





# **Model Curriculum**

**QP Name: Backhoe Loader Operator** 

QP Code: MIN/IES/Q0101

QP Version: 1.0

NSQF Level: 4

**Model Curriculum Version: 1.0** 

Skill Council for Mining Sector || B-311, Okhla Industrial Area, Phase-I, New Delhi-110020





# **Model Curriculum**

## **Backhoe Loader Operator**

SECTOR:	INFRASTRUCTURE
SUB-SECTOR:	EQUIPMENT
	<b>EQUIPMENT OPERATIONS</b>
OCCUPATION:	OPERATOR
<b>REF. ID:</b>	IES /Q0101 VERSION 1.0
NSQF LEVEL:	4











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# **Backhoe Loader Operator**

#### **CURRICULUM / SYLLABUS**

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

Program Name	Backhoe Loader Operators Course			
Qualification Pack Name & Reference ID.	IES/Q0101			
Version No.	1.0	Version Update Date	30-12 -2015	
Pre-requisites to Training	<ul> <li>Preferably Class VIII</li> <li>Certification Training in Backhoe Loader Operations preferred</li> <li>Must have valid Heavy Commercial Vehicle (HCV) Driving License</li> <li>In lieu of minimum qualification, should have 2 year experience in operating backhoe loader</li> <li>Technical and gallery training as per first schedule, Mining Vocational Training Rules (MVTR) 1966, if working in the mining area under DGMS</li> </ul>			
Training Outcomes	<ul> <li>After completing this programme, participants will be able to:</li> <li>Carry out pre-operation checks for backhoe loader operations. General introduction to backhoe loader machine, basic working of engine, hydraulic and electrical systems, operational controls and instrument panel, preparing machine for operations</li> <li>Operate a backhoe loader. Starting of backhoe loader, proceeding to worksite and carrying out earth digging, load lifting and dumping; parking and shutting down the machine; post-operative checks</li> <li>Carry out maintenance and troubleshooting of backhoe loader. General maintenance procedures and periodic service schedule; common faults and their diagnosis; reports and documents.</li> <li>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</li> </ul>			





This course encompasses <u>4 out of 4</u> National Occupational Standards (NOS) of "<u>Backhoe Loader Operator</u>" Qualification Pack issued by "<u>SSC: Infrastructure Equipment Skill Council</u>".

Sr. Module No.	Key Lear	ning Outcomes	Equipment Required
1 Pre-operation Theory Durati (hh:mm) 08:00 Practical Durati (hh:mm) 20:00 Correspondin Code IES/N 0101	on Orga escal Perfor the c Work supe I Loca dispo I Loca dispo I Loca dispo I Cont pane Proce fuel, Meth Optin com Skills - C Read instru equi Write devia Orall instru conc Plan all co effect Proce fuel, Optin com Skills - C Pan all co effect Performa Examine cracks weld O Check transr where	Ational Context: nisation structure, reporting and lation line. prmance standards and procedures in company. A target and review mechanism with rvisor tion and process for storage and osal of waste. Al Knowledge: working of engine and all systems; aulic & electrical. rols, levers, switches and instrument el & fuse box bus hand signals and safety & rgency signs at work site. edure for filling and topping up of coolant, oils nod of greasing and lubrication. mal working condition of ponents and monitoring systems ore & Professional I & understand general uctions/guidelines related to pment & worksite ops. e and record any incidents & ations on the prescribed formats. y communicate information & uctions to co-workers in a clear and ise manner. and organise work related tasks with oncerned in most efficient and cost tive way. ance Criteria: the machine to ensure there are no s and dents in the body work and joints. c all fluid levels in the engine, mission & hydraulic systems; top up e necessary ct air filters and gaskets; clean and y dust bowls water sediments in the fuel system c battery electrolyte levels and nal tightness. c tension of fan belt and compressor fitted	<ul> <li><u>BHL Machine</u> with standard tools and equipment.</li> <li>Class room with audio-video system</li> <li>Manufacturers O and M video &amp; Manual</li> <li>Safety video</li> <li>PPE Items</li> <li><u>Open ground</u></li> </ul>





