Steam Turbine Operation

TM162

Course Overview:

Steam Turbines of several types, which have widely varying configurations and applications, are usedextensively in the process industries. These and steam turbines represent a significant part of the capital andoperating costs of most plants, so that optimizing their selection is of major economic importance.The course is devoted to design features, efficiencies, operating characteristics, reliability and maintenanceimplications of centrifugal and steam turbine drivers.This course will cover the operating principles of centrifugal and steam turbines, specifications, their design,thermodynamics, effects of efficiency on operating costs, energy usage, effect on plant costs, special materialsof construction, selection, troubleshooting, and maintenance.

Course Objective:

Upon completion of this course, participants will have gained a thorough understanding of the varioussteam turbine configurations available to virtually every industrial user. Itemsdiscussed include mechanical design features, sizing and application criteria, maintainability, reliability,vulnerability and troubleshooting issues. Participants will learn simple techniques and short-cut methods ofmachinery selection, which can take the place of tedious hand calculations and will serve as rapid means todetermine sensitivity or influence of parameter changes on equipment performance. Participants will be able todetermine the most appropriate and efficient matching of compressor to steam turbine driver. Participants willalso acquire knowledge of operating and maintenance issues by getting to know mechanical design, machinerycomponents, piping design, as well as proven approaches to monitoring, troubleshooting, and maintenance ofcompressor installations.

Course Outline:

STEAM TURBINES:Operating Principles, Impulse Turbines, Reaction Turbines, Application Ranges, Configurations, ApplicationConstraints TURBINE COMPONENTS: Turbine Rotors, Blading, Diaphragms, Nozzles, Steam Chests, Glands and GlandSystems, Bearings, Balancing, Rotor Dynamics, Governing Systems, Lube Oil Management OVERVIEW OF SELECTION AND SIZING OF STEAM TURBINES FOR RELIABILITY:Thermodynamics, Steam (Water) Rates, Condensing and Backpressure Turbines, Single and MultistageTypes, Process Considerations OPERATION AND MAINTENANCE OF STEAM TURBINES:Commissioning, Startup, Run-In and Shut-down, Surveillance and Health Monitoring, PerformanceMeasurement, Monitoring and Tracking, Steam Turbine Washing, Steam Turbine Inspection, Maintenance,Overhaul and Repair (IMO&R) DESIGN PREDICTIVE VS. PREVENTIVE MAINTENANCE TECHNIQUES:Determination of Which Method to Use MACHINERY RELIABILITY AUDITS AND REVIEWS: Overview; Reliability Impact on Plants

Who Should Attend:

This application and component course is intended to be of direct use by persons in staff (Senior Technicians,Operators, Supervisors, Superintendents) and corporate engineering, plant planning and design, systemsdesign, equipment selection and evaluation, and equipment maintenance areas. It will also be of value toequipment and systems specialists in engineering contractor firms. This course should also be valuable tomanagerial and supervisory individuals responsible for operations and maintenance functions. The industriesmost directly involved with the subject matter are those producing chemicals, petrochemicals, petroleumproducts, natural gases, manufacturing gases, steel and other metals, and plants requiring processrefrigeration. Throughout the course participants will have ample opportunity to have equipment-relatedquestions answered by the instructor.

Training Language:

EN / AR

Training Methodology:

- -Presentation & Slides
- -Audio Visual Aids
- -Interactive Discussion
- -Participatory Exercise
- -Action Learning
- -Class Activities
- -Case Studies
- -Workshops
- -Simulation