Global Plant Services

Structural Weld Overlay Design, Qualification and Application

Background

A structural weld overlay (SWOL) is the addition of weld reinforcement material on the outside surface of a pipe to a sufficient thickness and extent to create a new structural barrier. It has earned recognition as a safe, problem-free means of crack mitigation and pipe repair.

The design of a SWOL is based on the as-built configuration of each component. The primary objectives of the design are to satisfy the minimum structural requirements and to allow for future ultrasonic examinations of any underlying welds and adjacent base material.

A SWOL can be used to repair an existing stress corrosion or thermal cycling crack or to pre-emptively mitigate potential future stress corrosion cracking (SCC) at susceptible locations. Inspections are periodically required by ASME Code or MRP 146 requirements.

Either stainless weld material or SCC resistant material (Alloy 52/52M) is used depending on the pipe material and a SWOL provides structural reinforcement with favorable residual stress reversal.

The SWOL moves the inspection volume to the outer portion of the original weld. The favorable stresses provide the basis to justify the current ASME Code, Section XI inspection interval of 10 years.

Structural Weld Overlay

Description

Westinghouse provides experienced support in the following areas:

- Structural Weld Overlay Design
- Residual Stress Analysis
- SCC and Fatigue Crack Growth Evaluations
- Leak-before-Break (LBB) Analysis
- ASME Code, Section XI Repair Plan
- Reconciliation of Code of Record Stress Reports
- Relief Requests Licensing support
- Temperature and Vibration monitoring
- Weld overlay implementation on site
- Post Weld Overlay Assessment
- Ultrasonic Test (UT) examinations

Benefits

Westinghouse has developed an integrated process for responding to an emergent need for a SWOL design integrating engineering, weld application and post–weld inspection to reduce the time and cost of this repair. We have developed generic SWOL designs for multiple nozzle, pipe, and fitting configurations. These designs were developed in conjunction with Westinghouse welding and non-destructive examination experts, which will allow timely adaptation and implementation of these designs for emergent flaw repairs.

Westinghouse

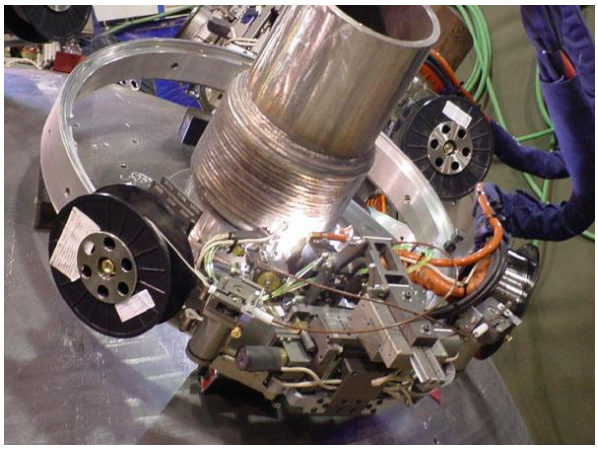
Westinghouse has available and ready an interdisciplinary team of experienced staff to provide the expert performance needed for the implementation of all SWOL elements including engineering, welding and UT examinations. Westinghouse NDE experts are qualified and certified in compliance with ASME Section XI and EPRI guidelines and perform numerous SWOL examinations each year, both manually and with our custom-built robotic scanners. We offer complete engineering, analytical, and metallurgical services to go along with our NDE and welding services.

Experience

Westinghouse has extensive experience providing the full range of needed services and has the plant specific design data needed to complete the design and qualification of the SWOL for Westinghouse and CE design units.

Westinghouse has installed more than 120 pressurized water reactor structural weld overlays to date on pressurizer and reactor coolant system branch piping nozzles in the United States and Europe.

Westinghouse has installed more than 200 boiling water reactor structural weld overlays to date on nozzles and piping locations.



Standard Weld Overlay Equipment

Structural Weld Overlay

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March 2018 / NS-ES-0296