Sr. No.	Module	Key Learning Outcomes	Equipment Required
2	Operate a Backhoe	<ul> <li>Inspect all greasing points and pivots and ensure lubrication</li> <li>Check footplates and steps are free of mud and oil spills.</li> <li>Check and adjust seat, belt, &amp; mirrors for operating efficiency</li> <li>Check all controls, gauges, lights and horns are functional</li> <li>Organisational Context</li> </ul>	BHI Machine with
2	Operate a Backhoe Loader Theory Duration (hh:mm) 30:00 Practical Duration (hh:mm) 75:00 Corresponding NOS Code IES/N0102	<ul> <li>Organisational Context <ul> <li>Responsibilities and time frame for assigned jobs.</li> <li>Emergency organisation and reporting channel work site.</li> <li>Equipment costs and delay implications to company.</li> <li>Location and process for storage and disposal of waste.</li> <li>Work target and performance review mechanism with supervisor.</li> </ul> </li> <li>Technical Knowledge <ul> <li>Besides technical knowledge related to pre-op checks should know</li> <li>Different attachments, their usage and functions.</li> </ul> </li> <li>Skills - Core &amp; Professional <ul> <li>In addition to core and generic skills listed above</li> <li>Interpret signage on road and at work site operations correctly.</li> <li>Use correct terminology while interacting with others at site</li> <li>Plan work schedule in time bound and cost effective way.</li> <li>Identify operational slow-downs and take timely remedial action.</li> </ul> </li> <li>Performance Criteria.</li> <li>Backhoe Start - up: After carrying out all pre- checks start machine as laid down; proceed to work site</li> <li>Inspect work site and plan ops; also identify problem areas.</li> <li>Earth Digging: Prepare worksite and determine correct start point to commence digging</li> <li>Operate the machine; modifying techniques to suit changing work conditions.</li> </ul>	<ul> <li><u>BHL Machine</u> with standard tools and equipment.</li> <li>Class room with audiovideo system</li> <li>Manufacturers O and M video &amp; Operation Manual</li> <li>Safety video</li> <li>PPE Items</li> <li><u>Open ground</u></li> </ul>





Sr. No.	Module	Key Learning Outcomes	Equipment Required
3	Carry out Maintenance	<ul> <li>Shift and dump load safely; using correct hand and communication signals.</li> <li>Backhoe Shutdown: Move and park the machine in garage; shut down as per procedure.</li> <li>Inspect for damages; leaks etc and report / take appropriate action as laid down.</li> <li>Organisational Context:</li> </ul>	<u>BHL Machine</u> with
	and Trouble Shooting of Backhoe Loader Theory Duration (hh:mm) 14:00 Practical Duration (hh:mm) 35:00 Corresponding NOS Code IES/N0103	<ul> <li>Organisation structure and maintenance policy.</li> <li>Location of special tools and equipment/ accessories.</li> <li>Technical Knowledge</li> <li>Maintenance and service Schedule</li> <li>Common defects and general causes for breakdown.</li> <li>Skills - Core &amp; Professional</li> <li>In addition to core and generic skills listed above;</li> <li>Plan maintenance &amp; servicing keeping op needs in mind.</li> <li>Performance Criteria</li> <li>Routine Maintenance: Clean machine outside and inside</li> <li>Clean air filter, replenish lubes and coolants as necessary</li> <li>Grease all pins and pivot points daily.</li> <li>Check battery electrolyte levels and terminals</li> <li>Check tyre pressure and wheel nuts for tightness.</li> <li>Basic Trouble Shooting: Place machine correctly and safely using supports as necessary.</li> <li>Diagnose the defect/ problem and rectify; if need be seek advice from supervisor.</li> <li>Reporting&amp; Documentation: Ensure documentation on prescribed formats completed in time.</li> <li>Report defects and problems in time and escalate as necessary</li> </ul>	standard tools and equipment. Class room with audio- video system Manufacturers O and M video, Maintenance Manual & Chart Safety video PPE Items Lab /workshop
4	Comply with Worksite Health and Safety Guidelines Theory Duration (hh:mm) 08:00 Practical Duration	<ul> <li>Organisational Context</li> <li>Health, safety, environmental (HSE) policies and guidelines of the company &amp; their importance</li> <li>Contact details of personnel responsible for HSE related matters &amp; in case of emergencies.</li> <li>Technical Knowledge</li> <li>OEMs guidelines for health, safety and</li> </ul>	<ul> <li><u>BHL Machine</u> with standard tools and equipment.</li> <li>Class room with audio- video system.</li> <li>Company's ESH video.</li> <li>PPE Items &amp; Safety Gear.</li> <li><u>Firefighting Eqpt.</u></li> <li><u>First Aid Kit.</u></li> </ul>





Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 20:00	<ul> <li>security requirements.</li> <li>Types, use and importance of Personal Protective Equipment (PPE)</li> <li>Types of common hazards and risks at worksite and proventive measures.</li> </ul>	• <u>Open ground</u> .
	Corresponding NOS Code IES/N7601	<ul> <li>worksite and preventive measures.</li> <li>In case of emergencies procedure to stop/ shut down machinery.</li> <li>Common injuries and appropriate basic first aid treatment.</li> <li>Fire fighting equipment: Basic knowledge of handling and using them.</li> <li>Skills - Core &amp; Professional</li> <li>In addition to the core and generic skills listed above</li> <li>Use correct PPE and other safety gear at work site.</li> <li>Performance Criteria</li> <li>Comply with safety, health, environment and security related regulations &amp;</li> </ul>	
		<ul> <li>guidelines at work.</li> <li>Correct use of Personal Protective Equipment (PPE) and other safety gear at work site.</li> <li>Follow safety measures during operations to ensure health and safety of self and others, general public not at risk.</li> <li>Operate fire extinguishers as applicable.</li> <li>Support in administering basic first aid.</li> <li>Record and report details as related to operations, incidents or accidents as applicable.</li> </ul>	
	Total Duration: Theory Duration (hh:mm) 60:00 Practical Duration (hh:mm)	<ul> <li>Unique Equipment Required:</li> <li>BHL Machine with standard tools and equipr</li> <li>Class room with audio-video projection syste</li> <li>Manufacturers O and M video &amp; Manual</li> <li>Safety video</li> <li>PPE Equipment: Helmet, gloves, harness, ear</li> <li>Fire fighting equipment</li> <li>First Aid Box and Charts</li> <li>Open ground and Lab/workshop</li> </ul>	em

#### Grand Total Course Duration: 210 Hours, 0 Minutes

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





### Trainer Pre-requisites for Job role: "Backhoe Loader Operator" Mapped to Qualification Pack: "IESC/Q0101 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 <u>"IES/Q0101 Version 1.0"</u> .				
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 <sup>th</sup> . Desirable Class 10 <sup>th</sup>				
4a	Domain Certification	Certified for Job Role: "Backhoe Loader Operator" mapped to QP: "IES/Q0101 – Version         1.0". Minimum accepted score 70%.         Desired: Certification Training in Backhoe Loader Operations				
4b	Platform Certification	Certified for Job Role: " <u>Backhoe Loader Trainer</u> " mapped to Qualification Pack: SSC/Q1402. Minimum accepted score 70%.				
5	Experience	<ul> <li>Around 3 to 4 year's site experience in backhoe loader operations.</li> <li>Desirable: Should have conducted O and M programs at work sites.</li> </ul>				





#### **Annexure: Assessment Criteria**

Assessment Criteria for Backhoe Loader Operator	
Job Role	Backhoe Loader Operator
Qualification Pack	IES/Q0101 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.





