

RTD IWEX

IWEX is a full matrix capture (FMC) technique using ultrasonic (UT) inspection in which individual A-scans are recorded for each and every element of an array transducer, and these A-Scans are processed in a similar way to seismic processing and medical imaging. Advances in computer-processing hardware and software are making these techniques possible in real-time in the field.



THE Applus+ SOLUTION

IWEX improves the ability to image flaws to determine if they are defects or benign. IWEX is a full matrix capture (FMC) technique, a new class of UT inspection techniques that capture the full waveform or A-scan for all combinations of firing each element in an array and acquiring the A-scans on each and every element of the array.

The term "Mode" indicates how many sound reflection the system uses to create the image of the flaw. Where other FMC techniques generate a single mode at time, up to three modes, IWEX can simultaneously generate up to 13 different modes to detect and image flaws of any orientation, from parallel to perpendicular to the inspection surface by processing the 16,384 A-scans generated by the two 64 elements array probes. This is an improvement on phased array, which can often only "see" flaw tips and corners, where IWEX can image the flaw surface. The IWEX image can be viewed as a 2D cross-section or displayed as a 3D image allowing the user to get a better look at the flaw. This ability to "see" the flaw better enables the user to distinguish between types of defects and to discriminate certain types of benign flaws from others that can grow and lead to failure.

Better sizing and discrimination also allows users to qualify ILI tools and enables them to determine the error in an ILI tool run. Knowing the error in an ILI measurement can assist in engineering critical assessments to predict the probability of failure for specific types of pipeline defects.

Target customers

IWEX is of great significance for the global energy industry. Primary applications have been developed for inspecting girth welds, seam welds such as electric resistance weld (ERW) and flash weld (FW) seams, and axial flaws in the pipe body, such as stress corrosion cracking.

In addition, the technique has been used to inspect the root of fillet welds for type B sleeves and welds in pressure vessels such as power plants and fuel-storage tanks.

IWEX is a next-generation UT-inspection technique. The previous state-of-the-art technique was Phased Array UT, which has been used for ILI tool validation, verification and qualification, but with less-than-satisfactory results. IWEX should provide a method capable of qualifying ILI tools with sufficient accuracy.

Key customer benefits

IWEX helps Applus+ clients to more confidently predict the probability of failure for specific types of pipeline defects and therefore to make informed decisions regarding prioritisation of repair and maintenance work. Its enhanced sizing and discrimination also allows the client to leave certain flaws in place without a field repair. Ultimately, this all adds up to cost savings, reduced downtime and enhanced productivity.