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For Training and Development

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

Code	City	Hotel	Start	End	Price	Language - Hours
540	Muscat (Oman)	Hotel Meeting Room	2024-12-01	2024-12-05	3950 €	En - 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 for Training and Development 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:**
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- **Professional Completion Certificate:**
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- **Program Timings:**
  - Training programs are held from 10:00 AM to 2:00 PM and include coffee break sessions during lectures.