				Marks /	Allocation
NOS	PC	Total Mark	Out of	Theory	Skills Practical
	PC1. Examine the backhoe loader body to ensure that the body components are free of cracks and wear		2	2	0
	PC2. Confirm that the boom and the stick are without dents and cracked welds		4	0	4
	PC3. Check the differential and hydraulic oil levels to ensure that they are as per manufacturer's indicators		4	4	0
	PC4. Check the hydraulic hose and ram for leakages		4	4	0
	PC5. Conduct checks to ensure proper condition of parking brake, main horn, reverse horn and head light		2	0	2
	PC6. Confirm fan belt tension, electrolyte level and terminal tightness are as per requirement		2	0	2
	PC7. Get visual inspection conducted to check the various controls, gauges, warning lamp and other safety devices	2 2 50 2 2 2 2 2 2	4	0	4
	PC8. Check load chart is displayed in cabin		2	2	0
1. IES/N0101C	PC9. Check and adjust driving position, rear and side mirrors, seat belts and set them as per comfort level		2	0	2
arry out pre-checks	PC10. Inspect the air filters and check the gasket and inner filter to ensure that the air filter dust bowls are cleaned		2	0	2
for backhoe	PC11. Drain water and sediment from the fuel tank		2	0	2
operations	PC12. Check to make sure coolant and oil in engine, transmission, etc. are topped up if necessary as per manufacturer's indicators		2	0	2
	PC13. Inspect the greasing points to ensure that all greasing pins and pivots points are appropriately greased		2	2	0
	PC14. Examine the compressor unit and all fittings and air lines		2	0	2
	PC15. Check clearance of the drawbar ball and socket, look for excessive free-play, and adjust if necessary		2	0	2
	PC16. Ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only)		2	0	2
	PC17. Keep footplates and steps clean and free from mud, dirt and oil		2	2	0
	PC18. Certify that the backhoe loader has no one under or on the machine before operating		2	0	2
	PC19. Maintain a checking/maintenance logbook to record all activities performed before starting the backhoe		3	3	0





		Marks Al			llocation	
NOS	РС	Total Mark	Out of	Theory	Skills Practical	
	PC20. Report defects precisely to the supervisor if beyond scope of his role	Tatal	3	0	3	
		Total	50	19	31	
	PC1. Plan and organize the job according to given instructions		2	0	2	
	PC2. Inspect the worksite to identify and loose soil, hidden deep trenches or marshy patches where a backhoe could get stuck		2	2	0	
	PC3. Prepare worksite ahead of operations in accordance of equipment operations		2	2	0	
	PC4. Carry out all pre-use and running checks		2	0	2	
	PC5. Ensure gear is on neutral position		2	2	0	
	PC6. Wear seatbelt and adjust seat position		2	0	2	
	PC7. Start the engine using the pushbutton switch and key switch together		2	2	0	
	PC8. Use the primping pump and pre-heater to start the engine in cold weather conditions		2	2	0	
	PC9. Select appropriate attachment as per the job requirement		1	0	1	
	PC10. Determine speed and direction of machine, as per the specified function	-	1	1	0	
2. IES/N0102	PC11. Use the emergency stop button to disable all power to the backhoe loader in case of a crisis, as per operator manual		1	0	1	
Operate a backhoe	perate a PC12. Ascertain the right location to begin	50	1	1	0	
loader	PC13. Establish weight of load and ensure it is within safe operational limits of the machine		2	0	2	
	PC14. Continually monitor hazards and risks , and ensure safety of self, other personnel, plant and equipment		1	1	0	
	PC15. Drive and operate machine, and modify the operating technique to meet changing work conditions		1	1	0	
	PC16. Effectively use stabilizers to ensure the machinery is completely immobile while digging		2	0	2	
	PC17. Select, attach and apply slings and lifting gear in accordance with safe working load requirements		1	1	0	
	PC18. Position and locate machinery to ensure stability to effectively shift materials according to job specifications		2	0	2	
	PC19. Shift load safely and effectively	1	1	1	0	
	PC20. Move load using hand/audible/communication signals		2	0	2	
	PC21. Turn off ignition after finishing operations	1	2	2	0	
	PC22. Ensure gear is in neutral position post usage	1	2	2	0	
	PC23. Idle the equipment for a few minutes post	1	2	0	2	





