Training Course of Ultrasonic Guided Wave Technology for Inspection and Monitoring of Pipelines

Pipeline is the primary structural component in processing plants such as refineries, petrochemical and chemical plants, and electric power plants. Maintaining the structural integrity of the many miles of piping is an important issue for safe operation of a plant. One of the emerging technology for piping inspection and monitoring is long-range guided-wave technology. This technology is in commercial use and provides new options for assessing pipeline. This technology can be used to inspect and monitor long sections of pipeline and to detect quickly and economically cross-sectional defects when properly applied.

The ultrasonic guided wave travels along the pipe providing 100% coverage of the pipe wall and rapid survey of a long length of pipeline from a single test location. Corrosion wall loss and cracks in aboveground, insulated, and buried pipe can be detected, and the locations and sizes of these defects can be estimated by analyzing the data with user-friendly software. Guided waves are useful for inspecting and monitoring areas that are difficult to access, such as those at high elevations, behind walls, or under insulation, from a remote accessible location. This saves time and money that would otherwise be used for scaffolding, insulation removal, or excavation.

Three guided wave systems for surveying pipeline are currently in commercial use for piping inspection: magnetostrictive sensor (MsS) system, GUL Wavemaker, and Teletest. For generating and receiving guided waves in pipe, MsS system is based on the magnetostrictive sensor (MsS) developed by Southwest Research Institute® (SwRI®) in USA; the other two systems are based on an array of piezoelectrice sensors developed by the Imperial College in United Kingdom. During this training course, the characteristics of these three systems are compared. The operation of the MsS system is explained in detail including generation and detection principles of guided waves. Also, probe fabrication and various applications are discussed.

This two-day course is designed for maintenance management personnel, inspectors, or operators responsible for pipeline integrity in oil or gas companies, refineries, chemical and petrochemical plants, and offshore pipelines Participants will gain an understanding of ultrasonic guided wave technology for inspection and monitoring of pipelines.

The course will provide a discussion on the physical principles of guided waves, commercialized systems for long-range guided-wave inspection and monitoring, probe installation and guided-wave system operation, data acquisition, mistakes of inspectors, data analysis software and making inspection report, examples of field test inspection report, guided wave monitoring, and application examples of guided wave technology. Emphasis will be placed on the application areas and what guided waves can and cannot do.

Where: Southwest Research Institute (SwRI) located at 6220 Culebra Rd. San Antonio, TX 78238 USA, or any facility worldwide with traveling of instructor (please see "Training with travel").

Training cost: $1,100.00 per person (minimum 3 people required for course to make)

Training with Travel: If a company invites the instructor to its facility, the company shall pay the following cost:

- Travel cost, test sample ship, equipment use charge ($500/training day)
- Minimum training cost: $2,200.00
- Additional training cost for more than 2 persons: $300/person

For example, if a company in New York invites the instructor to its facility for training 3 persons, the cost will be approximately $ 6,910 ($1,600 for labor cost during travel, $1,100 for shipping and usage of MsS system and sample, $160 for per diem cost of 4 days, $450 for lodging, $1,100 for transportation including airline travel, $2,500 for training cost of three persons).

Host: Southwest Research Institute® (SwRI®) will host the training course. SwRI®, developed and patented the magnetostrictive sensor (MsS) system for long-range guided wave inspection and monitoring and has conducted research and development for numerous applications using guided wave technology for DOT, various gas associations, power plants an oil companies.

Instructor: Sang Kim of Guided Wave Analysis LLC is the instructor. He has been very active in conducting research and development in the guided wave technology for the last 8 years, as well as training inspectors and operators from inspection companies, and consulting with companies using MsS guided wave systems.

Registration: Registration forms can be obtained through an email request to hk@gwanalysis.com. The training fee shall be paid at the time of registration. The registration is accepted up to five business days prior to the training.

Cancellation: Guided Wave Analysis LLC makes the decision to offer each course based on advanced registration. We reserve the right to cancel a course if there is insufficient enrollment.

Refunds: Guided Wave Analysis LLC will refund the course fee for if Guided Wave Analysis LLC cancels the course. If person registered for the course cannot attend, the half of the course fee will be refunded if the registrant provide a written notice through email within 24 hours of the course start.

Contact Information: If you need any help in attending the course, email Heui Kim at hk@gwanalysis.com or call 210-842-5819.

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COURSE OF DAY1

8:30 am Introductory Remarks and Course Overview_M101
- Handouts -- Manuals and presentation materials
- Course overview of MsS guided wave inspection

9:00 am Physical Principles of Guided Waves_M102
- Physical background on guided waves
- Long-range inspection

10:00 am Break

10:15 am Guided Wave Systems and MsS System_M103
- Comparison of guided wave systems
- MsS system for guided-wave inspection and monitoring

12:00 pm Lunch Break

1:30 pm MsS Guided Wave System Demonstration_M104
- MsSR3030 specification and system interconnection
- MsS probe installation on a pipe

3:00 pm Break

3:15 pm Data Acquisition in a Sample Pipe_M105
- Explanation of data acquisition software and equipment function
- Data acquisition from sample pipe
- Mistakes of inspectors in data acquisition procedure
- Selection of frequency of guided wave inspection

5:00 pm Adjourn

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COURSE OF DAY2

8:30 am Data Analysis Software Demonstration_M106
- Demonstration of data analysis software
- Calculation of velocity, attenuation, cross-sectional area of defect
- Making inspection report

10:00 am Break

10:15 am Examples of field test inspection report_M107
- Painted pipeline
- Corrosion under insulation data
- Road crossing data
- Buried pipeline
- Inspection range of guided wave testing

12:00 pm Lunch Break

1:30 pm Guided Wave Monitoring_M108
- Monitoring procedure
- Monitoring software demonstration

2:45 pm Break

3:00 pm Applications of Guided Wave Inspection and Monitoring_M109
- Application list of guided wave inspection and monitoring
- Questions and answers of guided application
- Reviews of course

5:00 pm Adjourn