Chemical, Mechanical Engineering

SCANDINAVIAN ACADEMY
Training and Development

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Course: Risk Based Strategies for Inspection & Maintenance (RBI & RBM)

Code	City	hotel	Start	End	price	Hours
540	Madrid (Spain)	Hotel Meeting Room	2024-07-22	2024-07-26	5950 €	25

INTRODUCTION

Risk Based Inspection (RBI) methodology enables the assessment of the likelihood and potential consequences of pressure equipment failures. RBI provides companies the opportunity to prioritize their equipment for inspection; optimize inspection methods, frequencies and resources; develop specific equipment inspection plans; and enable the implementation of Reliability Centered Maintenance. This results in improved safety, lower failure risks, fewer forced shutdowns, and reduced operational costs.

- **The risk-based approach needs:**
  - To be multi-disciplined
  - To be realistically applicable to plant integrity
  - Design with future scenarios in mind
  - Consideration of all potential degradation mechanisms
  - Understanding of the risks involved
  - Awareness of Fitness for Service assessment techniques

OBJECTIVES

- To provide clear understanding of the key aspects of Risk Based Inspection, its advantages and limitations
- To provide a clear understanding of how it is linked to reliability-centered maintenance
- Understand how fitness-for-service assessment affects the Risk
- To show you how to develop a successful RBI program at your facility
- Provide you with the practical and effective methods you need to perform practical likelihood and consequence analysis
- Show you how to develop optimum Inspection intervals for individual equipment based on the assessment of the active degradation mechanisms

ORGANISATIONAL IMPACT

- Identification and assessment of active degradation mechanisms
- Implementation of a Risk Based Inspection program would result in significant measurable improvements improved plant integrity
- Fewer failures
- Optimization of inspection and maintenance plans and resources

- Reduction in operating costs

PERSONAL IMPACT

- Delegates will acquire the knowledge necessary to apply the risk-based methodology
- Delegates will acquire the skills necessary to apply the risk-based methodology
- Enhance competence in RBI
- Enhance performance level
- Contribute additional value to the organization

WHO SHOULD ATTEND?

- Operations Engineers
- Maintenance Engineers
- Engineering Managers and Supervisors
- Technical Staff with responsibilities for inspection, maintenance, assessment and mitigation of plant equipment degradation, and who want to use RBI effectively in their plants

outline

- Significance of Inspection in Plant Integrity and Maintenance Costs
    - The Real Function of Inspection
    - Inspection Key Performance Indicators
- Common Inspection Strategies and Their Limitations
- Risk-Based Decision-Making Fundamentals and Tools
    - Risk Assessment - Probability of failure, consequences of failure
    - Risk Management – Avoidance, Mitigation
    - Risk Communication
- Understanding and Managing Risk
    - Principles Risk Assessment
    - Risk Assessment Elements
    - Qualitative, Semi-quantitative, and Quantitative Assessment
- Workshop 1- Illustrative Example of Risk Assessment
- Risk Based Inspection (RBI)
    - Definitions
    - Evolution
    - Key Elements of RBI
    - Reasons for implementing RBI
        - Benefits and Limitations of using RBI
        - RBI as a part of plant integrity management
        - Economic Benefits
- API Risk-Based Inspection Methodology

- API RP 580
- API BRD 581 – Various levels of RBI Analyses

- Impact of RBI on Related API Codes, Standards, and Recommended Practices
  - API 510, 570 and 650
  - API 579 Fitness-For-Purpose
- API Risk Based Inspection Software
- Workshop 2 - Q&A on API RBI Methodology
- Overview of API 571 - Recognition of Conditions Causing Deterioration of Failure
- Overview of over 60 damage mechanisms found in refineries
- Detailed discussion of some common damage mechanisms: Internal and external corrosion, brittle fracture, fatigue, SCC, HIC, internal and external corrosion
- Identification of Deterioration Mechanisms & Failure Modes
  - Active damage mechanisms in critical plant equipment
  - Inactive or “unlikely” mechanisms
  - Identification for assessment
  - Impact of simultaneous mechanisms
- Selection of Suitable Materials for Specific Deterioration Mechanisms
- Integrated Asset Management
  - Linking Risk Assessment, RBI, and RCM
  - Managing Risk Using RBI
- Workshop 3 - Case studies involving a number of equipment damage and failures, and learnings
- Development of Inspection Plan (Based on RBI Risk Ranking)
  - Inspection Planning Guidance
  - Need for Some Speculative / Exploratory Inspection
  - RBI Implementation
    - Essentials for Establishing a Successful RBI Program
    - The RBI Team - Recommended Structure and Mandate
  - Developing Equipment and Piping Systems / Circuits Inventory
  - Inspection History, Interpretation
    - Equipment Criticality Rating
  - Equipment Data Base
    - Shared Database by RBI and RCM
    - Importance of Data Quality
    - Computerized Maintenance Management Systems
  - Workshop 4 – Case Study: Risk-based categorization of equipment and failure modes
  - Inspection Interval Optimization Based on Assessed Risk
  - Evaluation of Inspection Results
    - Data Quality
    - Corrosion Rate Calculations
    - Remaining Life Calculations
  - Fitness-For-Service Assessments
  - Estimation of Consequences of Failures
  - Workshop 5 - Case Study - Assessment of defects in critical equipment

The Scandinavian Academy employs modern methods in training and skills development, enhancing the efficiency of human resource development. We follow these practices:

- **Theoretical Lectures:**
  - We deliver knowledge through advanced presentations such as PowerPoint and visual materials, including videos and short films.
- **Scientific Assessment:**
  - We evaluate trainees skills before and after the course to ensure their progress.
- **Brainstorming and Interaction:**
  - We encourage active participation through brainstorming sessions and applying concepts through role play.
- **Practical Cases:**
  - We provide practical cases that align with the scientific content and the participants specific needs.
- **Examinations:**
  - Tests are conducted at the end of the program to assess knowledge retention.
- **Educational Materials:**
  - We provide both printed and digital scientific and practical materials to participants.
- **Attendance and Final Result Reports:**
  - We prepare detailed attendance reports for participants and offer a comprehensive program evaluation.
- **Professionals and Experts:**
  - The programs scientific content is prepared by the best professors and trainers in various fields.
- **Professional Completion Certificate:**
  - Participants receive a professional completion certificate issued by the Scandinavian Academy for Training and Development in the Kingdom of Sweden, with the option for international authentication.
- **Program Timings:**
  - Training programs are held from 10:00 AM to 2:00 PM and include buffet sessions for light meals during lectures.