



Model Curriculum

QP Name: Backhoe Loader Operator

QP Code: IES/Q0101

QP Version: 3.0

NSQF Level: 4

Model Curriculum Version: 1.0

Infrastructure Equipment Skill Council, No.45, Jubilee Building (Second Floor), Museum Road,
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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/ 8342.2101
Minimum Educational Qualification and Experience	8th Grade pass with 2 year NTC plus 1 year NAC OR 10th Grade pass plus 1 year NTC/ NAC OR 10th Grade pass with 2 years of relevant experience OR 10th Grade pass and pursuing continuous schooling OR IES/Q0102 - Junior Backhoe Loader Operator NSQF Level 3 with minimum education as 5th Grade pass with 2 year relevant experience
Pre-Requisite License or Training	Light Motor Vehicle Driving License (LMV) is preferred
Minimum Job Entry Age	18 Years
Last Reviewed On	17/11/2022
Next Review Date	17/11/2025
NSQC Approval Date	17/11/2022
QP Version	3.0
Model Curriculum Creation Date	30/10/2022
Model Curriculum Valid Up to Date	17/11/2025
Model Curriculum Version	1.0
Minimum Duration of the Course	420 Hours
Maximum Duration of the Course	420 Hours

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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 be able to:

- Explain the roles and responsibilities of the Backhoe Loader Operator.
- Outline the guidelines, manuals related to backhoe loader.
- Explain the different types of backhoe loaders and their applications.
- Demonstrate the procedure to carry out all pre-use and running checks.
- Explain the importance of the right service schedule.
- Describe the guidelines for health, safety and security requirements.

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 0101 NOS Name: Carry out pre-operation checks for backhoe operations NOS Version - 3.0 NSQF Level - 4	30	30	60	0	120
NOS Code – IES/N 0102 NOS Name – Operate a backhoe loader NOS Version - 3.0 NSQF Level - 4	30	60	30	0	120
NOS Code - IES/N 0103 NOS Name - Carry out maintenance and troubleshooting of the backhoe loader NOS Version - 3.0 NSQF Level - 4	30	30	60	0	120
NOS Code - IES/N 7601 NOS Name - Comply with worksite health and safety guidelines NOS Version - 3.0 NSQF Level - 4	0	30	0	0	30
NOS Code - DST/VSQ/N0101 NOS Name - Employability Skills 30 hrs NOS Version - 1.0	0	30	0	0	30

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Total Duration	90	180	150	0	420
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Module Details

Module 1: Orientation

Bridge Module

Terminal Outcomes:

- Describe the operations of the Infrastructure Industry in India.
- Outline the skill training schemes offered by Skill Sector Councils.
- Know the different types of job roles available in IESC.
- Explain the roles and responsibilities of the Backhoe Loader Operator.

Duration: <4:00>	Duration: <0:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe employment opportunities in the industry. • Explain the roles and responsibilities of a Backhoe 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 backhoe loader

Mapped to NOS Code – IES/N0101 v 3.0

Terminal Outcomes:

- Explain the organization’s performance standards and procedures related to Backhoe 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.
- Know the reporting structure in the organization, schedule for resolving complaints/problems and escalation matrix for reporting unresolved problems.
- Know the basic working of engine and all systems of the backhoe loader.
- Understand the various hand signals and safety & emergency signs at work site.

Duration: <30:00>	Duration: <90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Show different types of backhoe loaders and their applications and functions. • Describe the working of various controls, levers, switches, instrument panel & fuse box of the machine. • Elaborate the steering techniques and the proper way to steer on a slope. • Describe the use of various tools provided with the machine. • Explain the relevance of greasing and oiling backhoe loader components that require routine lubrication. • Know the escalation matrix for reporting unresolved problems. • List possible methods to enhance operational efficiency of the backhoe loader. • List parameters to be covered in the periodic maintenance sheet. • List the general safety rules for operating a backhoe loader. 	<ul style="list-style-type: none"> • Create a checklist for pre operation inspection of the equipment to detect damage, flaws, cracks or leaks. • Demonstrate how to adjust the operator’s seat, rear and side mirrors and seat belts for ease of operation. • Demonstrate the procedure to check that the greasing points are properly greased. • Show how to clean the air filter dust bowls and check that the gasket and inner filter are in good condition. • Demonstrate how to drain water and debris from the fuel tank. • Show how to check fan belt tension, battery electrolyte level and tightness of the terminals. • Demonstrate how to conduct visual inspection of various controls, gauges, warning lamp and other safety devices. • Demonstrate procedure to check for leaks in the

