COURSE OVERVIEW ME0590
Diesel Engine Maintenance & Troubleshooting

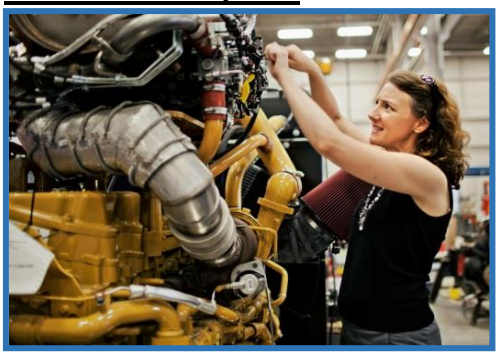
Course Title
Diesel Engine Maintenance & Troubleshooting

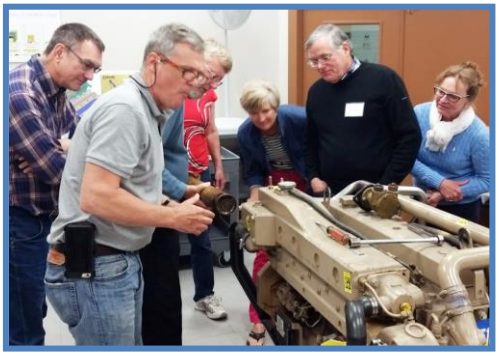
Course Date/Venue
Session 1: Januray 26-30, 2025/Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA
Session 2: December 07-11, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

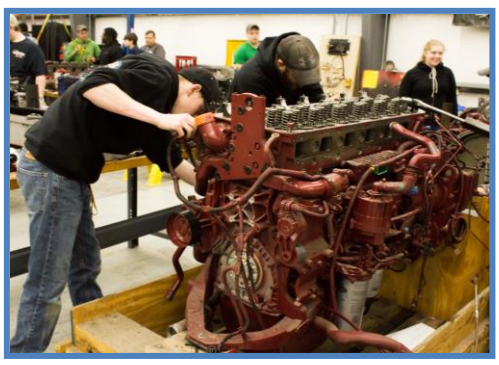
Course Reference
ME0590

Course Duration
Five days/3.0 CEUs/30 PDHs

Course Description







This practical and highly-interactive course includes practical sessions and demonstration for diesel engine maintenance and troubleshooting. Theory learnt in the class will be applied using various types of diesel engine equipment through hands-on practical sessions.

Diesel engines are the dominant propulsion engine of choice for most of the commercial and industrial applications in the world. Further, diesel engine is the emergency generator everywhere and for every applications in general such as hospitals, department stores and even in main power generation plants and utility plants in oil/gas fields and petrochemical plants.

Diesel engines power virtually all of the off-highway construction equipment. Deep water commercial freighters or containerships are almost all diesel engine powered. The passenger ships are primarily either diesel or a combination of diesel and gas turbine. The fuel economy, low maintenance costs, and reliability of diesel propulsion has lead to major retrofits so the ships could be operationally cost competitive. Why is the diesel engine the dominant choice for these applications? The diesel engine produces far more useful torque per rated horsepower than spark ignition (SI) gasoline engines or gas turbines.

Diesel engines are much more efficient, durable and reliable than any other heat engine. US diesel engine manufacturers warranty their Class 7 & 8 heavy-duty truck engines for 500,000 miles! In other words, the diesel engine powered vehicles are the most economical to own and operate.

This course is designed to provide a good overview of the maintenance, troubleshooting and service of industrial diesel engines. It will cover system operation, engine specifications, troubleshooting, lubrication and maintenance, testing and adjusting as well as a detailed account of the causes of engine malfunctions and their solutions.

Through interactive lectures, discussions, case studies, exercises and videos, the first four days of the course will cover everything related to diesel engines from components up to maintenance. The last day of the course (day 5) will be conducted in a workshop where participants will be given hands-on experience on operating, testing, troubleshooting and maintenance of a diesel engine.

