



MU107: Diesel Engine Generator: Operation, Maintenance & Troubleshooting





Training Description:

Diesel Engine is the one of the most Internal Combustion Engines, where it is used for many purposes. It can be utilized as a prime mover for any of Rotating Equipment Machinery such as Pumps, Compressors and Fans, in addition to its use for all Power Plants as Black Start Units.

This course is to provide an overview of the most important components of Diesel Engine and the function of each, as well as auxiliary system such as lubrication system, cooling system and different methods used for start-up of Diesel Engine. Also, on this course will explain how to utilize the Diesel Engine as a prime mover of rotating machinery or to Generate Power. Moreover, will cover all aspects of a modern Diesel Engine and associated systems. Descriptions of the Electrical systems associated with a Diesel Engine are then covered in detail including Generator Operations, Generator components, excitation systems and voltage regulation.

In addition, we will discuss how the steps in Operating and Maintenance Programs differs for these engines; in the end, we will discuss all Problems and Troubleshooting and how to overcome through the Logical Solutions with various examples of signature to achieve understanding the operation.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Consolidate and update understanding of the Diesel Engine Components and Auxiliaries
- ✓ Understand the Diesel Engine construction and rating for Diesel Generators
- ✓ Maintain the engine in safer way and will make more effective contribution to the operation of machinery
- ✓ Learn the basics of Engine operating value evaluation and maintenance planning. Special focus is on the economic aspects of Engine Operation and Utilization
- ✓ Understand the Diesel Generator vibration problems and vibration stress and how to reduce it
- ✓ Understand the modern Diesel Engine Electronic Management System
- ✓ Familiarize with the troubleshooting of Diesel Engine Generator & Its Auxiliaries System

Training Designed for:

This course is intended for all employees involved in the Operations and Maintenance of Diesel Engine Generator. It would be of specific benefit to those who are involved in the use of DEG as Emergency Generators which would include most Power Stations, Oil Platforms and Petrochemical Plants.

Training Program:

DAY ONE:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ Module (01): Overview on Diesel Engine
 - Introduction
 - Diesel as Prime Movers
 - Spark Ignition Engine
 - Compression Ignition Cycle





- Diesel Engine & Gasoline Engine
- 4 Strokes
- 4 Cycle Engine
- Air / Fuel Ratio

❖ **Module (02): Diesel Engines Components**

- Cylinders
- Pistons
- Crankshaft
- Cylinder Liners
- Connecting Rods
- Cylinder Heads and Valves
- Piston Rings
- Cam Shaft
- Flywheel
- Governor

DAY TWO:

❖ **Module (03): Engines Related Systems**

- The Fuel Injector
- Supercharging
- Turbochargers
- Crankcase Ventilation
- Exhaust & Induction System

❖ **Module (04): Diesel Engine Auxiliary Systems**

- Air Filtration System
- Fuel Storage and Supply System
- Air Supply System
- Exhaust System
- Water Cooling System
- Starting System
- Lubrication System
- Power Governing System

DAY THREE:

❖ **Module (05): Combustion Process**

- Ignition System
- Torque vs. Seat Load
- Ignition Voltage vs. Timing

❖ **Module (06): Power Generation**

- Introduction to Alternating Current (AC)
- Producing Magnetism with Electricity
- AC Generator
- Power Factor
- Synchronizing and Operating Generator
- Automatic Voltage Regulator





- Protection and Interlock System

DAY FOUR:

❖ **Module (07): Diesel Engine /Generator Operation**

- Pre-checks for Operation
- Standard Operation Procedures (SOP)
- Normal Operation Observation & Monitoring
- Shutdown Procedures
- Abnormal Operation Conditions
- Standard Isolation Procedures

❖ **Module (08): Common Problems for Diesel Engine**

- Cracked Heads
- Scaled Exhaust
- Fouling Deposits
- Corrosion
- Cavitation's
- Splash Lubrication
- Abnormal Sound / Noise
- Vibration
- Overheating
- Overloading

DAY FIVE:

❖ **Module (09): Diesel Engine / Generator Maintenance**

- Reactive Maintenance
- Preventive Maintenance Program
- Schedule Overhauls
- Predictive Maintenance
- Reliability Centered Maintenance
- How to initiate RCM?
- Maintenance Reporting

❖ **Module (10): Troubleshooting of Diesel Engine**

- Developing a Logical Systematic approach
- Common Diesel Engine Problem
- Diesel Generator Faults
- Fault Tree Analysis
- Troubleshooting Matrix

❖ **Course Conclusion**

❖ **POST-TEST and EVALUATION**

Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request”.

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.





Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

For training registrations or in-house enquiries, please contact:

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Training & Career Development Department