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<ul style="list-style-type: none"> Plan work according to the required schedule and location. 	<p>hydraulic hose and cylinder.</p> <ul style="list-style-type: none"> Examine the body of the backhoe loader for cracks and wear. Inspect the parking brake, main horn, reverse horn, and headlights to ensure that they are in proper working order. Prepare daily top-up plan of coolants, lubricants and fluids to ensure conformity with manufacturer’s specifications. Walk around the backhoe loader before starting it, to make sure no one is beneath it. Prepare a log book to record all actions completed prior to starting the backhoe loader.
<p>Classroom Aids:</p>	
<p>Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer’s Service and Repair Manual</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Safety Gear, Tool Kit, PPE</p>	

Module 3: Operation of a backhoe loader

Mapped to NOS Code – IES/Q 0101 v 3.0

Terminal Outcomes:

- Explain the responsibilities of the operator in his assigned job role.
- Outline the reporting structure of the company.
- Communicate the general safety rules for operating a backhoe loader.
- Explain the different types of backhoe loaders and their applications.
- Explain how to secure the backhoe loader using loader bucket and stabilisers to ensure maximum stability during digging.

Duration:<30:00>	Duration:<90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Elaborate the organization’s performance standards & procedures. • Describe the job role and responsibilities of the operator. • Outline procedure to notify the supervisor if a fault is found that is outside the scope of the operator’s job role. • Know the cost of the equipment and loss to the company resulting from its damage and the direct/ indirect cost of accidents. • Explain all the typical occupational hazards and techniques to overcome them. • Explain the need for stabilisers when digging. • Elaborate the use of various attachments, their uses, and functions (grapppler fork, buckets, side shift forks, sweepers, crane hooks, rock breaker etc.). • Identify the tools in the tool kit and explain their use. • Describe the engine and transmission as well as their use and purpose. • Know the optimal engine oil pressure and radiator coolant temperature. 	<ul style="list-style-type: none"> • Examine the jobsite for loose soil, concealed deep ditches, or marshy spots where the backhoe loader might become trapped. • Demonstrate how to utilise the priming pump and pre-heater to start the engine in extreme cold weather. • Demonstrate the use of the emergency stop button. • Show how to control the machine's speed and direction in accordance with the stated purpose. • Show how to select the appropriate attachment as per the job requirement. • Illustrate the proper backhoe loader maintenance techniques. • Monitor hazards and risks to ensure safety of self, other personnel, plant and equipment. • Demonstrate effective use of stabilizers to ensure the backhoe loader is completely immobile while digging. • Demonstrate the importance of turning off and locking the backhoe loader when leaving it unattended. • Show how to examine the backhoe loader for any damage or defective components and take appropriate

<ul style="list-style-type: none">• Identify immediate or temporary solutions to resolve mechanical issues.• Identify possible ways to improve operational efficiency.• Detail the advantages of documenting all activities in the prescribed formats in a timely manner.	measures.
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 & trouble shooting

Mapped to NOS Code: IES/N0103 v 3.0

Terminal Outcomes:

