



Model Curriculum

QP Name: Excavator Operator

QP Code: IES/Q0103

QP Version: 3.0

NSQF Level: 4

Model Curriculum Version: 1.0

Infrastructure Equipment Skill Council (IESC), Jubilee Building (Second Floor), No.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-2015/8342.2001
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 11th Grade Pass OR IES/Q0104 - Junior Excavator Operator NSQF Level 3 with minimum education as 5th Grade pass with 2 year relevant experience
Pre-Requisite License or Training	NIL
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

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:

- Ensure that the radiator coolant and oil levels in the engine, swing gearbox and track reduction unit are as specified by the manufacturer.
- Elaborate the organization's performance criteria and processes.
- Demonstrate the proper use of the different accessories of the excavator.
- Illustrate the importance of daily greasing of all greasing pins and pivot points.
- Elaborate the procedure for storage and disposal of hazardous materials and waste.
- Classify various safety signs, symbols and warnings used at site.

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 0107 NOS Name: Carry out pre-operation checks on an excavator NOS Version - 3.0 NSQF Level - 4	30	30	60	0	120
NOS Code – IES/N 0108 NOS Name – Operate an excavator NOS Version - 3.0 NSQF Level - 4	30	60	30	0	120
NOS Code - IES/N 0109 NOS Name - Perform routine maintenance and troubleshooting of a excavator 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	0	30	0	0	30
NOS Version - 1.0					
Total Duration	90	180	150	0	420

Module Details

Module 1: Orientation

Bridge Module

Terminal Outcomes:

- Describe the operations of the infrastructure industry in India.
- Elaborate the skill training schemes in the Skill Sector Councils.
- Discuss about the different types of job roles available in IESC.
- Explain the roles and responsibilities of the Excavator Operator.

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

Mapped to NOS Code – IES/N0107 v 3.0

Terminal Outcomes:

- Outline the performance standards, procedures and reporting structure followed in the organization.
- Classify the various excavators and their uses and functions.
- Create prescribed formats and record maintenance logbook to record all activities performed before starting the excavator.
- Examine the track & sprockets for worn or cracked teeth.
- Ensure that the radiator coolant and oil levels in the engine, swing gearbox and track reduction unit are as specified by the manufacturer.
- Understand the EATS and EGR system
- Demonstrate the processes to visually inspect the different controls, gauges, warning lights and confirm that all safety and maintenance decals are present.

Duration: <30:00>	Duration: <90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Outline the performance standards, procedures and reporting structure followed in the organization. • Explain the safety policy of the company. • Outline the excavator components, such as the propel system, boom & stick, and other attachments and their functions. • Explain the functioning of the piping kit of the breaker attachment. • Describe the various attachments offered by the manufacturer and their application. • List all components of the excavator and their functions. • Explain and clearly identify each of the EATS components and the function of EGR system. • Explain the locations of all drain points of the lubricants 	<ul style="list-style-type: none"> • Create prescribed formats and record maintenance logbook to record all activities performed before starting the excavator. • Ensure that all oil levels are checked before starting the excavator. • Demonstrate the procedure to check that the air filter dust bowls are clean, and that the gasket and inner filter are in good condition. • Illustrate the process to check and ensure that all cabin controls including electronic display are functioning properly. • Check to see if the hydraulic cylinders and track are functioning properly. • Show how to extend the boom lift cylinder to check for drift. • Ensure that the suspension seat adjustment control is properly selected to match the operator's weight.

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<p>and know the service intervals.</p> <ul style="list-style-type: none"> • Explain the importance of Ad Blue (DEF) and monitoring its level. • Describe the working of the Engine Control Unit and electronics inside the cabin. • Outline the process to ensure that the travel pedal or travel levers are functioning properly. 	<ul style="list-style-type: none"> • Check the functions of the A/c and controls. • Demonstrate how to check that the breaker pedal off switch is functioning properly. • Demonstrate the various attachment controls as per manufacture's specification. • Demonstrate the working of the ISO indicators (power boost, travel speed, working lamps and central warning indicators.)
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 3: Excavator Operations

Mapped to NOS Code – IES/N0108 v 3.0

Terminal Outcomes:

- Explain best practices for various applications.
- Elaborate the use of ignition switch, and mechanism to start the engine.
- Explain the process to ensure the excavator load and operating speed is within the manufacturer's specifications.
- Infer to maintain a safe distance from other plants and vehicles.
- Demonstrate the proper use of different accessories of excavator.

