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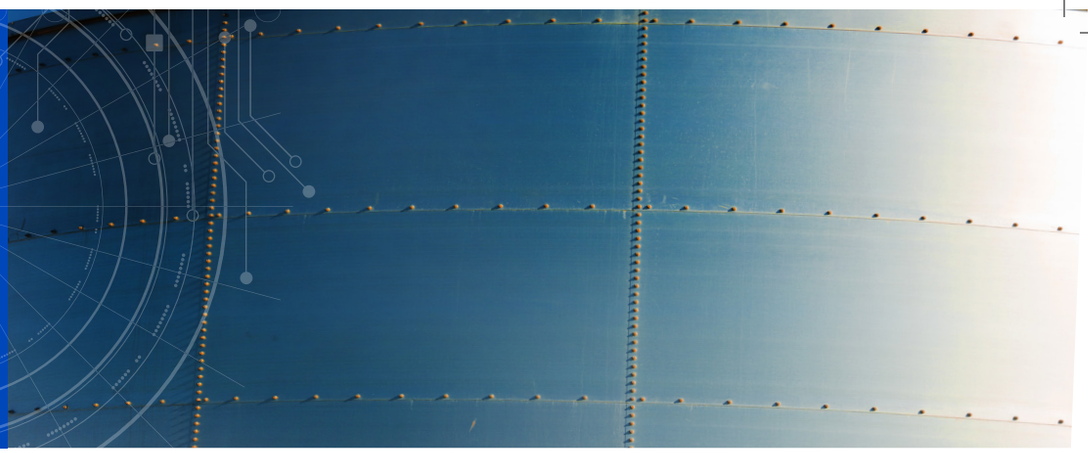


MsT™ Linear Scan Probe for Guided Wave Screening of Storage Tank Walls and Pipe Supports

Guided wave testing is an emerging NDE technology used for fast screening long lengths of pipes, tubes, and tank walls. Southwest Research Institute® (SwRI®) has developed the MsT™ linear scan guided wave probe based on magnetostrictive transducer (MsT) technology. This new probe allows fast automated scanning of structures up to 1.2 meters wide at one time with guided wave propagation distance 30+ meters from the probe.

Advantages

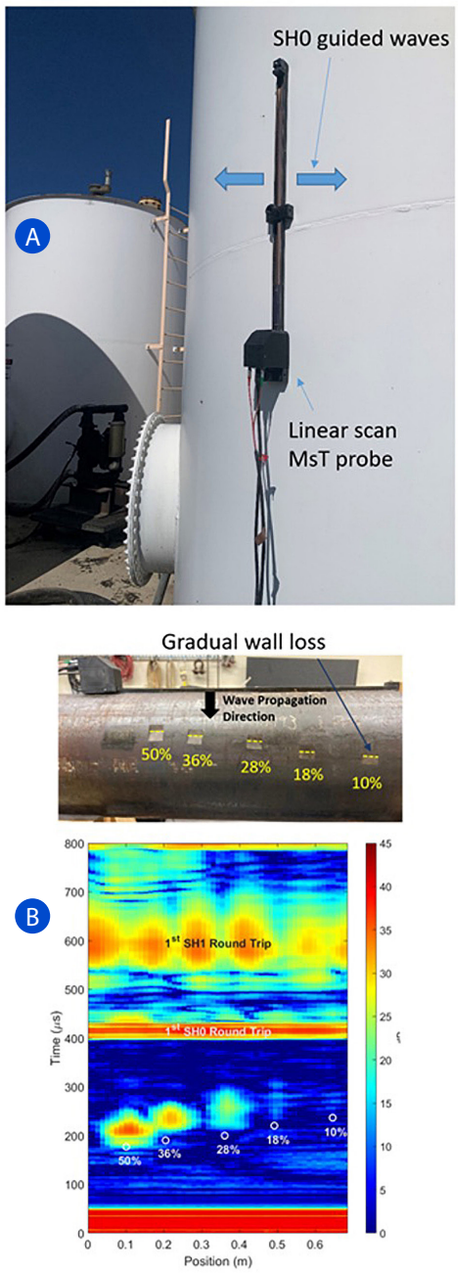
The probe is attached to the tank structure using either magnets or suction cups and shear-wave couplant. Once the probe is coupled to the structure, no further action is required from inspectors and all data collection is performed automatically.

The probe has outstanding sensitivity to pitting corrosion (>15% deep pits), stress corrosion cracking, and gradual wall thinning. With its wide frequency range, the probe can be used on plates up to 35 mm thick and on pipes from 1.5 inches OD.

Test Procedure

The probe utilizes an MsT sensor strip 0.6 to 1.2 m long connected to a software-driven servo motor that moves a magnetic cart along the length of the probe with a pre-defined increment. Data is analyzed using a synthetic aperture focusing technique (SAFT) algorithm.

Analysis of pipe support condition is based on indications produced by SH0 and SH1 modes, wave attenuation in the area of interest, roundtrip signals phase shift, and indication amplitude. The fundamental shear horizontal SH0 modes are used for detection of larger anomalies, pits, and cracks due to its low dispersion rate. A dispersive SH1 mode is used for detection and characterization of gradual wall loss. The frequency can be adjusted to different wall thicknesses.



Automated scan using the MsT linear scan probe:
(a) Probe mounted on tank wall;
(b) Detection of gradual wall loss anomalies from 10 to 50%.

Specifications

- Standard frequencies range from 20 to 250 kHz.
- The high-frequency package ranges from 250 to 400 kHz.
- Data can be acquired in increments from 5 to 200 mm, allowing high axial resolution in defect sizing.
- The variable probe aperture can be set from 12 to 1,200 mm.
- The probe can fit to pipe radius 36 inches and larger to scan the interface between pipe support circumference and soil/air in the axial direction.
- Scan time is 30 seconds to 5 minutes depending on the increments.
- Up to 3 frequencies can be acquired at one time.
- The probe can be used on walls from 1 to 35 mm thick.
- Circumferential guided wave scan of pipe supports for pipes with diameters from 44 to 1,200 mm can be performed to evaluate wall loss.
- The probe can be used on tank skirts to scan annual plate condition without cleaning the tank.

Probe attached to storage tank wall during guided wave screening of generalized corrosion area.

We welcome your inquiries.
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