Professional Engineering Services

Diesel Power Generating Maintenance & Troubleshooting

Course Duration

5 Days

Designed For

Mechanical, Instrumentation and control, Consulting, Electrical, Project, Maintenance, Power system control Engineers, Building Services designers, Systems Planners and Managers, Electrical and Instrumentation Technicians.

Course Objectives

An Excellent knowledge of basic operation principles, layout requirements, associated components and maintenance practices for diesel power plants

Course outcome

You will gain valuable know-how related to diesel generating plants on:

- ✓ Combustion processes and engine operation principles
- ✓ Types and applications
- ✓ Fuel and lube oil requirements
- ✓ ISO ratings and terminologies
- ✓ Engine components and their functions
- ✓ Generator principles and construction
- ✓ Plant layout requirements for single and multiple units
- ✓ Associated control panels and operation
- ✓ Testing and commissioning procedures
- ✓ Plant performance troubleshooting techniques
- ✓ Good maintenance practice

Course Contents

DAY 1 Part 1 : Diesel Technology and Classifications

- Historical introduction
- Internal combustion
- Gasoline engines Vs Diesel engine
- Engine Main systems
  - Lubrication System
  - Cooling System
- Fuel System
- Systems operation
- Air starting system operation
  - Turbocharger Vs Supercharger
  - Example for Cat 3600 diesel engine main systems & components

Part I: Introduction to Power Generation

- Power Generation Types
  - Gas Turbine
  - Steam Turbines
  - Combined Cycle
  - Diesel power
  - plants Diesel
  - Engine Process
- Nature of Diesel Combustion
- Diesel Engine Characteristics
- Advantages & Disadvantages of diesel engine
- Applications
- Main Systems
- Diesel Engine vs Gas Turbine

DAY 2 Part III: Basic Engine Design and Ratings

- Ratings definitions
- Design characteristics and formulas
- Engine layouts
- Ambient conditions
- Performance and efficiency
- Engine Cycles
- Direct and Indirect injection

Part IV: Fuel Oil Systems and Layouts

- Diesel fuel types & characteristics
- Diesel fuel injection system

Part V: Lube Oil Systems

- Lube Oil Function, Properties & Types
- Oil Contaminants & Degraders
- Oil Change, Sampling & Analysis
- Grease Functions, Properties & Application
- Oil Analysis Interpretation
- Equipment Troubleshooting
- Examples of Oil Related Failures
- Water elements factors

DAY 3 Part VI: Elect Generators

- Principle of operation
- Major components (field coils, commutator, DC output, regulator, armature, rotating diodes)
- Generator types
- Low voltage and medium voltage generators
- Insulation system
- Thermal Deterioration
- Design consideration
- E&R Performance and Characteristics

Part VII: Generator Sets

- Utility vs on-site Power
- Generator Set Sizing
- Load definitions
- Generator Faults & Protections
- Synchronizing Introduction
- Governors Types
- Load Management
- Applications
- Installation

DAY 4 Part VII: Diesel Engine Maintenance

- Centrifugal Oil Filter - Inspect
- Cooling System Coolant Sample (Level 2) - Obtain
- Engine Air Cleaner Element - Replace
- Engine Crankcase Breather - Clean
- Engine Oil - Change
- Engine Oil Filter - Change
- Fuel Analysis - Obtain
- Fuel System - Prime
- Fuel System Primary Filter (Water Separator) Element - Replace
- Fuel System Secondary Filter - Replace
- Metal Particle Detector - Inspect
- Zinc Rods - Inspect/Replace

Part VIII: Installation

- Foundations
- Vibrations
- Noise
- Air Intake
- Exhaust
- Ventilation
- Cooling
- Fuel System
- Starting System
- Starting Aids

DAY 5 Part X: Synchronization

- Synchronizing Conditions
- Types of Synchronization
- Load Shedding
- Governors
- Load management
- Applications

Part XI: Troubleshooting

SUMMERY AND CLOSING