

T-008 GAS TURBINES OPERATION, MAINTENANCE AND INSPECTION

A detailed overview of the design and operating principles of gas turbines, with in-depth information on maintenance and inspection best-practices

Gas turbines have been the backbone of power generation and mechanical drive applications in the oil & gas industry for more than 50 years. Their flexibility, reliability, and high power-density made them the ideal choice for powering generators and large compressors in remote or offshore plants and in land-based power stations.

Since the 1960s gas turbines have seen a tremendous technological development, with continuous increases in power output, power density, and simple-cycle efficiency. Modern gas turbines use cutting-edge super-alloys and advanced technologies that require operators and engineers to learn and understand the peculiar characteristics of these materials and technologies in order to operate their gas turbines reliably, especially when running in harsh environments or fueled by process gas.

This course provides a comprehensive overview of the engineering principles of industrial and aero-derivative gas turbines, including mechanical and thermodynamic design aspects. It presents in detail all components of a gas turbine system, including air filtration and auxiliary systems, discusses the combustion aspects of diffusive-flame and low-NO_x combustors, introduces the evolution and the characteristics of the super-alloys used in the hot-section of the machines and how they affect the hot section design.

The course also highlights the connection between the design characteristics of gas turbines and their operating performance and their maintenance needs. It analyses the best-practices in gas turbine maintenance and inspection and explains how maintenance routines can be optimized to improve the machine uptime.

Who should Attend?

The course is suitable for the following:

- Engineering staff
- Process & Operations Engineers and Supervisors
- Maintenance Engineers and Supervisors
- Technical managers of LNG plants or refineries

Duration

2 days

Course structure and content

A 2-day technical course aimed at responsible managers and engineers:

- Types of gas turbines & power rating
- The Brayton cycle and gas turbines' thermodynamic fundamentals
- Mechanical design of gas turbines
- Inlet air system selection
- Air compressor design and control
- Combustion fundamentals: premixed and diffusive flames
- Combustion systems design and operation: diffusive flame combustors, dry low-NOx combustors, emissions control
- Turbine section design: turbine materials, blade designs.
- Operating profile of gas turbines
- Power augmentation systems
- Failure modes: aqueous-acidic corrosion, oxidation, hot-corrosion, creep, fatigue.
- Start-up and testing
- Air systems and fouling
- Fuel types and systems
- Component parts and repair
- Overhaul best-practices
- Maintenance optimization and Time-Between-Overhauls extension
- Case histories
- Gas turbines workshop

Training Outcome:

On completion of the course, you should be able to:

- Understand the fundamentals of gas turbine technology, design, and operation (thermodynamics, mechanical aspects, materials)
- Understand the operating profiles of gas turbines and the operating risks
- Apply best maintenance & inspection practices and develop a maintenance improvement plan aimed at maximizing the machine uptime

Course Presenter

Ron van den Handel: with a career of over 35 years with Shell, Ron has worked as rotating equipment engineer in refineries, LNG, upstream plants, and large Shell projects. In the later part of his career Ron was Global Manager for Rotating Equipment in Shell Global Solutions, providing consultancy and advice to all Shell Operating Units and Projects around the world.