MsT Linear Scan Probe

for Guided Wave Testing of Storage Tank Walls, Tank Bottoms, and Pipe Supports

The emerging technology of guided waves is used for fast screening long runs of pipes, tubes, and tank walls. One existing probe has the advantage of inspecting long structures from a single location, but covering large areas requires time-consuming incremental probe movement.

Southwest Research Institute® (SwRI®) has developed the MsT linear scanning guided wave probe, based on magnetostrictive transducer (MsT) technology. This new probe allows fast automated scan of structures up to 1.2 meters wide with guided wave propagation 30+ meters from the probe.

The test procedure includes mounting the probe on a wall, running an automated scan, and compiling an inspection report. Once the probe is coupled to the structure, no further action is required from inspectors and all data collection is performed automatically.

Fundamental shear horizontal SH0 modes are used for detection of larger anomalies, pits, and cracks due to their low dispersion rate. A dispersive SH1 mode is used for detection and characterization of graduated wall loss. The frequency can be adjusted to different wall thicknesses to keep the frequency/thickness ratio close to 1.7.

The probe has outstanding sensitivity to pitting corrosion (>15% deep pits and stress corrosion cracking). Data analysis uses a synthetic aperture focusing technique (SAFT) algorithm to process the data. Depending on the geometry and condition of the structure, probe coverage can reach 100 square feet with scan time from 0.5 to 3 minutes. The probe can be used on tank walls with thickness up to 35 mm and on pipes from 1.5 inches OD.

Analysis of pipe support condition is based on indications produced by SH0 and SH1 modes, wave attenuation in the area of interest, round-trip signal phase shift, and indication amplitude.

Automated scan using MsT linear scan probe: (a) probe mounted on storage tank wall; (b) real-time B-scan imaging of acquired data with graduated wall loss indications
Probes Features

- Standard frequencies range from 20 to 250 kHz.
- The high-frequency package includes frequencies from 250 to 400 kHz.
- Data can be acquired in step increments from 10 to 200 mm, allowing high axial resolution in defect sizing.
- The probe aperture is variable from 12 to 1200 mm.
- The probe can fit to the pipe radius of 36 inches and larger to scan pipe supports and soil/air interface in the axial direction.
- Scan time is 30 seconds to 2 minutes depending on step increments.
- Up to 3 frequencies can be acquired at a time.
- The probe can be used on walls from 1 mm to 35 mm thick.
- Circumferential guided wave scan of pipe supports for pipes with diameters from 44 to 1200 mm can be performed to evaluate remaining wall loss.
- The probe can be used on tank skirts to scan annual plate condition without cleaning the tank.
- The probe can be used on walls with temperature up to 40°C with sugar-based couplant.
- Special couplant formula can be delivered for testing structures with surface temperature up to 100°C.

We welcome your inquiries. For more information, please contact:

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