Diesel Engine Generator Operation, Maintenance and Troubleshooting

Energy Milestones Corporation

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Diesel Engine Generator Operation, Maintenance and Troubleshooting

Overview

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

Course Objectives

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 Content

1. Diesel Technology and Classification

- Historical introduction
- Internal combustion
- Gasoline engines Vs Diesel engines
- Engine Main systems Lubrication System Cooling System
- Fuel System
- Systems operation
- Air starting system operation :

1. Turbocharger Vs Supercharger
2. Example for Cat 3600 diesel engine main systems & components

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Course Content

2. Introduction to Power Generation

- Power Generation Types
- Gas Turbine, Steam Turbine, Combined Cycle Diesel, Power Plants, Diesel Engine Process.
- Nature of Diesel Combustion
- Diesel Engine Characteristics
- Advantages & Disadvantages of a Diesel Engine
- Applications
- Main Systems
- Diesel Engine vs Gas Turbine

3. Basic Engine Design and Ratings

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

4. Fuel Oil Systems and Layouts

- Diesel fuel types & characteristics
- Diesel fuel injection system

5. Lube Oil Systems

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

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6. Elect Generators

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

7. Generator Sets

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

8. 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

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8. Diesel Engine Maintenance
- Fuel System Primary Filter (Water Separator) Element - Replace
- Fuel System Secondary Filter - Replace
- Metal Particle Detector - Inspect
- Zinc Rods - Inspect/Replace

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

10. Synchronisation
- Synchronizing Conditions
- Types of Synchronisation
- Load Shedding
- Governors
- Load management
- Applications

11. Troubleshooting

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Targeted Audience

This course is designed for Mechanical, Instrumentation and control, Consulting, Electrical, Project, Maintenance, Power system control Engineers, Building Services designers, Systems Planners and Managers, as well as Electrical and Instrumentation Technicians.

Course Methodology

Facilitated by an experienced professional trainer, this training course will be conducted as a highly interactive workshop session. A variety of training methodologies and facilitation techniques will be employed before and during the course, as applicable. These methods are aimed at enhancing individual and group interaction while maximising learning. Some of these methods are:

- Online Pre-post Test
- Colourful Visual Aids
- Gamification
- Self-Assessment Instruments
- Simulations
- Case Studies
- Videos
- Group Exercises & Discussions
- Role plays
- Indoor & Outdoor games

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