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| **Model Curriculum**  **QP Name: Wheel Loader Operator**  **QP Code: IES/Q0105**  **QP Version: 2.0**  **NSQF Level: 4**  **Model Curriculum Version: 1.0** |
| **­**  Infrastructure Equipment Skill Council (IESC), Jubilee Building (Second Floor), 45, Museum Road, Bengaluru - 560025 |

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Training Parameters

|  |  |
| --- | --- |
| Sector | Infrastructure Equipment |
| Sub-Sector | Equipment Operation |
| Occupation | Operator |
| Country | India |
| NSQF Level | 4 |
| Aligned to NCO/ISCO/ISIC Code | NCO-2015/7233 |
| Minimum Educational Qualiﬁcation and Experience | Class VIII  Minimum 2 years experience in Equipment operation |
| Pre-Requisite License or Training | NIL |
| Minimum Job Entry Age | 18 Years |
| Last Reviewed On | 11/01/2016 |
| Next Review Date | 31/05/2025 |
| NSQC Approval Date | 11/01/2016 |
| QP Version | 2.0 |
| Model Curriculum Creation Date | 30/04/2022 |
| Model Curriculum Valid Up to Date | 31/05/2022 |
| Model Curriculum Version *<* | 1.0 |
| Minimum Duration of the Course | 390 Hours |
| Maximum Duration of the Course | 390 Hours |

# Program Overview

This section summarizes the end objectives of the program along with its duration.

## Training Outcomes

At the end of the program, the learner should:

* Know the organization’s procedures and guidelines related to wheel loader operations
* Know the controls, levers and switches in order to operate the wheel loader properly
* Understand all the typical occupational hazards and techniques to be overcome
* Employ safe practices to use the tools and equipment
* Understand how to operate the wheel Loader for various applications
* Understand and know the different attachments options available for the machine
* Understand and know periodic maintenance, all checks and service intervals

## Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | Theory  Duration | Practical  Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| Bridge Module | 4 | 0 | 0 | 0 | 4 |
| NOS Code – IES/N 0113  NOS Name: Carry out pre-operation checks on wheel loader  NOS Version - 2.0  NSQF Level - 4 | 25 | 46 | 0 | 50 | 121 |
| NOS Code – IES/N 0114  NOS Name – Operate a wheel loader  NOS Version - 2.0  NSQF Level - 4 | 25 | 50 | 0 | 50 | 125 |
| NOS Code - IES/N 0115  NOS Name - Carry out maintenance and troubleshooting of the wheel loader  NOS Version - 2.0  NSQF Level - 4 | 32 | 50 | 0 | 50 | 132 |
| NOS Code - IES/N 7601  NOS Name - Comply with worksite health and safety guidelines  NOS Version - 2.0  NSQF Level - 4 | 4 | 4 | 0 | 0 | 8 |
| Total Duration | 90 | 150 | 0 | 150 | 390 |

# Module Details

# Module 1: Orientation

# Bridge Module

**Terminal Outcomes:**

* Describe the operations of the Infrastructure industry in India.
* Outline the skill training schemes in Skill Sector Councils.
* Know about the different types of job roles available in IESC.
* Understand the roles and responsibilities of the Wheel Loader Operator.

|  |  |
| --- | --- |
| Duration:*<4:00>* | Duration:*<0:00>* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Describe employment opportunities in the industry. * Explain the roles and responsibilities of a Wheel Loader Operator. * Describe the different technical trainings conducted in SSC. | NIL |
| **Classroom Aids:** | |
| Computer, projector, printer, student table, whiteboard, flip chart, markers and duster | |
| **Tools, Equipment and Other Requirements** | |
|  | |

## Module 2: Pre-op checks on Wheel Loader

**Mapped to NOS Code – IES/N0113 v 2.0**

## Terminal Outcomes:

* Explain the organization’s procedures and guidelines related to wheel loader operations.
* Explain the responsibilities of the assigned job role.
* Understand job-specific documentation and its importance such as daily maintenance checklist, operation handbook and components manual.
* Understand the risks and consequences of not adhering to established processes and job instructions.
* Know the reporting structure in the organization, schedule for resolving the complaint/problem and escalation matrix for reporting unresolved problems.
* Know the emergency organization of the specific work site.

