

Understanding Automated Ultrasonic Testing of Pipeline Girth Welds

Why: Automated Ultrasonic Testing (AUT) has long been used as an alternative or complement to Radiographic Testing (RT). It has been accepted for more and more critical applications and is now the technique of choice for offshore Steel Catenary Riser installations in the Gulf of Mexico. AUT has also seen increased use for inspection of pipeline girth welds for on-shore and off-shore applications. The effectiveness of an AUT program requires planning, procedure development, validation, and execution. Engineering teams with an understanding of the factors impacting girth-weld AUT are far better equipped to avoid problems during production than those applying a reactive approach to test method application. Manual Ultrasonic Testing is plagued by Operator subjectivity, and the concern extends to AUT by association. Pipeline Project Installation teams rely on experienced, qualified auditors to ensure this subjectivity does not introduce an unacceptable level of risk. This reliance is justified, but can compound the subjectivity in cases where the auditor's experience or qualifications are insufficient. An installation team with an understanding of the test's limitations and likely outcomes is equipped to not only critically assess the test results, but to also evaluate the auditor's capabilities.

What: This course is supplied to pipeline engineers, project managers and inspectors. The one-day course provides an overview of girth-weld AUT terminology and theory; as well as, interpretation of weld scans. Both multi-probe and phased array AUT systems will be discussed. The requirements of Standard Practice ASTM E1961-06 will be addressed with emphasis on zonal discrimination; angle selection and calibration block design. The course will contain a combination of classroom lecture and hands-on demonstrations.

Learning Outcomes and Evaluation:

Participants will be able to:

- Explain the basic theory of Ultrasonic Testing
- Describe the different types of probes used for weld interrogation
- Describe the construction of AUT calibration blocks
- Describe the principle of Time of Flight

Diffraction

- Explain the zonal AUT data interpretation screen



Instructor: Roger L. Spencer
Applications Engineer
Engineering & Nondestructive
Evaluation

EDUCATION

B.S. Electronic Engineering Technology,
Franklin University
A.S. Computer Engineering Technology,
Franklin University

TECHNICAL EXPERTISE

Mr. Spencer joined EWI in 1993 as a Laboratory Coordinator in the Materials and Mechanical Testing Laboratories. In 1996 he transferred to the NDE Technology team. At EWI, he is involved in helping member companies solve their NDE-related problems. Some examples of his work at EWI include measurement of thermal spray coatings using ultrasonics and eddy current, detection of surface contaminants using infrared imaging, ultrasonic sizing of cracks in thick steel components using conventional, phased array, and TOFD techniques, inspection of seal integrity in food and pharmaceutical packages, and development of a method for measuring properties of thin polymer films.

Mr. Spencer holds ASNT Level III certifications in ultrasonic testing, eddy current testing, and radiography.

BACKGROUND AND PROJECT EXPERIENCE

Mr. Spencer has 8 years hands-on experience as a Level II inspector in radiography, ultrasonics, eddy current, magnetic particle, and penetrant inspection methods. His Level II experience involved inspection of components used in several industries including aerospace, petrochemical, automotive, construction, and power generation (nuclear and fossil fuel). He also has 11 years experience in the aerospace industry as an NDE Level III in radiography, ultrasonics, magnetic particle, and penetrant inspection methods. As a Level III, he was responsible for developing NDE inspection procedures for military and commercial applications, training and certifying NDE inspectors, and process control activities related to NDE. In addition to NDE, Mr. Spencer also has experience in process control activities related to welding, chemical processing, and heat treat processes.

PROFESSIONAL AFFILIATIONS

American Society for Nondestructive Testing (ASNT)

Where: EWI
1250 Arthur E Adams Dr.
Columbus, OH 43221

Price: \$795.00/per student

Terms and Conditions: One registration is required per person. Upon receipt of your above registration an invoice will be generated for payment. Payment is due 30 days from receipt. 1/2 of the course fee will be refunded provided written cancellation is received within 48 hours of the course start.

Course Outline:

- 8:00 to 8:20 – Introductions and Course Overview
- 8:20 to 9:30 – Basics of ultrasonic testing (UT)
- 9:30 to 9:45 – Break
- 9:45 to 10:15 – Manual UT (MUT) vs Automated UT (AUT)
- 10:30 to 11:30 – Zonal Weld Inspection Using Multi-Probe AUT
- 11:30 to 12:00 – Time of Flight Diffraction (TOFD)

- 12:00 to 12:45 – Lunch
- 12:45 to 1:30 – ASTM E1961
- 1:30 to 2:30 – AUT Data Displays and Interpretation
- 2:30 to 2:45 – Break
- 2:45 to 3:30 – Introduction to Phased Array UT
- 3:30 to 4:00 – Zonal Inspection Using Phased Array AUT
- 4:00 to 4:30 – Open Question and Answer Period

Please complete the attached form and fax to TTI at 713-630-0560

Course Cost: \$795/per student

Course Date:

Name _____

Company _____

Address _____

Address _____

City, State, ZIP _____

Country _____

Phone/Mobile _____

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Payment by Credit Card

Circle One: VISA MasterCard AMEX

CC Number _____

Expiration Date _____

Signature* _____

** By signing above I commit to paying the course fee when invoiced*

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