Duration: <30:00>	Duration: <90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Outline the organization's performance criteria and processes. • Explain the consequences of process delays in repairing the machine. • Define safety protocols to be observed before undertaking any repair. • Define the escalation matrix for reporting unresolved problems. • Elaborate the fundamental mechanical system at work in the different operations of the backhoe loader. • Identify all tools and equipment in the tool kit and where it is stored. • Explain the importance of the optimal levels of control indicators e.g. fuel gauge, engine oil pressure and temperature. • Describe importance of regular cleaning of air filter dust bowls. • Explain the process of evaluation and basic trouble shooting. • Narrate how to plan for regular daily maintenance before machine operations. • Describe importance of daily greasing of all greasing pins and pivot points. • 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. 	<ul style="list-style-type: none"> • Create daily /weekly maintenance sheets in conformance with organization recommendation and machine running hours. • Show how to carry out periodic maintenance as per the checklist. • Demonstrate how to use appropriate props /support devices while doing maintenance. • Demonstrate the procedure to check and maintain the tyre rims, air pressure, wheel nuts and treads according to the manufacturer's recommendations. • Demonstrate how to position the locking bar to prevent the front and rear chassis moving. • Show how to clean the air filter dust bowls. • Demonstrate how to check and top up coolants, lubricants and fluids in conformance with manufacturer's specifications. • Show how to oil the greasing pins and pivot points. • Show how to check battery electrolyte level and terminal condition and make minor adjustments as needed. • 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

- Explain the importance of the right service schedule.
- Outline the company's performance criteria and processes.
- Identify common defects and general causes of breakdown.
- Demonstrate the procedure to respond to emergency situations.
- Explain the process to complete daily/weekly service sheets.

Module 5: Health and safety

Mapped to NOS Code: IES/N 7601 v3.0

Terminal Outcomes:

- Describe the guidelines for health, safety and security requirements.
- Identify common hazards and risks at site.
- Employ safe practices to use the tools and machines.
- Explain emergency procedure to stop and shutdown machinery.
- Carry out basic first-aid treatment for common injuries.
- Demonstrate the operation of firefighting equipment.
- Describe the procedure for storage and disposal of hazardous materials and waste.
- Describe various safety signs, symbols and warnings used in workplace.

Duration: <10:00>	Duration: <20:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the Health, safety, environmental (HSE) policies. • Explain the reporting procedure for all HSE activities. • List down the contact details of HSE personnel, in case of emergencies. • Explain safe working practices to avoid common hazards and risks. • Report all health and safety related incidents/accidents. • Classify waste based on non-recyclable, hazardous and recyclable material. 	<ul style="list-style-type: none"> • Show the correct use of Personal Protective Equipment (PPE). • Demonstrate safe procedure for lifting loads. • Demonstrate operation of fire extinguishers. • Demonstrate the procedure to give basic first aid. • Prepare hazard log register to report incidents and accidents. • 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	

Module 6: Employability Skills

Mapped to NOS: DST/VSQ/N0101

Terminal Outcomes:

At the end of this module, the learner should have acquired the listed knowledge and skills.

- Discuss the importance of Employability Skills in meeting the job requirements
- Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen
- Show how to practice different environmentally sustainable practices
- Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mind-set in different situations
- Demonstrate how to communicate in a well -mannered way with others
- Demonstrate working with others in a team
- Show how to conduct oneself appropriately with all genders and PwD
- Discuss the significance of reporting sexual harassment issues in time
- Discuss the significance of using financial products and services safely and securely
- Show how to operate digital devices and use the associated applications and features, safely and securely
- Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely
- Explain the significance of identifying customer needs and addressing them
- Discuss the significance of maintaining hygiene and dressing appropriately
- Create a biodata
- Use various sources to search and apply for jobs
- Discuss how to search and register for apprenticeship opportunities

Duration: 00:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Discuss the importance of Employability Skills in meeting the job requirements • Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. • Show how to practice different environmentally sustainable practices • Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mindset in different situations • Demonstrate how to communicate in a well -mannered way with others • Demonstrate working with others in a team • Show how to conduct oneself appropriately with all genders and PwD • Show how to operate digital devices and use the associated applications and features, safely and securely • Create a biodata • Use various sources to search and apply for jobs • Describe opportunities as an entrepreneur
Classroom Aids:	
Computer, projector, printer, student table, whiteboard/flip chart, marker, duster	
Tools, Equipment and Other Requirements	

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: Backhoe Loader Operator Mapped to QP: IES/Q0101 Version2.0. Minimum accepted score 70%.	Certified for Job Role: Backhoe 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
<p>Certified for Job Role: Backhoe Loader Operator Mapped to QP: IES/Q0101–Version2.0 Minimum accepted score 70%.</p>	<p>Certified for Job Role: Backhoe Loader Operator Minimum accepted score 70%.</p>

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
PwD	Persons with Disability