Course Objectives

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

- Apply and gain an in-depth knowledge on diesel engine maintenance and troubleshooting
- Recognize the different diesel engine types such as in line engines, v-type engines, slant engines, opposed engines and various numbers of cylinders according to classification by title, speed, piston format and fuel used
- Identify the basic terminology of force, torque, power, top and bottom dead center and determine the aspects of 2-stroke and 4-stroke by learning the various engine cycles
- Practice the various diesel engine maintenance exercises and discussion given during the course and recognize the principles of timing gear timing chain and sprocket according to timing mechanism construction
- Illustrate the different engine indicator diagrams and detail the methods of engine construction maintenance
- Characterize the different HP fuel pumps and maintenance including delivery valves, rack and pinion, barrel and plunger and injection pump timing as well as recognize the importance of fuel injectors and maintenance in actuations (hydraulic, mechanical, and electronic) and injector faults
- Identify the several types of governors (constant, variable speed, mechanical, and hydraulic) and apply the proper procedures in maintenance
- Demonstrate the functions of starting systems and maintenance in relation to hand cranking, electric, pneumatic, hydraulic and start spring tension start as well as determine the elements of crankshafts and its maintenance

- Specify the various cooling systems (air, water, oil) troubleshooting and maintenance in connection to overheating, overcooling, fan service and testing and recognize the different lubrications system troubleshooting and maintenance during high oil consumption, oil pressure problems and oil and filter changes

- Evaluate the features of air system service and outline the various components of turbo charging systems in air/fuel ration, surging and maintenance

- Define the elements of transmission systems in accordance to clutch, gearbox, trust bearings and different types of shafts

- Acquire knowledge on various hands-on practical sessions in diesel engine maintenance and from several group discussions in engine fault identity table performed during the course

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 covers systematic techniques and methodologies on diesel engine maintenance and troubleshooting for those involved in the maintenance and troubleshooting of diesel engines including engineers, supervisors and other technical staff.

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 + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- 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.

- 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.

Accommodation

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

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. Sayed Shaaban, PhD, MSc, BSc, is a **Senior Mechanical Engineer** with over 30 years of integrated **industrial experience** as a consultant and academic experience as a University Professor. His wide expertise includes **Machinery Vibrations Analysis**, **Maintenance & Reliability Management**, **Machinery Failure Analysis & Prevention**, Computerized Maintenance Management Systems (**CMMS**), Root Cause Failure Analysis (**RCFA**), **Preventive Maintenance**, **Predictive Maintenance**, **Total Productive Maintenance**, **Industrial Hydraulics**, **Mechanical Troubleshooting Maintenance**, **Pumps**, **Compressors**, **Bearings**, **Lubrication** and **Mechanical Shaft Alignment**. Furthermore, he is also an expert in assets inspection & management, measurements & instrumentations, maintenance planning & scheduling, transportation planning & management, inspection & assessment of laboratory testing equipments, utility trucks, heavy equipment, diesel engines and technical report writing.

During his career life, Dr. Shaaban has gained his practical and field experience through his various significant positions and dedication as the **Head of Automotive and Tractors Engineering Department**, **Project Manager**, **Technical Consultant**, **Team Leader** and **Material Testing Engineer** for international companies, universities, colleges, institutes and research centers like the British Council, James Watt College of Scotland, Helwan University, Technical Research Center, Al Handasia Manufacturing Co., GIAD Manufacturing Co. and the Egyptian Standards Authority.

Dr. Shaaban has **PhD** degree in **Mechanical Engineering** from the **Ecole Centrale** (**France**) and has **Master** and **Bachelor** degrees in **Mechanical Engineering**. Furthermore, he is an **author** of more than **40 technical books** along ten years of his work as a Technical Curricula Specialist in the Middle East and he has published **26 research papers** in local and international scientific journals and conferences.

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 be always met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Diesel Engine Types*** *Classification by Cycle, Speed, Piston Format, Fuel Used ● In Line Engines ● V-Type Engines ● Slant Engines ● Opposed Engines ● Numbers of Cylinders*
0930 – 0945	*Break*

