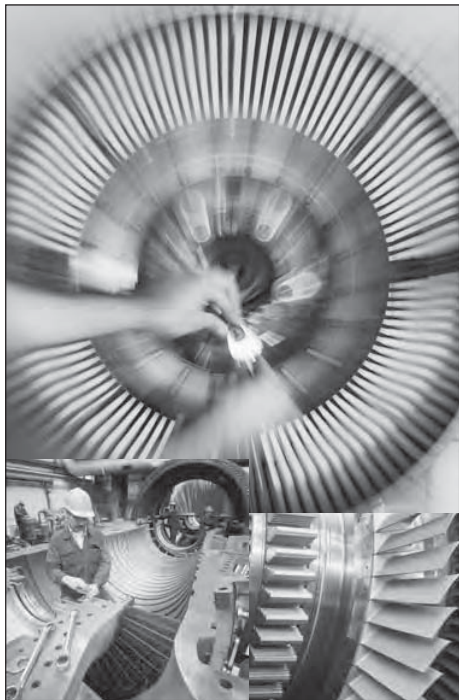

GAS TURBINES

FUNDAMENTALS, MAINTENANCE, INSPECTION AND TROUBLESHOOTING



YOU WILL LEARN HOW TO:

- Explain the basic thermodynamic principles behind gas turbines
- Understand the basic operation of a gas turbine
- Clearly describe the operation and function of gas turbine components
- Perform simple troubleshooting and maintenance
- Do a simple review of the successful operation of a gas turbine and know what characteristics are required for materials and fuels
- Perform simple condition monitoring interpretation and maintenance

WHO SHOULD ATTEND:

Those new to gas turbines and more experienced technical personnel who want an overview of the operation and available technologies of gas turbines.

The Workshop

This workshop gives a solid review of gas turbines with a focus on:

- Fundamental thermodynamics
- Gas turbine components
- Materials of construction
- Bearing, seals and lubrication systems
- Fuels and fuel supply systems
- Combustion air filters
- Control systems and instrumentation
- Operations and maintenance

Whilst it is unfortunately not possible to use a real life turbine in the course due to cost and perhaps space considerations, video clips, exercises and case studies with actual hardware examples will be used to make the course as interesting and practical as possible.

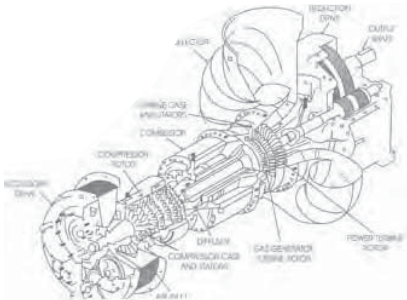
3 Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

The practical exercises are:

- Components
- Thermodynamics
- Operation and maintenance

To gain full value from this workshop, please bring your laptop/notebook computer.



The Program

OVERVIEW OF GAS TURBINES

- Industrial heavy duty gas turbines
- Aircraft-derivative gas turbines
- Medium range gas turbines
- Major gas turbine components
- Heat recovery steam generators

FUNDAMENTAL THERMODYNAMICS

- Reversible cycles with ideal gases
- Actual gas turbine cycles
- Air compressor performance characteristics
- Combustion processes
- Gas turbine performance calculations
- Comparison of basic specifications

GAS TURBINE COMPONENTS

- Axial-flow compressor
- Radial-inflow turbines
- Combustors, construction and types
- Igniters
- Fuel nozzles
- Hot path components
- Axial-flow turbine
- Firing concepts and emission control

MATERIALS OF CONSTRUCTION

- General metallurgical behaviour
- Gas turbine blade materials
- Turbine wheel alloys
- Corrosion problems
- Wear problems
- Future materials
- Coating technology

BEARINGS AND SEALS

- Bearing design principles
- Bearing materials
- Non-contacting seals
- Mechanical seals

LUBRICATION SYSTEMS

- Basic components
- Oil cooling and warming
- Oil cleaning and conditioning
- Lube oil selection

FUELS AND FUEL SUPPLY SYSTEMS

- Fuel specifications
- Fuel properties
- Fuel treatment
- Heavy fuels
- Fuel measurement
- Fuel supply systems
- Cleaning of turbine components

COMBUSTION AIR FILTERS

- Combustion air quality requirements
- Function of gas turbine air filters
- Environment and type of inlet filters
- Selection principles
- Operation and maintenance

EXHAUST SYSTEMS

- Sound abatement, inspection openings and chimneys

AUXILIARY COMPONENTS AND SYSTEMS

- Starting systems, washing systems, gear boxes, and couplings

CONTROL SYSTEMS AND INSTRUMENTATION

- Pressure measurement
- Temperature measurement
- Vibration measurement
- Performance measurement
- Control systems
- Monitoring and diagnostic systems

GAS TURBINE OPERATIONS AND MAINTENANCE

- Operating philosophies
- Analytical on-line condition monitoring
- Using a borescope
- Selecting maintenance approaches
- Maintenance planning
- Spare parts and special tools
- Inspection, overhaul and repair
- Maintenance control and documentation
- Evaluating gas turbine maintenance effectiveness
- Establishing and tracking performance Indices

MECHANICAL EQUIPMENT STANDARDS

- Applicable API standards
- ANSI standards
- International standards (ISO)
- Specifications

SUMMARY, OPEN FORUM AND CLOSING