|  |  |
| --- | --- |
| Duration: *<*25:00*>* | Duration: *<*46:00*>* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Introduction to the engine and transmission, as well as their use and purpose. * Explain the process for adding fuel and coolant to the compactor. * Describe the method to identify the grade and quality of oil to be used. * Describe the working of various controls, levers, switches, instrument panel & fuse box of the machine. * Identify various tools provided with the machine, explain their use and the importance of putting them back after use. * Explain why the operator should walk around the wheel loader before starting it, to make sure no one is beneath it. * Explain the importance of greasing and oiling pivots and pins that require routine lubrication. * Explain the use of the Operator Handbook and Components Manual. * List typical occupational hazards and techniques for dealing with them. * Know the cost of the equipment and loss to the organization resulting from its damage and the direct/ indirect cost of accidents. * Know the recommended optimal engine oil pressure and radiator coolant temperature. * Read instructions, guidelines /procedures/rules related to the worksite and equipment operations. * Explain the importance of using cabin controls and different operating modes and selection procedures and usage of the wheel loader in sequence of operation. * Know the safety interlocks and their functions during start and stop of machine * Know the function of the parking brake * Explain the function of service braking system on the machine and how to check the brake disk in the wheel hub. * Explain in the detail the importance of the latest emission norms in force since 01st Oct, 2021 and the major pollutant emissions in the exhaust gas. * Explain the EATS system and the EGR system & functions of DOC, SCR, DPF, ASC. | * Demonstrate the process to examine the bucket cutting edge, loader’s structure and the lift mechanism for signs of excessive wear. * Demonstrate the process to inspect the tyres, wheels, lug nuts, and stem caps for inflation, leaks and damage * Illustrate how to inspect the tanks, transmission, axles, tilt cylinders, pipes and hoses for leaks or damage. * Describe the process of draining moisture from air tanks in case it is equipped with air brakes. * Demonstrate how to check the fluid and liquid levels in the engine, hydraulic tank, fuel tank, gearbox, radiator, and brakes for conformity to the manufacturer's specifications. * Test that the parking brake, main horn, reverse horn, and headlights are in good working order. * Examine the different controls, gauges, warning lights, and other safety devices to ensure that they are working properly. * How to operate the wheel loader during face loading and Load & Carry Operation. * How to switch on and off Boom Suspension System and avoid usage of load & carry operation – this is a safety procedure to be followed to prevent damage of tyres and equipment. * Selection of various switches during operation. * Understand the importance of not to park on the slopes of the ramp as well as mines where trucks are plying; to avoid accidents. * Understand the location of EATS components, Ad Blue and its role in Emission control, fill quantities and the importance of reduced Ad Blue levels leading to severe inducement on the machine leading to stoppage of work at site. * Know and identify the locations of various oil filling / drain points and identify location of all filters. * Know in detail the maintenance functions of the wheel loader; understand the importance of preventive maintenance to reduce time. |
| **Classroom Aids:** | |
| Computer, projector, printer, student table, whiteboard, flip chart, markers and duster  Manufacturer’s Service a n d Repair Manual | |
| **Tools, Equipment and Other Requirements** | |
| Safety Gear, Tool Kit, PPE | |

# Module 3: Operation of a Wheel Loader

**Mapped to NOS Code – IES/N0114 v 2.0**

**Terminal Outcomes:**

* Explain the responsibilities of the assigned job role.
* Explain the controls, levers and switches for proper operation of the wheel loader.
* Know how to perform all pre-use and on-the-job inspections.
* Describe the process for documenting maintenance activities in the logbook and its importance.
* Outline the safety standards & procedures followed in the organization.

