Test Project

General knowledge

Heavy Vehicle Technology

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Contents within each Test Project Module

Each module will include but is not limited to the following:

1. Heavy equipment – machine(s)/vehicle(s)

   (a) Any heavy machine(s)/vehicle(s) used in modules 1-6 are relevant to the diesel industry which includes but is not limited to construction, industrial, agriculture and trucking industries.

2. Original Equipment Manufacturer (OEM) service literature and service software

   (a) There will be available access to manufacturers' service and parts information either online or in print form.
   (b) There will be available access to manufacturers' electrical and hydraulic schematics either online or in print form where applicable.
   (c) There will be access to OEM diagnostic service software where applicable.

3. Tooling

   (a) In all modules, there will be available access to general technicians' tooling and safety equipment relevant to the diesel industry.
   (b) There will be access to specialized OEM and aftermarket service tooling where applicable in the relevant modules.

4. Familiarization Day

   (a) The Competitor will have access to all the above during the scheduled familiarization day
   (b) The Competitor is able to ask questions if they don't understand or have knowledge of the above information.
   (c) Where applicable, tooling information may be shared with the Competitor.

Introduction to Test Projects and tasks

This Test Project consists of six modules that the Competitor will complete in 18 hours over a four-day period. Depending upon the daily schedule, the Competitor may complete one to two modules each day. The Competitor will have a maximum of three hours to complete each module.

These modules test the Competitor for excellence in troubleshooting, diagnosing, and repairing unsatisfactory conditions. The Competitor will be tested on several different OEM engines, vehicles and/or equipment. Depending upon the module, the Competitor may have a single task or may have multiple tasks. They may either be able to complete the module tasks in any order or there may be a strict order to follow. It is up to the Competitor to read each module's Test Project task(s) in its entirety before beginning the Test Project module.

Tasks are presented to the Competitor as a customer complaint. It is up to the Competitor to interpret the complaint and begin their diagnostic/repair strategy. As mentioned above, there will be available access to manufacturers' service, parts, and schematic information either online or in print form. There will also be access to OEM diagnostic service software where applicable. The Competitor should follow the available manufacturers' service information to safely and properly perform this task. If there is no manufacturers' service information for diagnosing or repairing an unsatisfactory condition or defect, the Competitor must use their own knowledge and procedures.

Competitors MUST also include a machine/vehicle vitals inspection along with a safety inspection prior to starting the engine. All defects found during inspections will be recorded upon the workorder provided within the module.

If the Competitor does not understand the tasks of the module test project, the Competitor may ask the judge for clarity.

The judge may play critical roles within the modules which may give the Competitor valuable information. Here is a list of critical roles the judge may play within the module.

- The judge will operate the machine/vehicle if the Competitor needs to verify a complaint or repair.

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- The judge may play the role of the machine/vehicle if the vehicle needs to be operated over a long distance or for a long period of time. (move the machine back and forth).
- The judge may play the role of the customer if the Competitor feels they want to interview the customer for more information.
- The judge may play the role of the parts manager if the Competitor needs to repair or replace a part.
- The judge will help lift items, if necessary, but the Competitor must make a request.

Whatever critical role the judge plays in the module, the Competitor is responsible for the judge's safety within the working area. For example: If the Competitor MUST perform a safety protocol before starting the machine, the Competitor MUST inform the judge of said protocol and make sure the protocol is followed.

REMEMBER, please be very specific about what the judge needs to do and what role or operation the judge should do. The Competitor is responsible within their repair area.

For recording and marking purposes, the Competitor MUST show the judge what they are doing as they work, and if applicable, the expected outcome (for example, measurements, fault locations torque wrench settings, adjustments, and conclusions). In the appropriate location and using proper industry standard service reporting format (complaint, cause component correction), document what you diagnosed and what was required to return the system to its normal condition.

- **The WSOS are on the last two pages of this document.**

Instructions to the Competitor

Safety Procedures

Appropriate Personal Protective Equipment (PPE) must be worn while in the competition area as per section 7.1 Personal Protective Equipment of the technical description.

The Competitor should have read the technical description for an understanding of the module specific safety requirements. The Competitor will be responsible for understanding the WorldSkills Health, Safety, and Environment Policy and Regulations for the host country or regional regulations. The Competitor will not lose marks for asking the judge about safety requirements within the module.

How to Avoid Hazards

The Competitor must go through and understand the following Hazard Assessments with their Expert. The Competitor must be able to work safely and fully understand the Hazard Assessment before they begin to work. The Competitor will not lose marks by asking the judge about the modules Hazard Assessment. However, the Competitor will lose marks if they fail to eliminate or control the hazards as they work.