0945 – 1130	***Basic Terminology*** *Force, Work, Torque, Power, Top and Bottom Dead Center, Stroke, Compression Ratio, Efficiency and Swirl*
1130 – 1230	***Engine Cycles*** *2-Stroke ● 4-Stroke*
1230 – 1245	*Break*
1245 – 1420	***Exercises & Discussion***
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Timing Mechanism Construction*** *Camshaft Drive ● Cam Drive Ratio ● Timing Gear Timing Chain and Sprocket ● Chain Tensioner and Guide ● Timing Belt and Cover ● Vibration Damper*
0930 – 0945	*Break*
0945 – 1100	***Engine Indicator Diagrams***
1100 – 1230	***Engine Construction & Maintenance***
1230 – 1245	*Break*
1245 – 1420	***Exercises & Discussion***
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***HP Fuel Pumps & Maintenance*** *Delivery Valves ● Rack and Pinion ● Barrel and Plunger ● Injection Pump Timing*
0930 – 0945	*Break*
0945 – 1045	***Fuel Injectors & Maintenance*** *Hydraulic Actuation ● Mechanical Actuation ● Electronic Actuation ● Injector Faults*
1045 – 1230	***Governors & Maintenance*** *Constant Speed ● Variable Speed ● Mechanical and Hydraulic Governors*
1230 – 1245	*Break*
1245 – 1330	***Starting Systems & Maintenance*** *Hand Cranking ● Electric Start ● Pneumatic Start ● Hydraulic Start ● Spring Tension Start*
1330 – 1420	***Crankshafts & Maintenance***
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

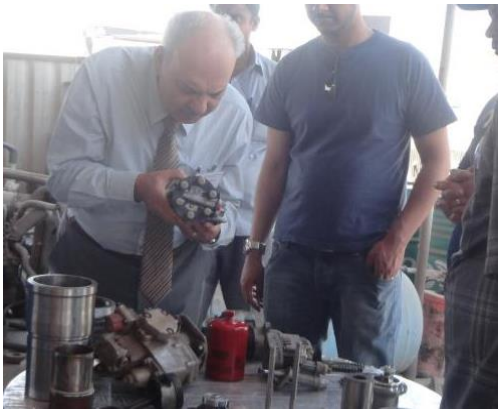
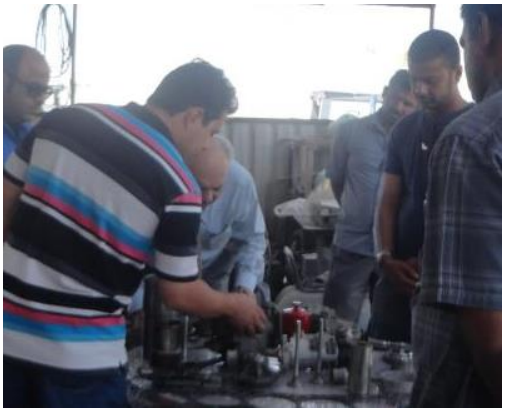
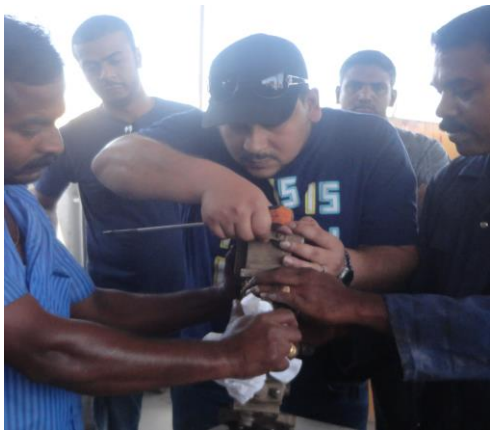
0730 – 0930	***Cooling Systems (Air, Water, Oil) Troubleshooting & Maintenance*** *Overheating ● Overcooling ● Fan Service and Testing ● Radiator and Pressure Cap Service ● Water Pump Service*
0930 – 0945	*Break*
0945 – 1045	***Lubrication System Troubleshooting & Maintenance*** *High Oil Consumption ● Oil Pressure Problems ● Oil and Filter Changes*
1045 – 1230	***Air System Service***
1230 – 1245	*Break*
1245 – 1300	***Exercises & Discussion***
1300 – 1330	***Turbocharging Systems*** *Air/Fuel Ratio ● Methods Of Pressure Charging ● Air Suction Filters and Silencers ● Bearings and Lubrication ● Surging ● Maintenance*
1330 – 1420	***Transmission Systems*** *Clutch ● Gearbox ● Thrust Bearings ● Shafts ● Shaft Bearings ● Shaft Couplings ● Faults and Defects*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Hands-on Practical Sessions***
0930 – 0945	*Break*
0945 – 1045	***Hands-on Practical Sessions (cont'd)***
1045 – 1230	***Hands-on Practical Sessions (cont'd)***
1230 – 1245	*Break*
1245 – 1345	***Group Discussions on Engine Fault Identity Table***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions/Site Visit

Site visit will be organized during the course for delegates to practice the theory learnt:-


Course Coordinator

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