TUV / IICS 2.9 CERTIFIED COMPOSITE REPAIR SYSTEM (CRS) INSPECTOR

(in references to ASME PCC-2 and/or ISO 24817)

COURSE DURATION: 4 DAYS

COURSE DESCRIPTION

This course is designed to equip inspectors engineers and technicians the correct methods and procedures to properly verify and inspect Engineered Composite Repair System (ECR Systems) throughout the repair process of piping systems. It has been built upon decades of data gleamed from industrial usage, testing, industry standards, and practical experience with composite materials.

It will be highly beneficial to any user of composite materials for pipe repair (but also for authorities) to establish a firm foundation of knowledge and understanding of the needs of these systems to ensure successful usage. Topics covered include **different types of ECR systems and repair design, engineering assessment forms and design / calculation documents, critical hold prints and quality control forms, proper preparation of surface and mixing of materials as well as other items relevant to the usage of ECR systems.**

The inspection methods, techniques, and processes discussed in this course will work with ECR Systems to ensure proper installation and working conditions regardless of the specific product system being used.

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COURSE OBJECTIVE

The course provides participants with the knowledge necessary to:

- Learn the basics of Engineered Composite Repair systems, their components, and process for implementation.
- Learn the basics of various tools used within the process of the ECR Systems installation and inspections such as durometers, surface preparation tools and methods, and profile measurement tools and techniques.
- Learn the process and requirements as provided within the ASME PCC-2 Article 4.1 and ISO 24817 for qualification, design, installation, and inspection of composite repair systems.
- Learn about proper documentation, inspection techniques, failure modes, and failure analysis processes as they relate to composite repair systems.

WHO SHOULD ATTEND

- Anyone who wishes to learn how to inspect and validate the installation of ECR systems in their facilities, and/or anyone overseeing the team who is providing the installation services.
- Anyone who wishes to perform post-installation inspection services for future inspection and recommissioning or revalidating in-service composite repair systems.
- Highly recommended to:
  - Plant inspectors
  - Site engineers
  - Reliability engineers
  - Pipeline inspectors,
  - Painting / coating inspectors,
  - Plant maintenance department personnel, &
  - Others who may be required or desires to inspect an ECR System which is installed for the repair and **rehabilitation** of pipelines or piping systems with composite materials.
  - Authorities

COURSE OUTLINE

DAY 1

Introduction to Composite Materials

- Composite material & how it is used for pipe repair
- Typical product types available, components used, & general limitations
- Defining an ECR System

Introduction to ASME PCC-2 & ISO 24817 Standards

- Requirements as presented within the two standards and comparison to understand the difference of each standard based on client usage
- Repair System qualification and testing requirements
- Repair System design requirements
- Repair System installation & inspection requirements
- Documentation requirements

Composite Repair Design Methods

- Defect analysis and relevance to repair design
- Defect and design types
- Data gathering and documentation
- Design limitations, constraints, and typical failure modes to design against
- Process for compliant repair designs

DAY 2

Installers, Supervisors, and Trainers

- Pre-requisites, skills and training
- Documentation and continuous skills development
- Training programs and respective requirements

Installation Methods and Requirements

- Understanding the differences in Repair Systems and types
- Installation guides and requirements for documentation
- Installation methods and site assessments
- Curing protocols and validation

Surface Preparation and Validation

- Tools and methods
  - Grit blasting
  - Power Tools
- Relevant standards
  - NACE
  - SSPC
  - Swedish Standards
- Surface cleanliness, profilometer and measurement options

Quality Control and Quality Assurance

- Documentation and recording process
- Defined critical hold points and measurable data
- Tools required and how to use them
  - Installation tools
  - Quality tools
  - Inspection tools and options

DAY 3

Post-Installation Inspection (pre-repair commissioning)

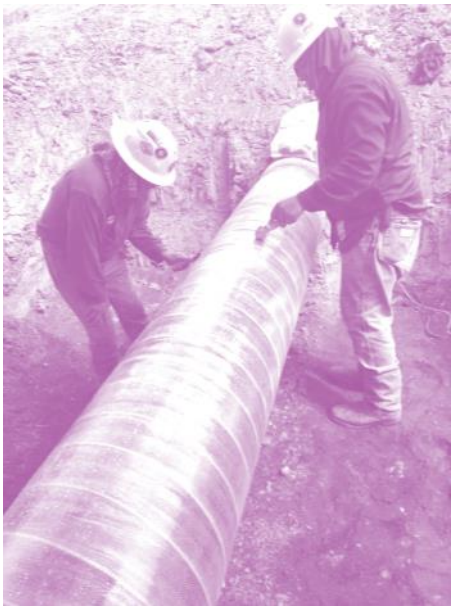
- Visual Inspection options and methods
- Physical property checks
- Defect types and allowable limits
- Radiographic tools and options
- UT tools and options
- Pressure testing requirements

Post-Installation Inspection (post-project commission)

- Methods for validation and review
- Options for recommissioning for extended life

TRAINING METHODOLOGY

Participants will spend time working with various tools used in the Quality Assurance and Post – Installation Inspection of ECR Systems and an assessment test will be given.



Failure Analysis

- Identifying failure mode
- Identifying cause of failure
- Documentation and reporting of failure analysis
- Case study example of a failure analysis

DAY 4

Topic Review and Course Summary

- Review of each topic highlights
- Review of tools available
- Q&A time prior to assessment testing

Assessment / Testing

- Includes questions on each topic to assess student grasp of relevant knowledge
- Includes "practical lab" on use of tools learned in the course

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TRAINER'S PROFILE

MATTHEW GREEN

As Vice President of Technical Service for ClockSpring|NRI, Matt Green leads the company's global technical department, which encompasses engineering, training, and education. Since 2006, he has traveled to more than 35 countries to educate the industry on non-metallic composite repair systems and their applications on pipelines and piping networks.

Green is actively involved in shaping the industry and its future through membership in industry organizations, including the ASME Post Construction Code 2 subcommittee for Nonmetallic and Bonded Repairs (Article 4) and the ISO 24817, both of which have helped to provide valuable standards and guidelines for composite repair systems to the industry.

He has published numerous technical papers and is a regular contributor of technical articles for industry publications.

Green is a graduate of Northeastern State University in Oklahoma earning his Bachelor of Science degree in Engineering Physics, with a minor in Mathematics.

TECHNICAL QUALIFICATIONS

- ✓ Educational Advancement
- ✓ Corrosion Engineering Course
- ✓ E1: Composites for Managers
- ✓ Corrosion and MIC Control Course