GLOBAL
INDUSTRIES
INTELLIGENCE

ADVACED RISK BASED INSPECTION

13TH - 17TH MAY, 2024

GRAND HYATT AL KHOBAR SAUDIA ARABIA

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COURSE OVERVIEW

Risk-Based Inspection (RBI) is an analysis methodology and process that requires qualitative or quantitative assessment of the probability of failure (PoF) and the consequence of failure (CoF) associated with each equipment item, piping circuits included, in a process unit. The risk-based approach requires a systematic and integrated use of expertise from the different disciplines that impact plant integrity. Risk-based methodologies enable the assessment of the likelihood and potential consequences of equipment failures. Risk-Based Inspection (RBI) provides companies the opportunity to prioritize their equipment for inspection; optimize inspection methods, frequencies, and resources; and develop specific equipment inspection plans. This results in improved safety, lower failure risk, fewer forced shutdowns, and reduced operational costs.

A properly implemented RBI program categorizes individual pieces of equipment by their risks and prioritizes inspection efforts based on this categorization.

RBI can be used to prioritize inspection-related activities, usually by means of non-destructive examination (NDE), to reduce the uncertainties around the true damage state of the equipment and the dynamics leading to such. The resulting inspection plan may outline the type and scheduling of inspection for an asset. In addition to NDE, additional risk mitigation activities identified by an RBI assessment might include a change in material of construction, installation of corrosion resistant liners, operating condition changes, injection of corrosion inhibition chemicals, etc.

Consistency and repeatability of analysis are critical to producing an effective RBI program, as RBI is based on relative risks.

COURSE OBJECTIVES:

Upon completion of this Workshop, the delegates will be aware and understanding of the following:

- Fundamental principles of Risk Analysis
- The Quantitative determination of probability of failure
- Analysis of consequence of failure methodology
- Fundamental principles of component integrity through Oil and Gas industries
- Understanding of API recommended practice API/ASME 579 standard "Fitness-for-Service" API/580/1 – Risk Based Inspection Program
- Purpose, scope and examination of critical steps within the RBI process
- Using Risk Based Inspection assessment and exercises
- Overview of deterioration mechanisms and failure modes affecting plant equipment
- Using risk determination, risk assessment and risk management

- Team roles and responsibilities within RBI assessment(s)
- Personnel training and qualifications required
- Documenting and record keeping requirements, Learn the latest World Class Maintenance Best Practices and Benchmarking Metrics to assure you stay current with the industry and ahead of your competition.

WHO SHOULD ATTEND?

Individuals responsible for implementation of Risk Based Inspection programs within their companies or plant facility. Mechanical integrity, equipment reliability and inspection personnel that are responsible for maintaining and servicing process plant equipment for a cost-effective inspection program. Plus, maintenance personnel, operations supervisors and process specialists that are involved with making decisions regarding suitability of equipment for continued service.

Day 1

Fundamental principles of Risk Analysis

In simple terms, risk management is an approach used by organizations to control losses. It involves identifying hazardous situations in the work environment and assessing the associated risks; then acting to minimize the possible consequences of these situations.

- Case Study in Practical Safety Risk Management
- Exercise Spot the Hazards

Definitions and acronyms used in RBI assessments.

Basic concepts of risk acceptance, perception of risk and using event tree analysis

ETA is a primary tool of Probabilistic Risk Assessment. In technical risk assessment, the initial state, or "initiating event," is generally a hazard or failure, the intermediate events are potential propagation paths, and the final states are either conditions of loss (degradation, damage, destruction, death) or successful loss mitigation.

- Video Event Tree
- Video Fault Tree
- Exercise using the Event Tree and Fault Tree

Understanding Risk Based Asset Management (RBAM) and Risk Based Management (RBM)

Fundamentally, a risk-based asset-management system collects relevant information based on the importance to the value stream and uses this information to make fiscally responsible decisions that will, in turn, create greater value to the organization. There are four phases in the risk-based asset-management model that are critical for the success in deployment of this strategy. The four phases are: Classify, Analyse, Control, and Measure.

- Video Asset Integrity Management

Asset life cycle and life cycle cost management implications to RBI

A key process within asset management is the understanding of asset life cycle. There are four key stages of the asset lifecycle, which this section will classify and describe. The four key stages of the asset lifecycle are: Planning – Acquisition – Operation and Maintenance – Disposal

Organisations need to implement a Risk-Based Maintenance strategy if the risk of consequence far outweighs the cost of equipment.

- Video Lifecycle Costing

Day Two:

Assessment of probability of failure (PoF) and consequence of failure (CoF)

Probability of Failure (POF) is likelihood that a piece of equipment will fail at a given time and an important part of effective risk analyses. POF is half of the equation when determining risk as part of Risk Based Inspection (RBI) methodology. The POF, calculated together with the Consequence of Failure (COF), helps operators establish the risk level for a particular piece of equipment and set inspection intervals based on the calculated risk.

