

This course can be adapted to virtual classroom mode

Diesel Engine Management

3 days
Overview

CMD-EN-A

LEVEL

Expert

PURPOSE

This course provides a deeper knowledge on the different functions used in the Diesel engines control, the components used (sensors and actuators), the strategies adopted that take these components and the engine operating physics into account.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

- know the actions performed by the system to realize the set torque (torque structure),
- know how the different sensors and actuators work and when they are used,
- set the control strategies for the turbocharger, the exhaust gas recirculation rate (EGR), the variable swirl system for engines that include it, the injection pressure, the phasing and the injected quantity for each injection performed during an engine cycle,
- use the failures detection modes (diagnostic).

WAYS AND MEANS

Interactive training with real life examples.

Agenda

TORQUE STRUCTURE

0.5 d

Transmission of the driver's wished set torque to the wheels by action of the engine control on the air (turbocharger) and fuel (injection system) supply. Pedal mapping. Working with a driven engine or with a cruise control. Interaction of the other systems of vehicle stability (AESP, ASR). Full load limits. Anti-surge strategy. Torque structure advantages.

AIR SUPPLY FUNCTION

1 d

Airflow regulation by the EGR valve and of the intake collector pressure by the turbocharger actuator position.

Interaction between the EGR regulation and the turbocharger regulation.

Advantage of an oxygen probe in the EGR regulation.

Cycle adjustment in dynamics to optimize pollutant emissions.

Operating the variable swirl shutters, the EGR cooler by-pass.

FUEL INJECTION FUNCTION

1 d

Pressure oscillations created during injection, influence on the injected flow rates during multi-injections.

Correction by a hydraulic behavior simulation model.

Choosing the drive ratio of the high pressure pump, influence of the rail volume and of the HP pipe lengths on the injected flow rate.

Rail pressure regulation on high or low pressure.

Engine speed regulation, regulation by function, idle speed regulation, anti-surges.

FAILURES DIAGNOSTICS

0.5 d

Diagnostics of rail pressure loop differences, of minimum pressure monitoring, sensor signal plausibility.
Supercharging pressure diagnostic.
Depollution system diagnostics (OBD).