

COURSE OVERVIEW EE0862
CAT 3500 Electronic Engine Diagnostic

Course Title

CAT 3500 Electronic Engine Diagnostic

Course Date/Venue

Session 1: May 04-08, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: October 06-10, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

EE0862



Course Duration/Credits

Five days/3.0CEUs/30 PDHs

Course Description



This practical and highly-interactive course includes practical sessions and exercises where participants will visit the workshop and they will be introduced to various equipment. Practical sessions will be performed in order to apply the theory learnt in the class.



This course is designed to provide an overview of caterpillar diesel generator maintenance. It covers the structure and component of diesel generator; the diesel systems and terminology; the diesel and gaseous fuel engines and components including air, oil, cooling, exhaust, fuel systems, governors, components, voltage, frequency and regulators; and the start, stop, auto start, safeties, alarms and shutdowns, controller types, inspection checklist, oil, fuel, coolant sampling, load banking, equipment & installation, day tanks, chargers, block heaters and remote annunciators.



During this interactive course, participants will learn the compression ratio, bore, stroke, combustion chamber, diesel operation, diesel systems, transfers back, engine cools down, generator shuts off, time delays, generator construction and generator operations; synchronizing, loading and unloading, reactive capability and power factor; the generator testing and commissioning, load testing, load rejection and generator fault finding; and the rotor earth fault, shorted turns, stator winding faults, generator repair capability, voltage regulators and excitation systems.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain a comprehensive knowledge on caterpillar diesel generator maintenance
- Operate and maintain diesel generator as well as apply diesel generator routine management
- Carryout operation procedures, overhaul maintenance, troubleshooting and testing
- Identify the structure and component of diesel generator and discuss diesel systems and terminology
- Describe diesel and gaseous fuel engines and components including air, oil, cooling, exhaust, fuel systems, governors, components, voltage, frequency and regulators
- Determine start, stop, auto start, safeties, alarms and shutdowns, controller types, inspection checklist, oil, fuel, coolant sampling, load banking, equipment & installation, day tanks, chargers, block heaters and remote annunciators
- Recognize compression ratio, bore, stroke, combustion chamber, diesel operation, diesel systems, transfers back, engine cools down, generator shuts off, time delays, generator construction and generator operations
- Illustrate synchronizing, loading and unloading, reactive capability and power factor
- Perform generator testing and commissioning, load testing, load rejection and generator fault finding
- Discuss rotor earth fault, shorted turns, stator winding faults, generator repair capability, voltage regulators and excitation systems
- Explain excitation principles, static excitation systems and brushless excitation systems
- Carryout system operations, droop control, isochronous control or islanded mode and maintenance
- Identify basic engine, single & three phase power formulas, lube system, cooling system, air system, fuel system, electrical system, basic electricity & safety, instrumentation, protection system and exhaust system

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.

Who Should Attend

This course provides an overview of all significant aspects and considerations of Caterpillar diesel generator maintenance for engineers and technicians involved in the maintenance of Caterpillar diesel generator.

Course Certificate(s)

Internationally recognized Wall Competency Certificates and Plastic Wallet Card Certificates will be issued to participants who have successfully completed the course and passed the exam at the end of the course. Certificates are valid for 5 years.

Recertification is FOC for a Lifetime.

Sample of Certificates

The following are samples of the certificates that will be awarded to course participants: -



- (2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

* Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology *



Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEUs

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CEU Official Transcript of Records

TOR Issuance Date: 14-Nov-19

HTME No. 8667-2014-9020-2555

Participant Name: Fahim Al Qahtani

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
EE0862-IH	Caterpillar Diesel Generator Maintenance	November 10-14, 2019	24	2.4
Total No. of CEU's Earned as of TOR Issuance Date				2.4

TRUE COPY



Maricel De Guzman
Academic Director

Haward Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 Standard.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking Continuing Education Units (CEUs) in accordance with the rules & regulations of the International Association for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology is accredited by



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Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology’s courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant’s involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant’s CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Dr. Ahmed El-Sayed, PhD, MSc, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of extensive experience in the **Power, Petroleum, Petrochemical** and **Utilities**. He specializes in **Hazardous Area Classification, Power Quality, Disturbance Analysis, Blackout, Power Network, Power Distribution, Power Systems Control, Power Systems Security, Power Electronics, ETAP, Electrical Substations, Tariff Design & Structure Analysis, Engineering Drawings, Codes & Standards, P&ID Reading, Interpretation & Developing, PLC, SCADA, DCS, Process Control, Instrumentation, Automation, Power Generation, Process Control Instrumentation, SIS, SIL, ESD, Alarm Management Systems, Fieldbus Systems and Fiber Optics** as well as the service pricing of these. He is currently the **Systems Control Manager** of **Siemens** where he is in-charge of Security & Control of **Power Transmission Distribution & High Voltage** Systems and he further takes part in the Load Records Evaluation & Transmission Services Pricing.

During his career life, Dr. Ahmed has been actively involved in different Power System Activities including Roles in Power System Planning, Analysis, Engineering, **HV Substation** Design, Electrical Service Pricing, Evaluations & Tariffs, Project Management and also in Teaching and Consulting. His vast industrial experience was honed greatly when he joined many International and National Companies such as **Siemens, Electricity Authority** and **ACETO** industries where he focused more on dealing with Technology Transfer, System Integration Process and Improving Localization. He was further greatly involved in manufacturing some of **Power System** and **Control & Instrumentation Components** such as Series of Digital Protection **Relays, MV VFD, PLC** and **SCADA** System with intelligent features.

