

TRANSPORTATION AND LOGISTICS

Heavy Vehicle Technology



WorldSkills Occupational Standards

WorldSkills Occupational Standards (WSOS)

Occupation description and WSOS

The name of the occupation is

Heavy Vehicle Technology

Description of the associated work role(s) or occupation(s)

The Heavy Vehicle Mechanic maintains, diagnoses, and repairs large machines and industrial equipment including towed and self-propelled equipment used in mining, forestry, agriculture, landscaping, and material handling industries. The mechanic must be able to maintain, diagnose, and repair internal combustion engines and components on stationary, mobile, tracked rubber-tired equipment, ground-engaging equipment, and earth-moving equipment.

Maintenance, diagnosis, and repair can involve individual components or entire systems, requiring the mechanic to have skill with engines, hydraulics, drive trains, electronics, braking systems, and much more. The mechanic must use specific tools to diagnose function, make adjustments, repair, or replace defective components or systems, test repairs for proper performance, interpret instructions in technical manuals, write service reports, and ensure that the work meets manufacturers' specifications and the requirements of legislation. The mechanic is frequently the interlocutor between the employer, the customer, and the manufacturer. This experience can allow the mechanic to advance to senior roles such as trainer, supervisor, or manager.

Although mechanics often specialize in certain machines or equipment, either by choice or as a result of employment, the diversity of heavy equipment and, along with rapid changes in technology, require broad knowledge and adaptability. Mechanics must also be able to work alone or as part of a team, at a variety of hours, and in an employer's shop, a customer's building, or outdoors in urban or rural locations, regardless of weather. Machines often require quick intervention to enable uninterrupted activity to resume.

The work is most rewarding for those who enjoy working with their hands and are logical, curious, and interested in problem solving. The mechanic also needs good vision, hearing, sense of feel and sense of smell to diagnose problems. The occupation requires strength and stamina. Proper safety standards must be maintained at all times to avoid risk of injury involved in working on heavy vehicles and with power tools.

General notes on the WSOS

The WSOS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills that are set out in the Standards Specification. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, provided that this does not distort the weightings assigned by the Standards.

WorldSkills Occupational Standards

Section	Relative importance (%)
1 Safety	10.4

The individual needs to know and understand:

- Best procedures to protect health and safety in the working environment.
- The use of personal protective equipment used by a mechanic.
- The range and use of substances, materials, and equipment used in workplace.
- The safe and sustainable use and disposal of substances and materials
- The causes and prevention of all risks related to required tasks.
- The importance of an orderly workspace to personal health and safety, and the importance of restoring the workspace for the next mechanic.

The individual shall be able to:

- 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,
- ear protection, respiratory protection, and either barrier gloves or fitted mechanic's gloves, as needed.
- Select and handle appropriate 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 mechanic.

2 Logical order of repair	12.8
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The individual needs to know and understand:

- How to organize and implement appropriate decisions regarding maintenance or repair.
- The methods best suited to complete each task.

The individual shall be able to:

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

Section	Relative importance (%)
3 Use and interpretation of technical information	12.8

The individual needs to know and understand:

- The purpose and use of the range of technical information in paper and electronic formats.
- How to read, interpret, and extract technical information from all formats.
- How to apply technical information to a task.
- How to accurately use the technical language associated with the task.

The individual shall be able to:

- 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.
- Interpret and accurately use the technical language associated with the task.

4 Precision measurement	12.8
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The individual needs to know and understand:

- The types of diagnostic and precision measurement tools in metric units
- The purposes, proper handling, and use of the types of diagnostic and precision measurement tools
- How to 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

The individual shall be able to:

- Select and use correct types of diagnostic and precision measurement tools in metric units
- Select and use diagnostic and precision tools according to their characteristics and the requirements of the task
- 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

Section	Relative importance (%)
5 Fault-finding	12.8

The individual needs to know and understand:

- The range of faults and their symptoms in heavy vehicle components or systems.
- The range and uses of diagnostic methods and equipment.
- How to apply the results of diagnostic testing and any relevant calculations to identify and isolate faults.
- The importance of regular maintenance to minimize faults in components or systems.

The individual shall be able to:

- Recognize and diagnose faults in heavy vehicle components or systems.
- Choose, interpret, and use 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.

6 Appropriate use of tools	12.8
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The individual needs to know and understand:

- The purposes and proper handling and storage of the range of tools used to maintain or repair any components or system relating to heavy vehicle service.

The individual shall be able to:

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

7 Maintenance or repair of components or systems	12.8
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The individual needs to know and understand:

- The range of procedures and manufacturers' specifications for maintenance or repair of diesel engine systems, hydraulic systems; pneumatic systems, electrical and electronic systems, drive train systems, and pre-delivery inspections
- How to choose the appropriate procedures to maintain or repair these systems
- The effects of the chosen procedures on other components or systems

Section	Relative importance (%)
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Choose the appropriate procedures to meet manufacturers' specifications for maintenance or repair of: <ul style="list-style-type: none"> • Diesel engine systems; • Hydraulic and Pneumatics systems; • Steering, Brakes and Undercarriage; • Electrical and Electronic systems; • Drive train systems; • Pre-delivery. • Predict and alleviate the effects of the chosen procedures on other components or systems. 	
<p>8 Communication of maintenance or repair process</p>	<p>12.8</p>
<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • How to clearly and accurately record technical information in a written report about each task. 	
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Clearly and accurately record technical information in a written report about each task. 	
<p>Total</p>	<p>100</p>

References for industry consultation

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (<http://www.ilo.org/public/english/bureau/stat/isco/isco08/>)
- ESCO: (<https://ec.europa.eu/esco/portal/home>)
- O*NET OnLine (www.onetonline.org/)

This WSOS appears to relate partly to mobile heavy equipment mechanics, except engines:
<https://www.onetonline.org/link/summary/49-3042.00>

It appears to fall between supervisory and attendant roles here:
<http://data.europa.eu/esco/occupation/264b00c9-84d0-4dc9-b590-aed2cea2b904>.

These links also enable adjacent occupations to be explored.

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Shanghai 2022.

Organization	Contact name
WesTrac (Australia)	Louise Azzopardi, Trainer and Assessor