

Model Curriculum

Excavator Operator

SECTOR: INFRASTRUCTURE EQUIPMENT

SUB-SECTOR: EQUIPMENT OPERATIONS

OCCUPATION: OPERATOR

REF. ID: IES /Q 0103 VERSION 1.0

NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

INFRASTRUCTURE EQUIPMENT SKILL COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**Excavator Operator**' QP No. '**IES/Q 0103 NSQF Level 4**'

Date of Issuance: December 30th, 2015

Valid up to: March 31st, 2017



Authorised Signatory
(Infrastructure Equipment Skill Council)

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Excavator Operator

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Excavator Operator”, in the “Infrastructure Equipment” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Excavator Operators Course		
Qualification Pack Name & Reference ID.	IES/Q 0103		
Version No.	1.0	Version Update Date	30-12 -2015
Pre-requisites to Training	<ul style="list-style-type: none"> • Preferably Class VIII • Certification Training in Excavator Operations preferred • Must have valid Heavy Commercial Vehicle (HCV) Driving License • In lieu of minimum qualification, should have 2 year experience in operating excavator. • <i>Technical and gallery training as per first schedule, Mining Vocational Training Rules (MVTR) 1966, if working in the mining area under DGMS</i> 		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Carry out pre-operation checks for excavator operations. General introduction to excavator machine, basic working of engine, hydraulic and electrical systems, operational controls and instrument panel, preparing machine for operations • Operate an excavator. Starting of excavator, proceeding to worksite and carrying out earth digging, load lifting and dumping; parking and shutting down the machine; post-operative checks • Carry out maintenance and troubleshooting of excavator. General maintenance procedures and periodic service schedule; common faults and their diagnosis; reports and documents. • Comply with worksite health and safety guidelines. Health, safety and environment policies; personal protective equipment, fire-fighting equipment, basic first aid for common injuries at work site 		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Excavator Operator” Qualification Pack issued by “SSC: Infrastructure Equipment Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Pre-operation Checks</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 20:00</p> <p>Corresponding NOS Code IES/N 0107</p>	<p>Organisational Context:</p> <ul style="list-style-type: none"> • Organisation structure, reporting and escalation line. • Performance standards and procedures in the company. • Work target and review mechanism with supervisor • Location and process for storage and disposal of waste. <p>Technical Knowledge:</p> <ul style="list-style-type: none"> • Overview of various types of excavators, their attachments and use. • Basic working of engine and all systems; hydraulic & electrical. • Controls, levers, switches and instrument panel & fuse box • Various hand signals and safety & emergency signs at work site. • Procedure for filling and topping up of fuel, coolant, oils • Method of greasing and lubrication. • Optimal working condition of components and monitoring systems <p>Skills - Core & Professional</p> <ul style="list-style-type: none"> • Read & understand general instructions/guidelines related to equipment & worksite ops. • Write and record any incidents & deviations on the prescribed formats. • Orally communicate information & instructions to co-workers in a clear and concise manner. • Plan and organise work related tasks with all concerned in most efficient and cost effective way. <p>Performance Criteria:</p> <ul style="list-style-type: none"> • Examine the machine to ensure there are no cracks and dents in the <ul style="list-style-type: none"> ○ Body work and weld joints. ○ Undercarriage ○ Tracks & sprockets ○ Turret & Cabin 	<ul style="list-style-type: none"> • <u>Excavator Machine</u> with standard attachments, tools and equipment. • Class room with audio-video system • Manufacturers O and M video & Manual • Safety video • PPE Items • <u>Open ground</u>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>Check all fluid levels in the engine, transmission & hydraulic systems; top up where necessary</p> <ul style="list-style-type: none"> Inspect air filters and gaskets; clean and empty dust bowls Drain water sediments in the fuel system Check battery electrolyte levels and terminal tightness. Check tension of fan belt and compressor belt if fitted Inspect all greasing points and pivots and ensure lubrication Check circle turn /rotating gear & mechanism Check footplates and steps are free of mud and oil spills. Check and adjust seat, belt, & mirrors for operating efficiency Check all controls, gauges, lights and horns are functional 	
2	<p>Operate an Excavator</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 75:00</p> <p>Corresponding NOS Code IES/N 0108</p>	<p>Organisational Context</p> <ul style="list-style-type: none"> Responsibilities and time frame for assigned jobs. Emergency organisation and reporting channel work site. Equipment costs and delay implications to company. Location and process for storage and disposal of waste. Work target and performance review mechanism with supervisor. <p>Technical Knowledge</p> <ul style="list-style-type: none"> Besides technical knowledge related to pre-op checks should know Different attachments, their usage and functions. Steering mechanisms and correct way of negotiating slopes. <p>Skills - Core & Professional</p> <ul style="list-style-type: none"> In addition to core and generic skills listed above Interpret signage on road and at work site operations correctly. Use correct terminology while interacting with others at site Plan work schedule in time bound and cost effective way. Identify operational slow-downs and take timely remedial action. 	<ul style="list-style-type: none"> <u>Excavator Machine</u> with standard attachments, tools and equipment. Class room with audio-video system Manufacturers O and M video & Operation Manual Safety video PPE Items Open ground

