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Engineering Critical Assessment

An engineering critical assessment determines the maximum allowable flaw-size for known materials in all construction and operating conditions.

THE Applus+ SOLUTION

Welding fabrication codes specify maximum tolerable flaw-sizes and minimum tolerable charpy-energy level based on good workmanship. Achieving these standards, however, does not ensure that a certain minimum risk tolerance has been obtained.

Engineering critical assessment (ECA) is an analysis based on the principles of fracture mechanics to determine if a given material (with known properties) with certain flaw characteristics can resist fracture, fatigue, creep or plastic collapse under specified loading conditions.

Applus+ ECA can be used to:

- Assist in the choice of welding procedure and/or inspection technique during the design phase of an installation
- Assess the significance of known defects that are unacceptable for the given fabrication code
- Detect a failure to meet the toughness requirements of a fabrication code
- Assess flaws found in–service and decision-making regarding their disposition (safely remain, down rate component/repair required)

The application of ECA requires a multi-disciplinary team and hinges on three parameters: stresses acting on the region of the flaw; size, position and orientation of the flaw; and toughness and tensile properties in the region of the flaw. Applus+ offers specialist capabilities in all of these three areas.

Target customers

Examples of where ECA has been applied include:

- Dynamic riser systems, which are fatigue-sensitive structures
- Steel catenary risers, which are also fatigue-sensitive structures
- Time-sensitive onshore and offshore pipeline-construction projects where high-productivity welding processes and automated ultrasonic testing (AUT) of weld quality are used

Key customer benefits

The in-depth stress-analysis consultation services provided by Applus+ offer clients key information about their assets where they need it most.