POF is calculated for individual pieces of equipment by looking at the potential damage mechanisms it could be susceptible to, a general frequency of failures, and management system factors. More details on POF are provided in the American Petroleum Institute's Recommended Practice 580 - Risk Based Inspection (RBI), which contains directions on developing, implementing, and maintaining an effective RBI program.

- Video Bathtub Curve
- Exercise Numbers Game
- Case Study Human Factors in Maintenance

Using data and knowledge in QRA as a useful decision-support tool

A Quantitative Risk Assessment (QRA) is the systematic development of the safety and risk management tool through engineering, procurement, construction and operation for oil, gas, chemical and petrochemical plants. The QRA is the identifying risks and evaluating possible accidental events (frequency and fatality), and calculation of the risks for leaks and explosions of the plant.

- Case Study - CSB Safety Video
- Video Quantitative Risk Assessmen

Principles and main steps of risk analysis

Risk analysis is the methodical study of uncertainties and risks we encounter in business, engineering, public policy, amongst other areas. Risk Analysis an essential tool when your work involves risk. It can help you identify and understand the risks.

- Exercise Principles and main steps of Risk Analysis
- Video Hazard and Risk

Qualitative, semi-quantitative, and quantitative approaches

Qualitative Risk Assessments and Quantitative Risk Assessments are specialised methods for calculating risks to individuals, public (societal risk), the environment and/or assets. As part of the formal safety assessment required in the project HSE management, a QRA is highly demanded by clients to identify major accident hazards and reduce the significant risk contributor according to the As Low As Reasonably Practicable (ALARP) principle.

Day Three:

Nature of Risk and its definition

According to ISO 31000, risk is the “effect of uncertainty on objectives” and an effect is a positive or negative deviation from what is expected.

- Case Study Maintenance Management
- Video ISO 31000 Risk management process

Complying with Global Processes and Minium Standards

Risk probability and impact.

The Risk Impact/Probability Chart is based on the principle that a risk has two primary dimensions: Probability – A risk is an event that "may" occur.

- Video What is a Risk Assessment? 4 Key Elements & How To Perform a Risk Assessment Safety Culture
- Case Study Case Study Structural Deviation

Probability impact matrix

Low impact/low probability - Low impact/high probability - High impact/low probability - High impact/high probability

With the Risk Impact/Probability Chart, you map out each risk – and its position determines its priority. High-probability/high-impact risks are the most critical, and you should put a great deal of effort into managing these. The low-probability/high-impact risks and high-probability/low-impact risks are next in priority, though you may want to adopt different strategies for each.

- Exercises using Corrective Maintenance Prioritisation tools.

Applying mitigation methodology

Risk mitigation strategies are action plans you conceptualize after making a thorough evaluation of the possible threats, hazards or detriments that can affect a project, a business operation, or any form of venture. The purpose of such strategies is to lessen or reduce, if not totally eliminate the adverse impacts of the known or perceived risks inherent in a particular undertaking, even before any damage or disaster takes place.

Day Four:

Deviation Analysis, Hazard and Operability Studies, Energy Analysis

The Hazard and Operability (HAZOP) study is the most widely used Process Hazards Analysis (PHA) technique in the chemical, pharmaceutical, food, oil and gas, nuclear, and other process industries worldwide. HAZOP is used during the design stages of a new process or project, for major process modifications, and for periodic review of existing operations.

- Video How to Calculate Standard Deviation
- Case study What is HAZOP?

Failure Modes, Effects Analysis, HAZOP's (Hazard and Operability Studies)

Failure Mode and Effect Analysis (FMEA) is an alternative method of hazard identification: it is less formalized than Hazop and involves the consideration of the possible outcomes from all discerned failure modes or deviations within a system.

- Exercises using the Failure Mode and Effect Analysis (FMEA) tool.
- Video What is FMECA
- Case study FMEA RCA
- Video 5-Why's

Day Five:

Failure Logic – Fault Trees, Event Trees & Cause – Consequence Identifying areas for improvement.

- Video Fault Tree Introduction
- Exercises Fault Tree and Line of Sight tools.

RBI Data Needs, Analysis of Equipment Failure Data

- Video What is Risk-Based Inspection

When to Conduct an RBI Reassessment

RBI assessment team roles and responsibilities

TRAINER'S BIO
JOHN HAY

John Hay has 30 years' experience in Maintenance and Reliability training worldwide, having successfully delivered training throughout Europe, Africa, Asia and the Middle East.