			Marks Allocation				
N	os	РС	Total Mark	Out of	Theory	Skills Practical	
		the usage					
		PC24. Remove attachments after use	_	2	0	2	
		PC25. Ensure attachments are cleaned, removed		2	2	0	
		and stored as per organization's protocol	-		2	•	
		PC26. Ensure that the machine is shut down and secured when left unattended		2	0	2	
		PC27. Follow reporting procedures as laid down by the employer		2	0	2	
		PC28. Complete all documentation in the prescribed standards in a timely manner		2	0	2	
		PC29. Report and escalate problems/ incidents as required in a timely manner	-	1	0	1	
		PC30. Report defects precisely to the supervisor if	-	1	0	1	
		beyond scope of his role	Total	50	22	28	
		PC1. Assess the right service schedule by tracking	····	4	0	4	
		machine operating hours		2	2	0	
		PC2. Clean air filter dust bowls at regular intervals PC3. Clean footplates, pedals and steps free from	-	2	2	0	
	IES/N0103 Carry out maintenanc e and troublesho oting on the backhoe	mud, dirt, ice and snow at regular intervals	50	2	2	0	
		PC4. Replenish coolants, lubricants and fluids everyday		4	0	4	
		PC5. Grease all greasing pins and pivot points everyday		2	2	0	
		PC6. Check battery levels and condition of the terminals and carry out minor adjustments if required		4	0	4	
mai		PC7. Check and maintain the tyre rims, air pressure, wheel nits and treads as per manufacturer's indicators		2	2	0	
otin the bac		PC8. Examine the position of the machine to ensure that 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		2	2	0	
load	der	PC9. Complete timely and legibly daily/ weekly maintenance sheets as provided by the company		4	0	4	
		PC10. Inspect the locking bar to ensure that it is in position to prevent the front and rear chassis moving and creating a crushing zone		1	1	0	
		PC11. Ensure that suitable props/ support devices are used and the bucket is not raised while performing maintenance		1	1	0	
		PC12. Ensure that no maintenance task on the engine is performed when running or still hot		4	0	4	
		PC13. Assess when the problem is beyond his competence and report the problem to suitably		2	2	0	





					Marks Allocation	
7	NOS	PC	Total Mark	Out of	Theory	Skills Practical
		qualified and competent personnel				
		PC14. Diagnose the problem		2	2	0
		PC15. Handle and dispose waste based on environmental guidelines at the work place		4	0	4
		PC16. Follow reporting procedures as laid down by the employer		2	2	0
		PC17. Complete all documentation in the prescribed standards in a timely manner		4	0	4
		PC18. Report and escalate problems/ incidents as required in a timely manner		2	2	0
		PC19. Report defects precisely to the supervisor if beyond scope of his role		2	0	2
			Total	50	20	30
		PC1. Comply with safety, health, security and environment related regulations/ guidelines at the work site		5	5	0
	IES/N7601	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		5	0	5
4. IES		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		6	6	0
	omply	PC4. Carry out operations as per the manufacturer's and worksite related health and safety guidelines		6	0	6
wo he	worksite health and safety	PC5. Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines	50	6	0	б
gu	idelines	PC6. Follow safety regulations and procedures with regard to worksite hazards and risks		6	0	6
		PC7. Operate various grades of fire extinguishers, as applicable		6	6	0
		PC8. Support in administering basic first aid and report to concerned team members, as required, in case of an accident		5	0	5
		PC9. Respond promptly and appropriately to an accident/incident or emergency situation, within limits of your role and responsibility		5	0	5
			Total	50	17	33







## Infrastructure Equipment Skill Council

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