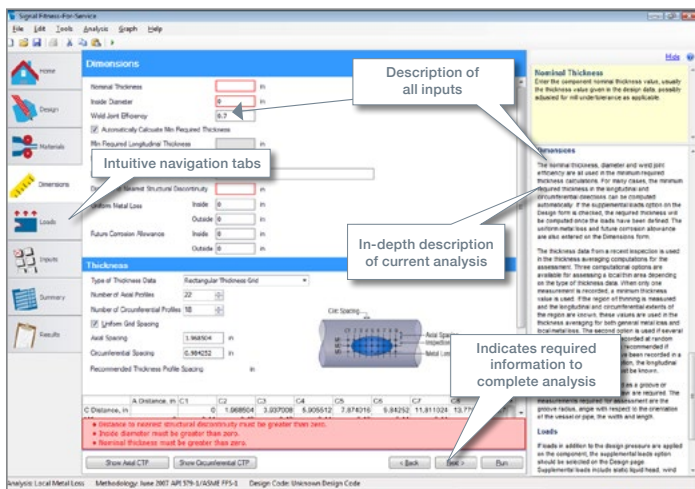
- Extensive library of stress intensity and reference stress solutions
- Extensive database of material constants for fatigue crack growth
- Weight function method for computing stress intensity factors for cracks subject to complex stress fields

BS 7910 Crack Analysis: FAD-based crack assessment in accordance with BS 7910†

Creep Damage: API 579 Part 10, Level 1 assessment

Creep Damage (Advanced):

- API 579 Part 10, Level 2 assessment
- Remaining life estimates with and without crack-like flaws, under static or cyclic operating conditions

Dents and Gouges: API 579 Part 12, Level 1 and 2 assessments

Laminations: API 579 Part 13, Level 1 and 2 assessments

Pipeline Assessments:

- ASME B31G‡ Level 1 assessment
- Side-by-side comparison to API 579 calculations

Pipeline Assessments (Advanced)

- ASME B31G Level 2 effective area method
- API 579 Level 2 effective area method
- Parametric flaw assessment of in-line inspection cracking data

* API 579/ASME FFS-1 (2000, 2007, 2016) Fitness-for-Service

†† BS 7910:2013 Guide to Methods for Assessing the Acceptability of Flaws in Metallic Structures

††† ASME B31G-2009 Manual for Determining the Remaining Strength of Corroded Pipelines
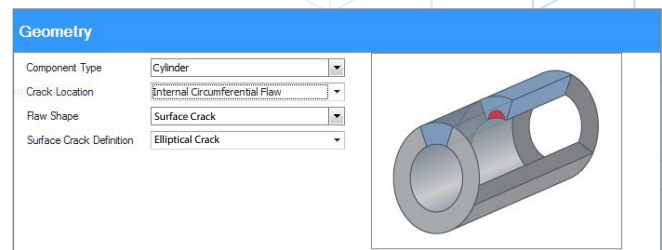

Figure 3. Extensive library of structural geometries and crack shapes

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