Dr. Ahmed is well-versed in different electrical and instrumentation fields like Load Management Concepts, **PLC** Programming, Installation, Operation and Troubleshooting, **AC Drives** Theory, Application and Troubleshooting, Industrial Power Systems Analysis, AC & DC **Motors**, Electric Motor **Protection, DCS SCADA, Control** and Maintenance Techniques, Industrial Intelligent Control System, **Power Quality** Standards, Power Generators and Voltage Regulators, Circuit Breaker and Switchgear Application and Testing Techniques, **Transformer** and **Switchgear** Application, Grounding for Industrial and Commercial Assets, Power Quality and **Harmonics, Protective Relays** (O/C Protection, Line Differential, Bus Bar Protection and **Breaker Failure Relay**) and Project Management Basics (PMB).

Dr. Ahmed has **PhD, Master & Bachelor** degrees in **Electrical and Instrumentation Engineering** from the **University of Wisconsin Madison, USA**. Further, he has numerous papers published internationally in the areas of Power Quality, Superconductive Magnetic Energy Storage, SMES role in Power Systems, Power System **Blackout** Analysis, and Intelligent Load Shedding Techniques for preventing Power System Blackouts, HV **Substation Automation** and Power System Stability.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US\$ 5,500 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0900	<i>Caterpillar Diesel Generator Overview</i>
0900 – 0930	<i>An Introduction to Caterpillar Diesel Generator</i>
0930 – 1000	<i>Structure & Component of Diesel Generator</i>
1000 – 1015	<i>Break</i>
1015 – 1045	<i>Cat Diesel Engines as Prime Movers</i>
1045 – 1115	<i>Diesel Systems & Terminology</i>
1115 – 1145	<i>Description of Diesel & Gaseous Fuel Engines & Components including Air, Oil, Cooling, Exhaust, Fuel Systems & Governors, Components, Voltage, Frequency & Regulators</i>
1145 – 1215	<i>Description to Start, Stop, Auto Start, Safeties, Alarms & Shutdowns, Controller Types, Inspection Checklist, Oil, Fuel, Coolant Sampling, Load Banking, Equipment & Installation, Day Tanks, Chargers, Block Heaters & Remote Annunciators</i>
1215 – 1230	<i>Break</i>
1230 – 1230	<i>Compression Ratio</i>

1230 - 1245	Bore
1245 - 1330	Stoke
1330 - 1420	Combustion Chamber
1420 - 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 - 0830	Diesel Operation
0830 - 0900	Diesel Systems
0900 - 0930	Transfers Back
0930 - 0945	Break
0945 - 1015	Cat Engine Cools Down
1015 - 1045	Generator Shuts Off
1045 - 1115	Time Delays
1115 - 1145	Generator Construction
1145 - 1200	Break
1200 - 1230	Generator Operations
1230 - 1330	Synchronizing
1330 - 1420	Loading/Unloading
1420 - 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 - 0830	Reactive Capability
0830 - 0900	Power Factor
0900 - 0930	Generator Testing & Commissioning
0930 - 0945	Break
0945 - 1015	Load Testing
1015 - 1045	Load Rejection
1045 - 1115	Generator Fault Finding
1115 - 1145	Rotor Earth Fault
1145 - 1200	Break
1200 - 1230	Shorted Turns
1230 - 1330	Stator Winding Faults
1330 - 1420	Generator Repair Capability
1420 - 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 - 0830	Voltage Regulators & Excitation Systems
0830 - 0900	Excitation Principles
0900 - 0930	Static Excitation Systems
0930 - 0945	Break
0945 - 1015	Brushless Excitation Systems
1015 - 1045	PMG's
1045 - 1115	System Operations
1115 - 1145	Droop Control

1145 – 1200	<i>Break</i>
1200 – 1230	<i>Isochronous Control or Islanded Mode</i>
1230 – 1330	<i>Maintenance Points</i> <i>AC Generator (Physical Condition, Instrumentation, Performance Test-Building Load, No Load)</i>
1330 - 1420	<i>Caterpillar Diesel Engine</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Four</i>

Day 5

0730 – 0830	<i>Basic Engine</i>
0830 – 0900	<i>Single & Three Phase Power Formulas</i>
0900 – 0930	<i>Lube System</i>
0930 – 0945	<i>Break</i>
0945 – 1030	<i>Cooling System</i>
1030 – 1100	<i>Air System</i>
1100 – 1130	<i>Fuel System</i>
1130 – 1200	<i>Electrical System, Basic Electricity & Safety</i>
1200 – 1215	<i>Break</i>
1215 – 1245	<i>Instrumentation</i>
1245 – 1315	<i>Protection System</i>
1315 - 1345	<i>Exhaust System</i>
1345 – 1400	<i>Course Conclusion</i>
1400 – 1415	<i>POST-TEST</i>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Onsite Training (1 Day):-

Practical sessions will be organized for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various practical exercises using onsite equipment and simulators in the workshops and facilities.



Examination (1 Day):-

A course final examination will be directed at the end of this event. The exam will cover all the aspects of the subjects learned including the classroom and the onsite training. Participants who successfully pass the exam will be certified by our Accredited Certification System.

Course Coordinator

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