|  |  |
| --- | --- |
| Duration:*<25*:00*>* | Duration:*<50:00>* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * List different types of wheel loaders and their applications and functions. * Understand controls, levers and switches in order to operate the wheel loader properly. * Communicate the general safety rules for operating a wheel loader. * Walk around the wheel loader before starting it, to make sure no one is beneath it. * Elaborate the use of the ignition switch and mechanism to start the engine in extreme cold conditions. * Discuss the engine and transmission, as well as their use and purpose. * Understand significance of greasing and oiling parts of the wheel loader. * identify immediate or temporary solutions to resolve mechanical issues. * Learn common hazards in the work area and procedures to deal with them. * Describe the risk and consequences of failing to follow clearly specified procedures/work instructions. | * Show how to wear the seatbelt and adjust the seat position * Know position and operation of the emergency stop button. * Describe the instrument panel, its position, and its functionality. * Demonstrate how to adjust the machine's speed and direction in accordance with the requirement. * Demonstrate the safe movement of the load around the site. * Show how to test check product load in order to avoid overloading during operations. * Demonstrate turning radius of the equipment and safe operation in limited space. * Show steering techniques and the proper way to steer on a slope. * Give examples of all signs, warnings, and other emergency signals. |
| **Classroom Aids:** | |
| Computer, projector, printer, student table, whiteboard, flip chart, markers and duster  Manufacturer’s Service and Repair Manual | |
| **Tools, Equipment and Other Requirements** | |
| Safety Gear, Tool Kit, PPE | |

# Module 4: Routine maintenance and trouble shooting

**Mapped to NOS Code: IES/N0115 v 2.0**

**Terminal Outcomes:**

* Explain the responsibilities of the assigned job role.
* Communicate the reporting structure in the company.
* Show how to monitor machine working hours to determine the best service plan.
* List all the typical occupational hazards and techniques to overcome them.
* Illustrate the importance of greasing and oiling parts of the wheel loader

|  |  |
| --- | --- |
| Duration: <32:00> | Duration: <50:00> |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Elaborate the fundamental mechanical system at work in the different operations of the wheel loader. * Outline the performance standards & procedures followed in the company. * Define safety protocols to be observed before undertaking any repair. * Define the scope of the position and when and to whom to escalate for help. * Identify common defects and general causes of breakdown. * Explain the importance of the optimal levels of control indicators e.g. fuel gauge, engine oil pressure and temperature. * Describe the importance of regular cleaning of air filter dust bowls. * Identify the potential causes of any unusual noises coming from the engine. * Identify prominent places on the equipment for display of safety and maintenance stickers. * Describe importance of daily greasing of all greasing pins and pivot points. | * Create a checklist for pre operation inspection of the equipment to detect damage, flaws, cracks or leaks. * Create daily /weekly maintenance sheets in conformance with organization recommendation. * Carry out periodic maintenance as per the checklist. * Demonstrate how to use appropriate props /support devices while doing maintenance. * Demonstrate how to clean the air filter dust bowls. * Demonstrate the procedure to check and maintain air pressure in the tyres and the tightness of the wheel nuts. * Prepare a daily top-up plan of coolants, lubricants and fluids to ensure conformity with the manufacturer’s specifications. * Demonstrate how to drain water and debris from the fuel tank. |
| **Classroom Aids:** | |
| Computer, projector, printer, student table, whiteboard, flip chart, markers and duster  Manufacturer’s Service and Repair Manual | |
| **Tools, Equipment and Other Requirements** | |
| Safety Gear, Tool Kit, PPE | |

# Module 5: Health and safety

**Mapped to NOS Code: IES/N 7601 v2.0**

Terminal Outcomes:

* Describe the guide lines for health, safety and security requirements.
* Identify the common hazards and risks at the workshop and at site.
* Employ safe practices to use the tools and machines.
* Explain emergency procedures to stop and shutdown machinery.
* Know basic first-aid treatment for common injuries.
* Demonstrate the operation of fire-fighting equipment.
* Elaborate the procedure for storage and disposal of hazardous materials and waste.
* Design various safety signs, symbols and warnings for use in the work place.