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		Performance Criteria. <ul style="list-style-type: none"> • Excavator Start up After carrying out all pre- checks start machine as laid down; proceed to work site • Operations: Inspect work site and plan ops; also identify problem areas. • Prepare worksite and determine correct start point to commence digging • Operate the machine; modifying techniques to suit changing work conditions. • Load Lifting & Dumping: Position machine correctly to lift load safely & ensuring stability. • Load Dumping: Shift and dump load safely; using correct hand and communication signals. • Excavator Shutdown: Move and park the machine in garage; shut down as per procedure. • Inspect for damages; leaks etc and report / take appropriate action as laid down. 	
3	Maintenance and Trouble Shooting of Excavator Theory Duration (hh:mm) 14:00 Practical Duration (hh:mm) 35:00 Corresponding NOS Code IES/N 0109	Organisational Context: <ul style="list-style-type: none"> • Organisation structure and maintenance / breakdown policy and procedures. • Location of special tools and equipment/ accessories. Technical Knowledge <ul style="list-style-type: none"> • Maintenance and service Schedule • Common defects and general causes for breakdown. Skills - Core & Professional <ul style="list-style-type: none"> • In addition to core and generic skills listed above; • Plan maintenance & servicing keeping op needs in mind. Performance Criteria <ul style="list-style-type: none"> • Routine Maintenance: Clean machine outside and inside • Clean air filter, replenish lubes and coolants as necessary • Grease all pins and pivot points daily. • Check battery electrolyte levels and terminals • Check tyre pressure and wheel nuts for tightness. • Basic Trouble Shooting: Place 	<ul style="list-style-type: none"> • <u>Excavator Machine</u> with standard tools and equipment. • Class room with audio-video system • Manufacturers O and M video, Maintenance Manual & Chart • Safety video • PPE Items • <u>Lab /workshop</u>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>machine correctly and safely using supports as necessary.</p> <ul style="list-style-type: none"> • Diagnose the defect/ problem and rectify; if need be take advice from supervisor. • Reporting& Documentation: Ensure documentation on prescribed formats completed in time. • Report defects and problems in time and escalate as necessary 	
4	<p>Worksite Health and Safety Guidelines\</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 20:00</p> <p>Corresponding NOS Code IES/N7601</p>	<p>Organisational Context</p> <ul style="list-style-type: none"> • Health, safety, environmental (HSE) policies and guidelines of the company & their importance • Contact details of personnel responsible for HSE related matters & in case of emergencies. <p>Technical Knowledge</p> <ul style="list-style-type: none"> • OEMs guidelines for health, safety and security requirements. • Types, use and importance of Personal Protective Equipment (PPE) • Types of common hazards and risks at worksite and preventive measures. • In case of emergencies procedure to stop/ shut down machinery. • Common injuries and appropriate basic first aid treatment. • Fire fighting equipment: Basic knowledge of handling and using them. <p>Skills - Core & Professional</p> <ul style="list-style-type: none"> • In addition to the core and generic skills listed above • Use correct PPE and other safety gear at work site. <p>Performance Criteria</p> <ul style="list-style-type: none"> • Comply with safety, health, environment and security related regulations & guidelines at work. • Correct use of Personal Protective Equipment (PPE) and other safety gear at work site. • Follow safety measures during operations to ensure health and safety of self and others, general public not at risk. • Operate fire extinguishers as applicable. 	<ul style="list-style-type: none"> • <u>Excavator Machine</u> with standard attachments, tools and equipment. • Class room with audio-video system. • Company's ESH video. • PPE Items & Safety Gear. • Firefighting Eqpt. • First Aid Kit. • <u>Open ground</u>.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Support in administering basic first aid. Record and report details as related to operations, incidents or accidents as applicable. 	
	Total Duration: Theory Duration (hh:mm) 60:00 Practical Duration (hh:mm) 150:00	Unique Equipment Required: <ul style="list-style-type: none"> Excavator Machine with standard attachments, tools and equipment. Class room with audio-video projection system Manufacturers O and M Manual & Video Safety video and charts PPE Equipment: Helmet, gloves, harness, earplugs, goggles, mask Firefighting equipment First Aid Box and Charts Open ground and Lab/workshop 	

