Mechanical & Structural: Fitness-for-Service (FFS)

Make Informed Run, Repair, or Replace Decisions

Fitness-for-service (FFS) is a multi-disciplined engineering assessment used to make run, repair, or replace decisions for equipment or piping systems that contain a flaw or are subject to a particular damage mechanism. FFS assessments are also used to determine remaining life and optimize inspection plans (including inspection techniques and inspection frequency).

Implementing FFS into an asset's lifecycle management program will improve safety, reduce risk, optimize design, maximize equipment availability, and reduce future maintenance and inspection costs. Our Mechanical and Structural Engineering team provides proactive and reactive FFS assessments to help you extend equipment life and safely justify continued operation with known damage or defects.

Proactive vs. Reactive Fitness-for-Service

FFS is typically used in a reactive mode to assist with critical run, repair, or replace decisions once flaws or damage are discovered. Equity Engineering recommends implementing FFS technology proactively and reactively throughout your asset integrity management program to extend equipment life and optimize inspection plans and mechanical integrity decisions.

Reactive Fitness-for-Service

FFS assessments are traditionally used to determine whether equipment or piping systems are safe for continued operation with the presence of some type of damage or defect that is detected during planned outages or on-stream inspections.

BENEFITS:

- Make informed run, repair, or replace decisions on in-service equipment
- Determine future inspection or outage intervals
- Develop repair procedures

SERVICES

- Turnaround support
- Fire damage assessments or failure analysis
- Volumetric damage
- Fracture mechanics assessments
- HIC/SOHIC/blisters
- Distortion or geometric imperfections
- High-temperature hydrogen attack (HTHA) damage

Proactive Fitness-for-Service

FFS technology can be utilized proactively to optimize decisions at every phase of the equipment lifecycle management process.

BENEFITS:

- Extend equipment life, optimize equipment design, and refine inspection intervals and tasks
- Determine go/no-go acceptance criterion in advance of inspections
- Understand the effects and potential for future damage progression
- Establish screening tools to aid in non-destructive examination (NDE) and flaw sizing
- Evaluate impact from operational changes
- Make decisions prior to high-stress situations when time and resources are available for critical thinking

SERVICES

- Brittle fracture screening
- Turnaround planning
- Creep and fatigue remaining life assessments
- Go/no-go acceptance criterion for volumetric damage (e.g., corrosion & crack-growth estimations)

Case Study

Expedited Level 3 Fitness-for-Service Assessment

Industry: Refining

Type of Asset: Process Distillation Column

Location: USA

Issue:
The client identified multiple regions of extensive localized wall loss during a plant outage. Upon closer inspection, the damage was due to corrosion under insulation (CUI).

Solution:
Our team performed a Level 3 FFS assessment to determine whether the process column could be placed back into service without repair. To prevent any delay in the process unit start-up, an assessment was needed on an expedited 48-hour timeline. The speed at which the assessment was completed was only feasible due to Equity's tools and expertise in executing similar assessments.

Result:
The assessment results provided the justification needed to continue safely operating the equipment without repair. The client was able start up the process unit without any delay.

> **EVERYONE I'VE INTERACTED WITH HAS BEEN GREAT AND KNOWS WHAT THEY'RE DOING.** THEY WERE ABLE TO UNDERSTAND THE PROBLEM AND COME UP WITH A VIABLE SOLUTION IN A TIMELY MANNER.

Fitness-for-Service Evaluation, February 2023

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