ICTD
المركز العالمي للتدريب والتطوير
International Centre For Training & Development

MUE178

Gas Turbines & Generators: *Troubleshooting, Maintenance & Inspection*

Course Introduction:

This course presents both the fundamental basics and up to date technology for the operation and maintenance of gas turbines. For turbines to operate efficiently, they require good load control, efficient safety devices, and proper maintenance program. The course presents an overview of gas turbines, fundamentals of thermodynamics, mechanical equipment standards, and gas turbine components. The course also covers bearings and seals, fuels and fuel supply systems, control system, and instrumentation. Gas turbine operation and maintenance and troubleshooting will be also presented. By the end of the course the participants will be updated with the up-to-date technology for the operation, maintenance, and troubleshooting of gas turbines.

Course Objectives:

Upon successful completion of this course, the delegates will be able to:

- ✓ Identify and learn about technology and relative merits of gas turbine power plants
- ✓ Analyze thermodynamically the gas power plant cycles
- ✓ Learn and make performance analysis for the gas turbine main components
- ✓ Analyze the variables, which affect the performance parameters such as power, efficiency and heat rate
- ✓ Learn about different maintenance activities on gas turbine
- ✓ Learn about testing, operation, monitoring, and troubleshooting of gas turbines
- ✓ Learn about new technologies gas turbine inspection and monitoring
- ✓ Apply troubleshooting techniques to gas turbine

Who Should Attend?

This course is targeted at technicians and engineers involved in operation and maintenance of Gas Turbines. Experienced engineers and maintenance specialists will also benefit from attending this course, as will those managers concerned with the maintenance scheduling and repair aspects of Gas Turbines.

Course Outline:

Day 1:

- Make acquaintance, presentation of the program course
- Discussion of subjects of special interest to the participants
- General Introduction on gas turbines

- Basic thermodynamics (entropy, compression and expansion processes, gas turbine cycles)
- Gas turbines background and forma (open cycle gas turbines, the closed cycle gas turbine. nUses of gas turbines
- Gas turbine power and sizes
- Gas turbines components

Day 2:

- GT combustion monitoring and protection the combustion chambers
- Gas turbines fuels, calculation types, wet and dry analysis, stoichiometric, gravimetric method, air/fuel ratio exhaust gas temperature monitoring
- Combustion products, check balance, exhaust gas analysis exhaust gas as pollutants.
- Combustion intensity, fuel calori c value, upper and low limits

Day 3:

- GT over speed control and protection
- Basic function of control system control system calibrate and cost
- Lubrication system, start-up system, ignition and aming system, fuel control and governor system. Control and safety system

Day 4:

- Vibration protection
- Vibration in gas turbines, blade and disc vibration, rotor vibration, ame and casing vibration, noise level
- Vibration monitoring. Ignition and control system, fuel control and governor system, control and safety system, Application of vibration analysis
- Hand on equipment
- Gas Turbine Commissioning, start-up and shut down. Systematic trouble shooting.
- List with typical problems
- Case study & Troubleshooting techniques

Day 5:

- GT generators and transformers
- Background, financial, environmental, calculations, overall efficiency, WHB, combined cycle cogeneration, system description
- Combustion inspection, Hot Gas Path Inspection (HGPI) and Major inspection

- Maintenance, preventive maintenance, conditioned monitoring, endoscopes checking, TREND ANALYSIS, maintenance documentation & records, cost of maintenance, factors affecting maintenance
- Case study & Troubleshooting techniques
- Evaluation of the course and course recap

Course Certificate:

International Center for Training & Development (**ICTD**) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per the course location. This rate includes participant's manual, and-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee/Tea
08:20 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Coffee/Tea/Snacks)
13:30 - 15:00	Last Session