



Arabian Institute For Training

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# Refinery Shutdown & Turnaround

## INTRODUCTION

- Refineries extreme safety and continuous operation constriction requirements demand properly designed and executed shutdowns together with increase in efficiency with the use of latest technologies place massive importance on properly designed and executed shutdown and turnaround.
- This Refinery Shutdown and Turnaround training seminar introduces the methodologies to plan execute major overhaul and upgrading in the most efficient and cost effective way of the highly complex refinery structure.
- This Refinery Shutdown and Turnaround training seminar emphasizes the optimization of the shutdown work structure so assets remain reliable and efficient with minimization of the required shutdowns though out the life cycle of the Refinery.

This training seminar will highlight:

- Use of API 571 for work identification for static equipment and other international codes for dynamic equipment
- Sizing work requirements using API 579
- Creation of the appropriate Work structures to avoid repletion and minimize personnel engagement
- Use Gantt charts to monitor execution and keep in time
- Use of CPM PERT techniques for scheduling
- Use failure mathematics to safeguard risk on planning activities
- Assess turnaround with the appropriate efficiency testing and indicators

## OBJECTIVES

At the end of this training seminar, you will learn to:

- Understand the Failure mechanisms of Refinery applying API 571
  - Size the necessary work for Assets life maximization using API 579
  - Apply the correct type of turnaround for each asset
  - Schedule work activities
  - Control time, budget and scope during shutdown
  - Assess performance of Turnaround
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## **TRAINING METHODOLOGY**

- This Refinery Shutdown and Turnaround training seminar is delivered by means of a combination of instructor-led topic areas and class discussions. This training course is further enhanced by the use of case studies, examples and practical exercises that are pre-loaded onto a laptop for each delegate. The templates, case studies, examples and exercises are subsequently available to each delegate after the seminar as a reference for further study, research or practice. This ensures a high level of knowledge and skill retention.

## **ORGANISATIONAL IMPACT**

The organisation will:

- Be capable to optimize shutdown and turnaround costs
- Be able to minimize effect of shutdown turnaround on life cycle scale
- Target work activities on critical Refinery equipment
- Assess Refinery Shutdown activities in time, scope and efficiency

## **PERSONAL IMPACT**

- Understand the machine failure and degradation using API 571 and other international codes
- Size shutdown work requirement using API 579
- Implement the appropriate shutdown program to improve reliability
- Control Shutdown cost time and scope during execution
- Assess all Turnaround activities with the appropriate indicators

## **WHO SHOULD ATTEND?**

- It is highly recommended that Refinery maintenance, reliability, engineering and technical support staff including leadership and management to attend this Maintenance Engineering training seminar. Also, including:
  - Planners
  - Supervisors
  - Engineers
  - Reliability Engineers
  - Maintenance Team Leaders and Managers
  - Operations Team Leaders and Managers

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## Course Outline

### Refinery Shutdown Types and Asset Pairing

- Definitions of Shutdown and Turnaround
- Material Failure and Degradation in Refinery using API 579
- Refinery Structure and Units Sensitivity to Failure
- Failure Rate Mathematics the Basis of Reliability Center Maintenance
- Shutdown and the Life Cycle of Refineries

### Shutdown and Turnaround Planning

- Refinery Work Order System (WO) Input for Planning
- Size of Work using API 579 and Create Work Breakdown Structure (WBS)
- Creating the Most Appropriate Organization Structure to Run the Shutdown
- Spare Parts and Materials required for the Shutdown
- Personnel Internal or Subcontractors required for Shutdown

### Organizing the Shutdown Time Sequencing

- Work Sequencing Optimization
- Material – Personnel - Contractors Constraints
- Fitting the Optimum Number of Shutdowns in the Life Cycle of Plants
- Utilization of Timing Techniques (CPM-PERT)

### Control of Shutdown Time, Costs and Work Quality

- Gantt Charts for Keeping in Time
- S - curve usage for Budget Monitoring
- Financial Reserves for Uncertainties
- ISO/API Standards for Work Handove

### Shutdown Performance Analysis and Turnaround Efficiency Measurement

- Asset Turnaround Performance Indicators
  - Shutdown Workload Performance Indicators
  - Shutdown Planning Performance Indicators
  - Turnaround Effectiveness and Cost Performance Indicators
  - Shutdown and Turnaround Data Archiving and Future Recommendations
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