Grand Total Course Duration: 210 Hours, 0 Minutes

(This syllabus/ curriculum has been approved by SSC: Infrastructure Equipment Skill Council)

Trainer Pre-requisites for Job role: “Excavator Operator” Mapped to Qualification Pack: “IES/Q 0103 Version 1.0”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “IES/Q 0103 Version 1.0”.
2	Personal Attributes	Aptitude for conducting training, with strong communication and interpersonal skills. Passion for training and developing others; well-organised; and a team player. Eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	Class 8 th . Desirable Class 10 th
4a	Domain Certification	Certified for Job Role: “ <u>Excavator Operator</u> ” mapped to QP: “IES/Q 0103 – Version 1.0”. Minimum accepted score 70%. Desired: Certification Training in Excavator Operations
4b	Platform Certification	Certified for Job Role: “ <u>Excavator Trainer</u> ” mapped to Qualification Pack: SSC/Q1402. Minimum accepted score 70%.
5	Experience	<ul style="list-style-type: none"> • Around 3 to 4 year’s site experience in excavator operations. • Desirable: Should have conducted O and M programs at work sites.

Annexure: Assessment Criteria

Assessment Criteria for Excavator Operator	
Job Role	Excavator Operator
Qualification Pack	IES/Q 0103 Version 1.0
Sector Skill Council	Infrastructure Equipment

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for Qualification Pack has 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.
2	The assessment of the theory/knowledge will be based on written test/viva or both while skill test shall be hands on practical. Behaviour and attitude will be assessed while performing the assigned task.
3	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 centres (as per assessment criteria below)
4	To pass the Qualification Pack, every trainee should score a minimum of 40% in each NOS and 60% aggregate. 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.

NOS	Performance Criteria	Marks Allocation			
		Total Mark	Out of	Theory	Practical
IES/N0107 Carry out pre-operation checks on an excavator	PC1. Adhere to time limits given by supervisor	70	2	1	1
	PC2. Ensure that turret and undercarriage are free of cracks and wear		3	0	3
	PC3. Confirm that the track & sprockets - for wear or cracked teeth		3	1	2
	PC4. Ensure that the boom and the stick are free of dents and cracked welds		3	0	3
	PC5. Confirm that the forks is without bends		3	0	3
	PC6. Make sure that oil levels of engine, transmission, radiant coolant and brake are as per manufacturer's indicators		3	1	2
	PC7. Check differential and hydraulic oil levels		3	0	3
	PC8. Check the hydraulic hose and ram for leakages		2	0	2
	PC9. Conduct checks to ensure proper condition of parking brake, main horn, reverse horn and head light		4	1	3
	PC10. Check fan belt tension, electrolyte level and terminal tightness		2	0	2
	PC11. Conduct visual inspection to check the various controls, gauges, warning lamp and ensure that all safety and maintenance decals are available		3	1	2
	PC12. Check load chart is displayed in cabin		2	0	2
	PC13. Check and adjust driving position, rear and side mirrors, seat belts and set them as per comfort level		3	0	3
	PC14. Check the circle turn gear and clean if required		2	0	2
	PC15. Ensure air filter dust bowls are clean and check the gasket and inner filter		4	1	3
	PC16. Check and ensure that all cabin controls including electronic display are functioning properly		3	0	3
	PC17. Get water and sediments drained from the fuel tank		1	0	1
	PC18. Ensure coolant and oil in engine, transmission, etc. is topped up, if necessary as per manufacturer's indicators		2	0	2
	PC19. Ensure that all greasing pins and pivots points are appropriately greased		3	0	3
	PC20. Examine the compressor unit and all fittings and air lines		4	1	3
	PC21. Check clearance of the drawbar ball and socket, look for excessive free play, and adjust if necessary		2	0	2
	PC22. Ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only)		4	1	3
	PC23. Keep footplates and steps clean and free from mud, dirt and oil		3	1	2
	PC24. Certify that no one is under or on the machine, before operating		2	0	2

