Centrifugal Compressor, Rotor & Steam Turbine

Design, Processes & Maintenance

Introduction

Process plant operation requires a thorough understanding of the design, operation, and maintenance of steam turbines and centrifugal compressors. These days, when minimum and constant production is necessary for organisations to remain competitive, this is especially crucial.

The importance of proper design, operation, and maintenance of centrifugal compressors and steam turbines of various designs and applications will be covered in this training course on centrifugal compressors and steam turbines. These machines are found in the chemical and process industries, including power generation, oil refineries, gas production facilities, and other engineering fields.

The goal of this training programme is to acquaint engineers, technicians, and operators with the standards and best practices used in the design, operation, maintenance, and repair of this equipment. During the training programme, the focus will be on physically understanding operational difficulties and the most effective ways to troubleshoot them.

Included in this Course N Carry training programme will be:

- Guidelines for choosing the best steam turbine and centrifugal compressor for a certain application
- Practical concerns for the trouble-free operation of steam turbines and centrifugal compressors
- An explanation of the thermal and aerodynamic instability of steam turbines and centrifugal compressors
- Design, operation, maintenance, and troubleshooting guidelines
- Economic concerns related to maintenance and repair: a cost-benefit analysis

Objectives

Following this training session, participants will be capable of:

- Recognise the technical characteristics of steam turbines and centrifugal compressors.
- Choose the best kind and dimension of machinery for a particular industrial need.
- Utilise techniques for determining the extent of equipment degradation and inefficiency.
- Use best practices and methods to identify the underlying causes of issues.
- Select the most effective fixes and troubleshooting methods available.

Training Methodology

This training course on centrifugal compressors and steam turbines will follow workshop principles and incorporate formal lectures as well as interactive worked examples in many workshops. A number of educational and illustrative videos will also be presented.

This training course will place a strong emphasis on explaining all technical concepts and offering solutions to issues pertaining to pipeline system installation, operation, and maintenance as well as repairs and modifications that arise in regular industrial practice.

There will be real-world examples to support each lesson. There will be many of chances for engaged conversation, professional experience sharing, and exchange, all of which will serve to reinforce the knowledge that has been acquired. All instructional materials will be supplied.

Organizational impacts

In any plant, centrifugal compressors and steam turbines are essential pieces of equipment. By selecting them based on design specifications, operating at peak efficiency, performing necessary maintenance at regular intervals, and keeping the right spare parts at optimal clearances, these pieces of equipment help organisations achieve their goals of maximum output at the lowest possible OPEX and CAPEX.

Following the conclusion of this training programme on centrifugal compressors and steam turbines, the delegate will be qualified to:

- Indicate which compressors and turbines to buy or upgrade using the API, ASME, or ISO codes.
- Run turbines and compressors with maximum efficiency.
- Choose, select, and build the essential replacement parts by reverse engineering them.
- Maximise the duration of crucial clearances at BEP.

Personal Imapct

Any technological organisation that wants to be controlled effectively and treated with respect by its peers needs technical expertise; when this is accomplished, personal fulfilment follows.

The delegation will leave this training session on centrifugal compressors and steam turbines with the necessary level of expertise for:

- Choosing compressors and turbines appropriately
- Handle operational curves under ideal circumstances.
- Machine alignment and balancing for minimal vibration
- Utilise reverse engineering methods in the production and maintenance of spare parts.
- Assembling and disassembling while adhering to the necessary protocols.

- Troubleshoot any issues that could arise.

Who should attend?

All levels of technical personnel in the oil and gas, chemical and process industries will benefit immensely from this Course N Carry Centrifugal Compressors & Steam Turbines training course, but in particular:

- Engineers in Chemistry, Process, and Mechanical
- Technologists and Product Engineers
- Professionals in operation, technical service, and maintenance
- Professionals in engineering, consulting, and sales
- Technical experts in charge of multidisciplinary energy initiatives

Course Outline

Day 1

Gas Thermodynamics

- Gas Laws and Properties
- Thermodynamics and Aerodynamics of Centrifugal Compressors
- Variations in the Pressure and Velocity of Gas in a Centrifugal Compressor
- Rate of Mass and Volume Flow in Relation to Temperature, Pressure, and Gas Composition
- The Impact of Gas Molecular Weight on Performance
- Temperature of Discharge, Power Absorbed Depending on Gas Composition and Operating Conditions
- Examining and Managing Choke and Surge

Day 2

Centrifugal Compressors: Architecture and Function

- Summary of the Key Characteristics of Different Compressor Types
- Compressor Classification according to Application and Design
- International Codes and Standards for Compressor Design
- Essential Components of Centrifugal Compressor Design
- Evaluation of the Efficiency of Centrifugal Compressors
- Guidelines for Centrifugal Compressor Operation Without Problems

Day 3

Steam Heat Exchanger

- The Mollier Charts and Steam Properties
- The Cycle of Rankine
- Steam Needed for Every KWH Produced
- Extremely Supercritical Conditions

Day 4

Steam Turbines: Architecture and Function

- Essential Components and Technical Features of Steam Turbine Design
- The Fixed and Rotating Blades
- The Seals, Both Internal and External
- Journal Bearings, Thrust and Radial
- Control, Stop, and Non-Return Turbine Valves
- Interlocks and Turbine Controllers

Day 5

Upkeep of Rotating Machinery

- Equipment Piping and Ground Rules
- Aligning Thermal Equipment
- Rotating Machine Balancing
- Finishes on Sealing Interface Surfaces
- Internet Cleaning
- Vibration analysis, oil analysis, and thermography are used in troubleshooting.