Duration:<30:00>	Duration:<90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Summarize the organization's procedures and guidelines related to excavator operations. • Outline the organization's performance criteria and processes. • Classify the different types of excavators and their uses and functions. • Explain the engine and transmission, as well as their use and purpose • Elaborate the steering techniques and the proper way to steer on a slope. • List best practices during operation for optimum productivity. • Explain the reason for keeping the excavator in low idle RPM for 2 to 5 minutes after starting and before shutting down. • Explain the importance of not doing back firing. • Explain the ISO indicators with relation to the product. • Explain the Joystick functions (ISO or cross pattern). • Explain the decals inside the operator cabin. • Explain the function and location of the ECU and various electronics inside the operator cabin. 	<ul style="list-style-type: none"> • Demonstrate how to conduct a walk around visual inspection of the Engine and Hydraulic components prior to starting. • Ensure three-point contact while climbing in and out from the cabin to avoid accidents and injuries to the operator. • Show how to use the various power modes available in the excavator. • Demonstrate the joystick operation. • Show how to identify and choose the proper attachment for the excavator according to the job requirement. • Demonstrate the procedure to judge the gradient of the excavator travel limitation and operate accordingly. • Demonstrate how to maintain bench height based on the tipper's size while keeping the loading angle at 45° to get the best productivity. • Demonstrate how to adjust the safety belt and use the safety lever while operating the Excavator. • Show how to operate and navigate the keypad of the computer. • Show how to read the gauges on the control panel like

<ul style="list-style-type: none"> • Understand the significance of various error codes in the ECU. • Explain the importance of each decal inside the cabin – what precautions and safety measures to be followed during operation. 	<p>Hydraulic Oil Temperature, Engine Oil pressure, Battery charge and electrolyte indicator.</p>
<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 4: Routine maintenance and simple trouble shooting

Mapped to NOS Code: IES/N0109 v 3.0

Terminal Outcomes:

- Summarize the organization's procedures and guidelines related to repair and maintenance.
- Communicate the reporting structure in the company.
- Illustrate the importance of daily greasing of all the pins and pivot points.
- Plan to complete timely and legibly daily/ weekly maintenance sheets.
- Describe all the typical occupational hazards and techniques to overcome them.
- Demonstrate how to determine the best service plan on the basis of excavator running hours.

Duration: <30:00>	Duration: <90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Summarize the organization's procedures and guidelines related to repair and maintenance. • Communicate the reporting structure in the company. • Demonstrate how to determine the best service plan based on excavator running hours. • Describe all the typical occupational hazards and techniques to overcome them. • Plan out a schedule for resolving complaints. • Outline the safety policy of the organization. • Elaborate the fundamental mechanical and hydraulic systems at work in the different operations of the excavator. • Identify common problems in the excavator and general causes of breakdown and take relevant action. • Explain how to diagnose problems in the excavator. • Define the scope of the position and when and to whom to escalate for help. • Define safety protocols to be observed before undertaking any repair. 	<ul style="list-style-type: none"> • Create daily /weekly maintenance sheets and carry out maintenance in conformance with the organization's recommendation. • Create a checklist and inspect the excavator to detect damage, flaws, cracks or leaks. • Demonstrate the procedure to clean the air filter dust bowls, pumps and valves. • Prepare a daily top-up plan of coolants, lubricants and fluids to ensure conformity with the manufacturer's specifications. • Check the battery electrolyte levels and condition of the terminals and carry out minor adjustments if required. • Verify that the excavator is on firm and level ground before attempting to carry out any repair/ maintenance. • Demonstrate how to drain water and debris from the fuel tank. • Create awareness to ensure that no maintenance task on any part of the concrete pump is performed when it is running or still hot. • Demonstrate how to use appropriate props /support devices while doing maintenance.

<ul style="list-style-type: none">• Identify the potential causes of any unusual noises coming from the excavator.• Identify prominent places on the excavator for display of safety and maintenance stickers.• Describe importance of daily greasing of all the greasing pins and pivot points.	
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 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.
- Explain the emergency procedure to stop and shutdown the excavator.
- Carry out basic first-aid treatment for common injuries.
- Demonstrate the operation of firefighting equipment.
- Elaborate the procedure for storage and disposal of hazardous materials and waste.
- Describe various safety signs, symbols and warnings used at site.

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 of the organization. • Explain the reporting procedure for all HSE activities. • List down the contact details of HSE personnel, in case of emergencies. • Identify common hazards and risks at site. • Describe the emergency procedure to stop and shutdown the excavator. • Categorize waste based on non-recyclable, hazardous and recyclable material. • List various safety signs, symbols and warnings used at site. 	<ul style="list-style-type: none"> • Show the correct use of Personal Protective Equipment (PPE). • Demonstrate the operation of the fire extinguishers. • Demonstrate the procedure to give basic first aid. • Prepare a 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. • Demonstrate safe working practices to use the tools to avoid common hazards and risks.
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
- 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
- Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws
- 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
- Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges
- Explain the significance of identifying customer needs and addressing them
- Create a biodata
- Use various sources to search and apply for jobs
- Discuss the significance of dressing up neatly and maintaining hygiene for an interview
- Discuss how to search and register for apprenticeship opportunities
- Describe opportunities as an entrepreneur

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 • 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 • Show how to operate digital devices and use the associated applications and features, safely and securely • Explain the significance of identifying customer needs and addressing them • Create a biodata • Use various sources to search and apply for jobs • Discuss the significance of dressing up neatly and maintaining hygiene for an interview • 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
<p>Certified for Job Role: Excavator Operator Mapped to QP: IES/Q103 Version2.0. Minimum accepted score 70%.</p>	<p>Certified for Job Role: Excavator Operator Minimum accepted score 70%.</p>

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: Excavator Operator Mapped to QP: IES/Q103 Version2.0. Minimum accepted score 70%.</p>	<p>Certified for Job Role: Excavator 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 disabilities