NOS	Performance Criteria	Marks Allocation			
		Total Mark	Out of	Theory	Practical
	PC25. Maintain a checking/maintenance logbook to record all activities performed before starting the excavator		3	1	2
	PC26. Report defects precisely to the supervisor if beyond scope of his role		1	0	1
		Total	70	10	60
IES/N0108 Operate an excavator	PC1. Plan and organize the job according to given instructions	60	2	0	2
	PC2. Inspect the worksite to identify and loose soil, hidden deep trenches or marshy patches where excavator could get stuck		3	0	3
	PC3. Start the engine using ignition switch		3	0	3
	PC4. Use the priming pump and pre-heater to start the engine in cold weather conditions		3	0	3
	PC5. Identify and select the appropriate attachment to be used for performing the task at a work site		4	1	3
	PC6. Use the emergency stop button to disable all power to the excavator in case of a crisis, as per operator manual		2	0	2
	PC7. Operate the shifting quadrant device for selecting the correct gear range		4	1	3
	PC8. Ensure excavator load and operating speed is within limits specified by the manufacturer		4	1	3
	PC9. Look out for people working and hazards such as trenches, potholes and cables		2	0	2
	PC10. Adhere to time limits given by the supervisors		2	0	2
	PC11. Perform in-operation visual checks on critical temperature and pressure gauges		3	0	3
	PC12. Select and use the right type of brake in different situations and conditions		4	1	3
	PC13. Ensure that walkway rules e.g. operating the excavator within the permissible/ allocated areas are followed		2	0	2
	PC14. Utilize judiciously various signaling devices available in the excavator as such as turn signal, parking indicator, air horn etc.		2	0	2
	PC15. Keep a safe distance from a tip edge and use an approved stop block before tipping over an edge		3	1	2
	PC16. Keep a safe distance from other plant or vehicles		2	0	2
	PC17. Judge the grade of the excavator travel limitation and operate accordingly		2	0	2
	PC18. Ensure that excavator is always parked on firm, level ground; with handbrake applied and drive and controls disengaged		3	1	2
	PC19. Operate the body hoist control handle to maneuver the hydraulic ram that tips the dump		3	0	3

NOS	Performance Criteria	Marks Allocation			
		Total Mark	Out of	Theory	Practical
	PC20. Discharge the load safely at the position and in the manner designated by the supervisor		3	0	3
	PC21. Ensure that no other operators travel on or stand near the Excavator		2	0	2
	PC22. Inform supervisor of any problems while operating the Excavator		2	0	2
		Total	60	6	54
IES/N0109 Perform routine maintenance and troubleshooting of an excavator	PC1. Assess the right service schedule by tracking machine operating hours	55	3	0	3
	PC2. Clean air filter dust bowls at regular intervals		4	1	3
	PC3. Clean footplates, pedals and steps free from mud, dirt, ice and snow at regular intervals		3	0	3
	PC4. Drain water and sediment/ fuel separators everyday		3	1	2
	PC5. Replenish coolants, lubricants and fluids everyday		3	0	3
	PC6. Grease all greasing pins and pivot points everyday		3	0	3
	PC7. Check battery levels and condition of the terminals and carry out minor adjustments if required		2	0	2
	PC8. Check and maintain the tyre rims, air pressure, wheel nuts and treads as per manufacturer's indicators		4	1	3
	PC9. Ensure the machine is on firm and level ground before attempting to carry out any maintenance; track machine operating hours to assess the right service schedule		4	1	3
	PC10. Complete timely and legibly daily/ weekly maintenance sheets as provided by the company		2	0	2
	PC11. Ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only)		3	0	3
	PC12. Ensure that suitable props/ support devices are used and the bucket is not raised while performing maintenance		4	1	3
	PC13. Ensure that no maintenance task on the engine is performed when running or still hot		2	0	2
	PC14. Assess when the problem is beyond his competence and report the problem to suitably qualified and competent personnel		2	0	2
	PC15. Diagnose the problem		2	0	2
	PC16. Handle and dispose waste based on environmental guidelines at the work place		3	0	3
	PC17. Follow reporting procedures as laid down by the employer		2	0	2

NOS	Performance Criteria	Marks Allocation			
		Total Mark	Out of	Theory	Practical
	PC18. Complete all documentation in the prescribed standards in a timely manner		2	0	2
	PC19. Report and escalate problems/ incidents as required in a timely manner		2	0	2
	PC20. Report defects precisely to the supervisor if beyond scope of his role		2	0	2
		Total	55	5	50
IES/N7601 Comply with worksite health and safety guidelines	PC1. Comply with safety, health, security and environment related regulations/ guidelines at the work site	25	3	1	2
	PC2. Use Personal Protective Equipment (PPE) and other safety gear such as seat belt, body protection, respiratory protection, eye protection, ear protection and hand protection		3	0	3
	PC3. Follow safety measures during operations to ensure that the health and safety of self or others (including members of the public) is not at risk		3	1	2
	PC4. Carry out operations as per the manufacturer's and worksite related health and safety guidelines		3	1	2
	PC5. Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines		2	0	2
	PC6. Follow safety regulations and procedures with regard to worksite hazards and risks		2	0	2
	PC7. Operate various grades of fire extinguishers, as applicable		2	0	2
	PC8. Support in administering basic first aid and report to concerned team members, as required, in case of an accident		2	0	2
	PC9. Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility		3	1	2
	PC10. Record and report details related to operations, incidents or accidents, as applicable		2	0	2
		Total	25	4	21



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