

Course Name: Centrifugal Compressor & Steam Turbine: Operation, Maintenance & Troubleshooting

Reference Code :

Description:

A complete understanding of design, functioning and maintenance of centrifugal compressors and steam turbines is a prerequisite for successful operation of process plants. This is especially important nowadays when the demand for minimum and continuous production is vital for competitiveness of organizations

This Centrifugal Compressors & Steam Turbines training seminar will feature the importance of proper design, operation and maintenance of centrifugal compressors and steam turbines of various designs and applications, which are encountered throughout chemical and process industries, including oil refineries, gas production facilities, power generation and other fields of engineering.

This training seminar is intended to familiarize engineers, technicians and operators with the guidelines and best practices employed in utilizing this equipment, including design, operation, maintenance and repair. The emphasis in the training seminar will be on physical understanding of the problems in operation and the best way of troubleshooting them.

This training seminar will feature:

- Principles of selection of right centrifugal compressor and steam turbine for the given application
- Practical issues related to trouble-free functioning of centrifugal compressors and steam turbines
- Explanation of aerodynamic instabilities of centrifugal compressors and thermal instabilities of steam turbines
- Guidelines for design, operation, maintenance and troubleshooting
- Maintenance and repair economic issues: cost and benefit analysis

Course Objective: By the end of this training seminar, participants will be able to:

- Understand technical features of centrifugal compressors and steam turbines
- Select optimal type and size of equipment for a given industrial application
- Use methods of estimating the degree of deterioration and inefficiency of equipment

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- Apply best practices and techniques of pinpointing the root cause of problems
- Choose the most efficient remedies and troubleshooting techniques in operation

Programme Methodology:

This Centrifugal Compressors & Steam Turbines training seminar will be conducted along workshop principles with formal lectures and interactive worked examples included in several workshops. Presented also will be several illustrative and instructive videos.

The emphasis in this training seminar will be on the explanation of all technical points and providing answers to problems that are encountered in everyday industrial practice related to installation, operation and maintenance, as well as repair and alterations of pipeline systems.

Each learning point will be reinforced with practical examples. There will be ample opportunities for active discussion and sharing professional experiences and exchange that will help solidify the gained knowledge. All training seminar materials will be provided.

Who Should attend?

This Centrifugal Compressors & Steam Turbines training seminar is designed to benefit all levels of Technical Personnel in the oil and gas industry as well as in chemical and process industries but will greatly benefit:

- Chemical, Process and Mechanical Engineers
- Product Engineers and Technologists
- Operation, Technical Service and Maintenance Professionals
- Engineers, Consultants and Sales Professionals
- Technical Professionals responsible for interdisciplinary energy projects

Course Outline:

DAY 1

Gas Thermodynamics

- Gas Properties and Laws
- Centrifugal Compressor Aerodynamics - Thermodynamics

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- Changes in Gas Velocity and Pressure in a Centrifugal Compressor
- Mass and Volume Flow Rate as a Function of Pressure, Temperature and Gas Composition
- Molecular Weight of Gas and its Effect on Performance
- Discharge Temperature, Power Absorbed as a Function of the Gas Composition and the Operating Conditions
- Investigating and Controlling Surge and Choke

DAY 2

Centrifugal Compressors – Design – Operation

- Overview of the Main Features of Various Types of Compressors
- Classification of Compressors based on Design and Application
- World Standards and Codes related to Compressor Design
- Main Elements of Centrifugal Compressor Construction
- Analysis of Centrifugal Compressor Efficiency
- Guidelines for Trouble-free Centrifugal Compressor Operation

DAY 3

Steam Thermodynamics

- Steam Properties and the Mollier Charts
- The Rankine Cycle
- Steam Requirement per KWH Production
- Ultra-supercritical Conditions

DAY 4

Steam Turbines – Design -Operation

- Main Elements and Technical Characteristics of Steam Turbine Design
- The Rotating and Stationary Blades
- The Internal and External Seals
- Radial and Thrust Journal Bearings

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- Stop – Control – Non Return Turbine Valves
- Turbine Controls and Interlocks

DAY 5

Maintenance of Rotating Machines

- Machines Piping and Ground Regulations
- Alignment of Thermal Machines
- Balancing of Rotating Machines
- Surface Treatments of Sealing Interfaces
- Online Washing
- Troubleshooting through Vibration Analysis, Oil Analysis and Thermography

Course Duration Date of start : 28/04/19

Time: 08:00 AM -03:00 PM **Numbers of hours:** 30 Hours

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