John has worked with many of the major companies worldwide such as Shell, Marathon Oil, Conoco Phillips, Dolphin Drilling, Chevron, Total, and DONG Energy managing and delivering Maintenance and Reliability training in key areas such as Total Productive Maintenance TPM Reliability Centred Maintenance RCM, Life Cycle Management LCM, Root Cause Analysis RCA, Risk Based Inspection RBI, Criticality Analysis, KPI Management/analysis and Maintenance Planning and Scheduling including many other related areas.

John is also an accredited Operational Excellence Auditor within Shell and an International Maintenance & Reliability Trainer and has specialist knowledge within SAP Plant Maintenance interfacing within all other SAP modules.

Course Methodology

Practical Learner Friendly Training

- Presentations
- Games
- Case Studies Audio – Video
- Interactive Exercises
- Learning by Doing
- If I listen, I forget If I see, I remember.
- If I do, I understand.
- If I teach, I learn.

TRAINING METHODOLOGY:

The course is interactive and is comprised of lectures, case studies, technical process learning, and supplemental discussions related to various industries and the challenges of implementation.

TESTIMONIALS

RICHARD GROGAN

UK IT/SAP Team Manager at Amoria Bond

Since working with John at ConocoPhillips we have had nothing but good feedback on his performance. He has made an impact from his first day on site both in terms of process improvement and in terms of building relationships within the business.

He is punctual, professional and has been an absolute pleasure to work with. I would highly recommend John as a true expert within the SAP arena.

Scott Fraser

Vice President OIM Energy Group

John provides an excellent service, in his chosen field. John is professional & a pleasure to work with

David Furnival

Head of Maintenance Strategy and Support

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John was a key member of the team I managed to implement major improvements into the Work Preparation, Scheduling and Execution process in Shell Europe. John played an important role in coaching maintenance staff how to use SAP to optimise their process so that their benefits were transparent (and encouraging). John was skilled at using tough love to manage resistance and encouragement to manage strugglers. He was a hard worker, dedicated to the project to which he added a great deal.

Richard Grogan
UK IT/SAP Team Manager at Amoria Bond

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Jon Briggs
Maintenance Superintendent

John is a highly motivated and competent SAP Professional. Whilst working as a Reliability Engineer in the same in the same Maintenance group John always found the time to give the reliability team the benefit of his knowledge and skill

Leo van Grol

Operational Integrity Manager for Upstream

John has great knowledge of maintenance processes and SAP. The combination makes him an invaluable resource when aiming to make improvements in the maintenance area.

Richard Rockwood

Management Consultant - Physical Asset Management - CAPEX OPEX Lifecycle - Reliability - CMRP - API 580

I'd like to recommend John Hay and the excellent work he provided to Shell Exploration and Production. For several years I had the pleasure of working with John in numerous locations around the globe implementing SAP for Shell Exploration and Production. In every business environment from the Middle East, Europe, to Asia, John delivered excellence and quickly earned a well-deserved reputation as the "go to" subject-matter-expert" for the Shell global SAP implementation. John quickly established himself with SAP, maintenance, and reliability skills that far surpassed Shell internal SAP experts. In part, this was a direct result of John's vast experience in the workplace application of SAP beyond the classroom. John's mastery of SAP Maintenance Management, Material Management, and associated Inventory and Purchasing modules was second to none. John later was appointed the Project Manager for the Shell SAP implementation in Brunei and led a team of over 15 SAP Shell internal and independent consultants.
John's vision and application of SAP as a workplace tool designed to deliver process efficiency and business results set the standard that Shell modelled on a global initiative. I cannot recall a single situation where John didn't provide added value, offered solutions to complex problems, and/or provided leading edge business solutions. John's ability and experience to apply SAP as a business solution tool in "real world" situations is unmatched and frankly speaking, without a doubt, the best I have personally and professionally witnessed. John's SAP ability is "world class" and his knowledge, skills, and abilities with SAP deliver excellence and business results. I value my time spent working with John and I know the global clients he has worked with value his expertise and invaluable contribution.

Larry Olson, CMRP

President / CEO at Nexus Global Business Solutions, Inc.

