



Guided Wave Pipeline Inspection System

TISEC specializes in the nondestructive testing of pipelines with long-range ultrasound. Under ideal conditions, the technology may be used to inspect up to 1000 feet (300 meters) of pipe from a single sensor position or up to 4000 feet (1.2 km) in one day. The actual inspection range depends on the type of pipe coating, degree of corrosion present in the pipeline, number of elbows, and whether the pipe is aboveground or underground. The technology may be applied to thin- and thick-walled pipe, with diameters ranging from 1" to 60", rapidly and economically. The reliable engineering data is used to assess exactly where your pipeline needs follow-up nondestructive or visual inspection.

Inspection Applications

- Transmission/distribution lines
- Refinery lines
- Offshore risers
- Tank farm lines
- Headers
- Storage sphere support legs
- Refrigeration lines
- Corrosion under insulation (CUI)
- Underground pipelines
- Pipelines under road crossings

Benefits include:

- Rapid screening of long lengths of pipe
- 100% of pipe wall is inspected
- Detection of leaking and corrosion or wall loss in insulated and buried pipelines

How it Works

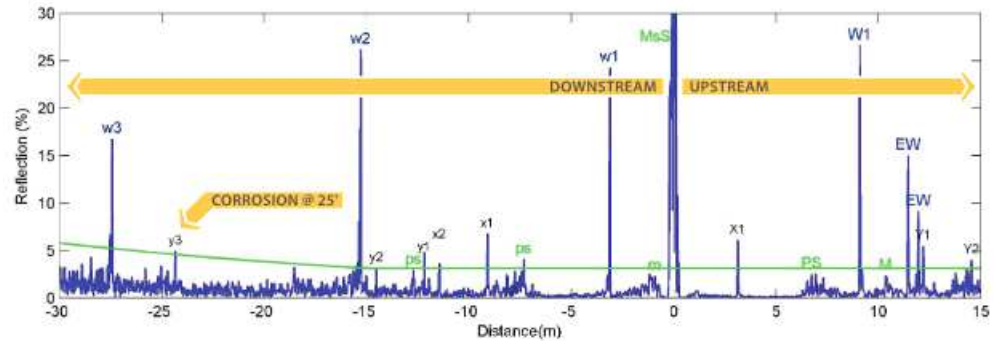
- The sensor is installed on the outer diameter (OD) of the pipeline.
- Long-range ultrasound is focused upstream and then downstream.
- Ultrasound is reflected back from leaking source, corrosion, and wall loss or thickness variation.
- Defect is located with respect to the sensor location using the speed of sound in the pipeline.
- Corrosion severity is estimated in terms of cross-sectional area loss.
- Automatic report generation with reflector characterization and location.

Data and Reporting

Guided wave data is acquired and interpreted by professionally trained technicians and engineers with expertise in long-range ultrasound. Reflections are clearly identified as welds, cross sectional area loss, pipe supports, repair clamps, elbows and other relevant pipeline features.



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The Sensor and Instrumentation

TISEC uses magnetostrictive (MSS) sensing technology and instrumentation. The sensor is bonded to the pipe and consists of a proprietary cobalt alloy and conductors wrapped around the outer surface of the pipe. The sensor is unique because it generates ultrasound around the entire circumference of the pipeline. Competing guided wave pipeline inspection technology that use piezoelectric transducers, make contact only with a small fraction of the pipeline. Comparatively, the (MSS) sensing technology generates a very pure torsional guided wave. Sensitivity to corrosion is enhanced with (MSS) sensing technology. The instrumentation is portable and may operate on battery power for an entire day. The technology may be used on in-service and out-of-service pipelines.

Inspection Range

The inspection range depends on the condition of the pipeline, coatings, diameter and product inside the pipeline, and number of elbows. The best-case scenario is a straight section of pipeline where inspection ranges may exceed 1000 feet. The inspection range of underground pipelines may be limited to 60 feet depending on pipeline condition, moisture content of the soil, and pipeline product.

The inspection range may be estimated by providing information on the overall pipeline condition, condition and type of surface coating, number of elbows in the line, type of product

inside the pipeline, and pipeline thickness and diameter. Actual inspection range is determined during initial testing on the target pipeline.

Sensitivity

The MSS sensor generates a pure torsional wave in pipelines that is very sensitive to corrosion. Torsional waves are a powerful inspection tool since they are not attenuated significantly by pipeline coatings and product. Inspection may be carried out at low frequencies 30 to 100 kHz or at high frequency 100 to 250 kHz. Corrosion sensitivity is defined in terms of cross-sectional area (CSA) loss. The technology reliably detects CSA losses in the 10% range and can detect losses in the 3% range under ideal testing conditions.

Unique Experience

TISEC is uniquely qualified to perform long range ultrasonic inspection of pipelines, rail track, bridge pile, and ship hulls. Our technical professionals are leaders in developing guided wave ultrasound inspection systems, procedures, training, and inspection services.

Our American Society for Nondestructive Testing (ASNT) certified inspectors have complementary training in fall protection, rope access, highway safety, railway safety, first aid, and confined space safety.