Hazard Assessment

Each module has multiple hazards. The hazards include but are not limited to the following hazards listed on the next pages. A placard of hazards for each module will be displayed within the module.

The Competitor must take the following safety measures as shown below:

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Legend

DANGER

If you do not avoid the danger, it **will** kill or seriously injure you or someone else.

WARNING

If you do not heed the warning, you could be killed or seriously injured.

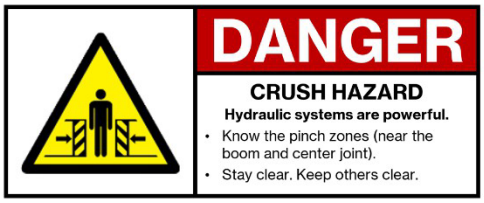
CAUTION

If you do not take precautions, you could be injured.

Danger Hazards















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Warning & Caution Hazards



WARNING

FALL HAZARD

You could slip off the machine.

- When climbing, face the vehicle.
- Aways use three points of contact.
- Position hands and feet properly.



WARNING

HAND INJURY HAZARD

The starter could crank the engine.

- Keep hands away from moving parts (fan, belts, pulleys).



WARNING

FOOT INJURY HAZARD

Heavy objects could fall on your feet.

- Place heavy objects at the back of the bench.
- Prevent them from rolling.



CAUTION

HAND INJURY HAZARD

Meshing gears could pinch your hands.

- Keep hands clear or meshing gears.
- Wear gloves when handling parts.



CAUTION

BURN HAZARD

Hot fluids and parts can burn you.

- Wear snug mechanic's gloves.
- Touch with caution.



CAUTION

CUT HAZARD

Engine parts could cut your skin.

- Wear snug mechanic's gloves.
- Inspect for sharp edges.
- Keep hands clear.



CAUTION

IRRITATION HAZARD

Engine fluids could irritate your skin.

- Wear latex gloves (supplied).
- Use wiping cloths (supplied).



CAUTION

LIFTING HAZARD

Lifting heavy objects could hurt you.

- Wear gloves.
- Ask the judge for help if necessary.



CAUTION

FALL HAZARD

You could slip and fall on oily floors.

- Wipe and clean all oil drips and spills immediately
- Use wiping cloths (supplied).



CAUTION

TRIP HAZARD

You could trip on the engine support.

- Watch your step.
- Position your feet properly.

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WSOS

The WorldSkills Occupational Standards (WSOS) for Heavy Vehicle Technology

The summary of all six modules is scored as follows:

Safety – 10.0%

- Consistently and diligently follow the best procedures to protect health and safety in the working environment.
- Use appropriate personal protective equipment (safety footwear and eye protection with side shields at all times, and ear protection, respiratory protection, and either barrier gloves or fit mechanic's gloves, as needed).
- Select and handle substances, materials, and equipment safely and in compliance with manufacturers' instructions.
- Dispose of substances and materials safely and sustainably. Predict and eliminate all risks related to required activities.
- Prepare and maintain an orderly workspace with regard to health and safety and restore the workspace for the next technician.

Logical Order of Repair – 10.0 %

- Organize and implement appropriate decisions regarding maintenance or repair.
- Use the methods best suited to complete each task.

Use and Interpretation of Technical Information – 15.0 %

- Choose the appropriate sources of technical information applicable to the task.
- Read, interpret, and extract technical information from the chosen sources.
- Apply technical information to the task.
- Understand and accurately use the technical language associated with the task.

Diagnostic and Measurement 15.0 %

- Demonstrate an understanding of the types of diagnostic and precision measurement tools in both imperial and metric units.
- Demonstrate an understanding of the purposes, proper handling, and use of the types of diagnostic and precision measurement tools.
- Choose, use, and interpret the results of diagnostic and precision measurement tools to produce accurate measurements to determine component reusability and to find faults in components and systems.

Fault-Finding – 15.0%

- Recognize and diagnose faults in heavy vehicle components or systems.
- Choose, use, and interpret the results of appropriate diagnostic methods and equipment.
- Apply the results of diagnostic testing and any relevant calculations to correctly identify and isolate faults related to the task.

Appropriate Use of Tools – 10.0%

- Choose and properly use, maintain, and store appropriate tools for the task.

Maintenance or Repair of Components or System – 15.0 %

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- Choose the appropriate procedures to meet manufacturers' specifications for maintenance or repair of diesel engine systems, hydraulic systems, pneumatic systems, electrical and electronic systems, drive train systems, and pre-delivery inspection.
- Predict and alleviate the effects of the chosen procedures on other components or systems.

Communication of Maintenance or Repair Process – 10.0%

- Clearly and accurately record technical information in a written report about each task.

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