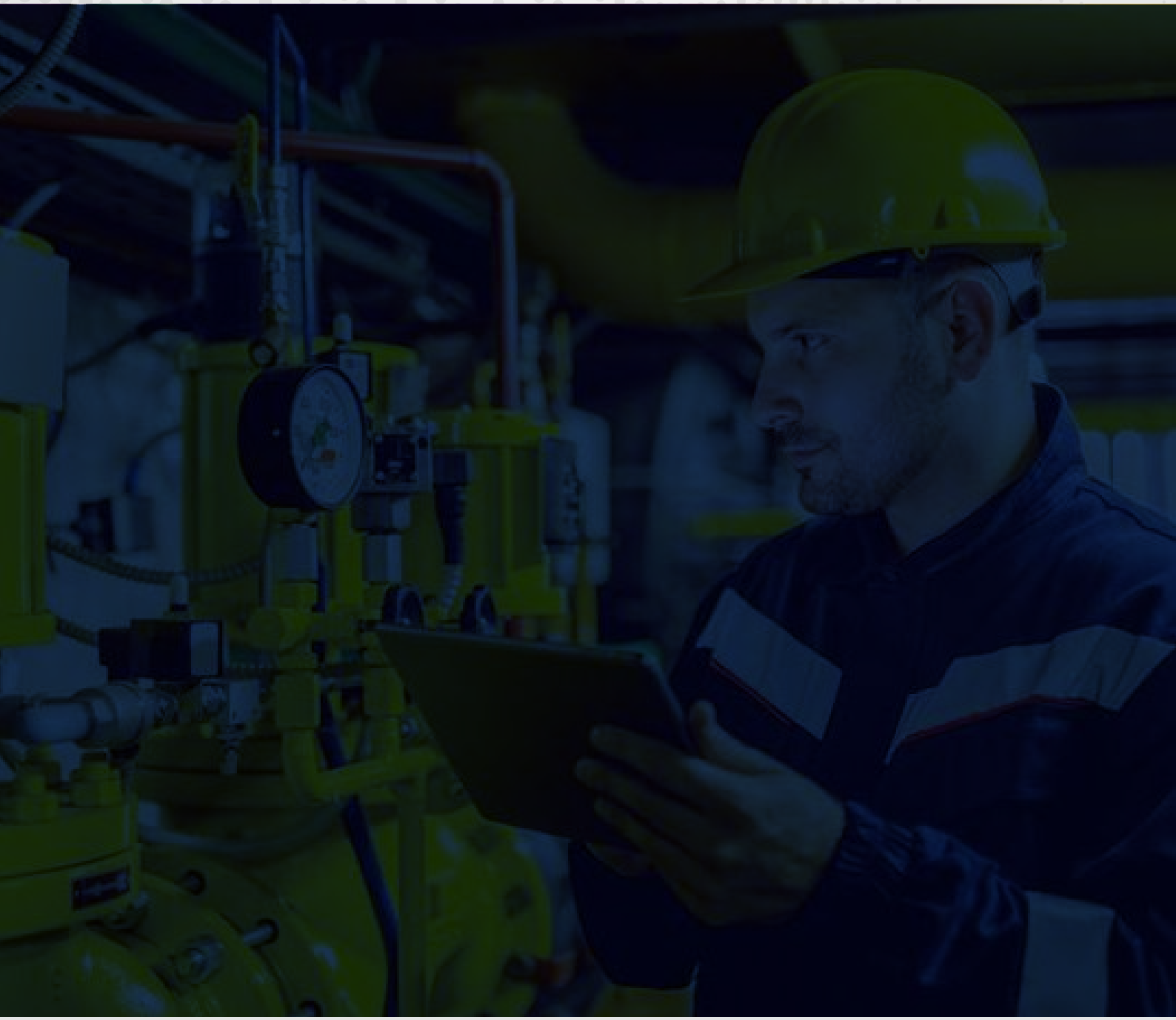
During my time as John's manager, I found John to be very cooperative and articulate about his assignments. John was asked to take on assignments in various locations geographically and not once was there ever a question about would he take the assignment. With John it was always about when and where. His normal reply was I want to do whatever it takes to make the company successful.
John brought a good knowledge of the overall working of SAP and was able to identify opportunities for improvement.
During my time as John's manager, he displayed exceptionally good sound judgment and personal character.

Qazi Akhtar

EAM Solution Advisor ITT-SAP at Schlumberger

John is an extremely competent SAP PM consultant. He is not only well versed on the ERP side but also has a vast maintenance management experience on the business side. John qualifies as a true functional consultant. He is incredibly detailed in his approach and definitely his maintenance operations knowledgebase compliments his SAP functional skills very well. A thorough professional and definitely a team player. I genuinely enjoyed working with John and it would be a pleasure to work with him again.

Course duration: 5- Days



ADVACED RISK BASED INSPECTION

13th - 17th May, 2024
Grand Hayat Al Khobar Saudia Arabia

FOR REGISTRATION PLEASE COMPLETE THIS FORM AND EMAIL BACK TO
MUHAMMAD SAAD
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REGISTRATION DETAILS

NAME .....
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REGISTRATION FEE:

Book & Pay till 4 April, 2024@ GBP 3995/Person
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Name _____ Position _____

THIS BOOKING IS INVALID WITHOUT A SIGNATURE.
AUTHORIZATION SIGNATORY MUST BE AUTHORIZED TO SIGN ON BEHALF OF CONTRACTING ORGANISATION