|  |  |
| --- | --- |
| Duration: <04:00> | Duration: <04:00> |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Describe the Health, safety, environmental (HSE) policies. * Explain the reporting procedure for all HSE activities. * Display the contact details of HSE personnel, in case of emergencies. * Report all health and safety related incidents/accidents. * Explain safe working practices to avoid common hazards and risks. * Categorize waste on the basis of non- recyclable, hazardous and recyclable material. | * Prepare a hazard log register to report incidents and accidents. * Show the correct use of Personal Protective Equipment (PPE). * Demonstrate safe procedure for lifting loads. * Demonstrate the operation of fire extinguishers. * Demonstrate how to give basic first aid. * Conduct a mock drill for dealing with emergencies like fires and other calamities. * Demonstrate safe storage and disposal of waste. |
| **Classroom Aids:** | |
| Computer, projector, printer, student table, whiteboard, flip chart, marker and duster | |
| **Tools, Equipment and Other Requirements** | |
| Fire Extinguishers, Personal Protective Equipment and other safety gears | |

# [Annexure](#_Annexure)

## Trainer Requirements

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Trainer Prerequisites | | | | | | |
| Minimum Educational Qualification | **Specialization** | **Relevant Industry Experience** | | **Training Experience** | | **Remarks** |
| ***Years*** | ***Specialization*** | ***Years*** | ***Specialization*** |  |
| CLASS VIII |  | **3** | **2** | **1** |  |  |

|  |  |
| --- | --- |
| Trainer Certification | |
| Domain Certification | **Platform Certification** |
| Certified for Job Role: Wheel Loader Operator  Mapped to QP: IES/Q0105 Version2.0.  Minimum accepted score 70%. | Certified for Job Role:Wheel Loader Operator  Minimum accepted score 70%. |

## Assessor Requirements

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Assessor Prerequisites | | | | | | |
| Minimum Educational Qualification | **Specialization** | **Relevant Industry Experience** | | **Training/Assessment Experience** | | **Remarks** |
| ***Years*** | ***Specialization*** | ***Years*** | ***Specialization*** |  |
| CLASS VIII |  | **3** | **2** | **1** |  |  |

|  |  |
| --- | --- |
| Assessor Certification | |
| Domain Certification | **Platform Certification** |
| Certified for Job Role: Wheel Loader Operator  Mapped to QP: IES/Q0105 - Version2.0  Minimum accepted score 70%. | Certified for Job Role: Wheel Loader Operator  Minimum accepted score 70%. |

## 

## Assessment Strategy

Criteria for assessment for Qualification Pack have been laid down based on the NOS’s.

Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS and weightages have also been given among the NOSs accordingly.

The assessment of the theory/knowledge will be based on written test/viva or both while skill test shall be hands on practical.

Behavior and attitude will be assessed while performing the assigned task.

The assessment shall be done as per the guidelines formulated by IESC.

The assessment agencies in consultation with IESC will create unique question papers for theory/knowledge and practical skills at each IESC accredited testing centers (as per assessment criteria below)

To pass the Qualification Pack, every trainee should score a minimum of 70%.

In case of successfully passing only certain number of NOS’s, the trainee is eligible to take subsequent assessment on the balance NOS’s to pass the Qualification pack.

# References

## Glossary

|  |  |
| --- | --- |
| Term | Description |
| Declarative Knowledge | Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem. |
| Key Learning Outcome | Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application). |
| OJT (M) | On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site |
| OJT (R) | On-the-job training (Recommended); trainees are recommended the specified hours of training on site |
| Procedural Knowledge | Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills. |
| Training Outcome | Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training. |
| Terminal Outcome | Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module**.** A set of terminal outcomes help to achieve the training outcome. |

## Acronyms and Abbreviations

|  |  |
| --- | --- |
| Term | Description |
| QP | Qualification Pack |
| NSQF | National Skills Qualification Framework |
| NSQC | National Skills Qualification Committee |
| NOS | National Occupational Standards |
| PMKVY | Pradhan Mantri Kaushal Vikas Yojana |
| QRC | Qualification Review Committee |
| SSC | Sector Skill Council |
| SDMS | Skill Development Management System |
| SIP | Skill India Portal |
| HSE | Health Safety Environment |
| PPE | Personal Protective Equipment |