

Model Curriculum

Junior Borewell Drilling Machine Operator

SECTOR: INFRASTRUCTURE EQUIPMENT
SUB-SECTOR: EQUIPMENT OPERATIONS
OCCUPATION: MACHINE OPERATION
REF ID: IES/Q0125, V1.0
NSQF LEVEL: 3



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: 'Junior Borewell Drilling Operator' QP No. 'IES/ Q 0125 NSQF Level 4'

Date of issuance: April 1st, 2018

Valid up to: March 31st, 2020

* Valid up to the next review date of the Qualification Pack



Authorized Signatory
(Infrastructure Equipment Skill Council)

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Junior Borewell Drilling Machine Operator

CURRICULUM / SYLLABUS

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

Program Name	Junior Borewell Drilling Machine Operator		
Qualification Pack Name & Reference ID	IES/Q0125		
Version No.	1.0	Version Update Date	28 June 2018
Pre-requisites to Training	Class 8th Standard 0 to 1 years' experience as an assistant in Drilling Operations		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Assist in pre-operation checks on borewell drilling machine by inspecting, preparing and testing the functions of all controls and systems of the machine including its monitoring and safety devices. • Assist in borewell drilling operations by inspecting the worksite, understanding the task, planning the methodology and executing it precisely and safely within the allotted resources and time frame. • Assist in regular maintenance of borewell drill machine by selecting and carrying out the relevant service schedule, diagnosing and rectifying common faults, compiling and submitting reports as per organisations policy. • Comply with worksite health and safety guidelines by following processes and procedures related to personal protective equipment, basic first aid for common injuries at work site, emergency evacuation and disposal of hazardous waste 		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Junior Borewell Drilling Machine Operator” Qualification Pack issued by “Infrastructure Equipment Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Assist in carrying out pre-operation checks on borewell drilling equipment</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 16:00</p> <p>Corresponding NOS Code IES/N0173</p>	<ul style="list-style-type: none"> Assist in levelling of drilling equipment as per the slope of ground by using jacks. Inspect equipment for structural damages, leakages, condition of tires, tightness of bolts and nuts. Inspect the mast sections for cracks, breaks in chain, and proper greasing. Assist in checking all components in engine, hydraulic, electrical and transmission systems are fitted correctly/not missing Assist in checking all levels in the engine (fuel, lube, coolant), hydraulic and transmission systems; top up where necessary Assist in greasing points/ pivots and ensure lubrication of all moving components. Check availability of casing pipes and drill bits to commence operations. Assist in polishing drill bits and servicing of hammer before connecting to the mast. Check connections of all pipes, and hoses; tighten all valves, clamps and nut/bolts Check availability of all essential tools and accessories required for drilling operations. Acquire the ability to read and comprehend basic signs, symbols, diagrams, charts and decals on the equipment. Communicate information & instructions using correct tech terms and phrases to team members /supervisor in a clear and concise manner. Assist in maintaining logbook to record all activities carried out before the drilling operation. Report defects and problems in time and, if beyond his scope, escalate as necessary 	<ul style="list-style-type: none"> Borewell Drilling Equipment with standard tools, accessories and equipment. Class room with audio-video system Manufacturers O and M Manual & Video Safety video PPE Items & Safety Gear Open ground
2	<p>Assist in borewell drilling operation</p> <p>Theory Duration (hh:mm)</p>	<ul style="list-style-type: none"> Assist in inspecting the site conditions for any obstruction like underground service utilities, and overhead power lines. Collect the requisite tools and other 	<ul style="list-style-type: none"> Borewell Drilling Equipment with standard tools, accessories and equipment.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	18:00 Practical Duration (hh:mm) 36:00 Corresponding NOS Code IES/N0174	accessories/ equipment from the storage and place them near the drilling site <ul style="list-style-type: none"> • Assist in setting up the equipment to include parking and stabilising the machine at the drilling point. • Assist in starting up as per procedure and check functioning of all the controls, monitoring devices/aids. • Assist in drilling operations: Select the appropriate drill rods, connect it to the rotatory motor, polish and attach drill bits • Assist in monitoring the drilling by continuously observing gauges like RPM, temperatures, pressures and levels etc • Assist in shutting down as per procedure, removal of drill bits/rods; and post operations walk around checks • Inspect for damages; leaks etc and report / take appropriate action as laid down. • Assist in maintaining logbook to record all activities carried out during the drilling. 	<ul style="list-style-type: none"> • Class room with audio-video system • Manufacturers O and M Manual & Video • Safety video • PPE Items & Safety Gear • Open ground
3	Assist in routine maintenance and troubleshooting of borewell drilling equipment Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 16:00 Corresponding NOS Code IES/N0175	<ul style="list-style-type: none"> • Assist in positioning the machine correctly and safely before carrying out any maintenance activity • Assist in ensuring all safety measures and equipment are in place before starting the repair work. • Assist in inspecting machine for damaged / cracked parts / components and rectify as necessary • Assist in inspecting and checking the functions of all control mechanisms and monitoring devices. • Assist in inspecting engine, hydraulic, electrical, transmission and compressor systems. • Assist in servicing the various systems/assemblies/components as per the guidelines. • Assist in inspecting and servicing the drill rods, bits and casing as laid down in the maintenance manual • Assist in diagnosing the defect/problem and rectifying using appropriate tools/eqpt. • Assist in completing documentation on prescribed formats legibly and in 	<ul style="list-style-type: none"> • Borewell Drilling Equipment with standard tools, accessories and equipment. • Class room with audio-video system • Manufacturers O and M Manual & Video • Safety video • PPE Items & Safety Gear • Lab/workshop/ Covered Shed

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		time. <ul style="list-style-type: none"> Report defects and problems in time and escalate, if beyond his scope, as necessary 	
4	<p>Comply with Worksite Health and Safety Guidelines</p> <p>Theory Duration (hh:mm) 06:00</p> <p>Practical Duration (hh:mm) 12:00</p> <p>Corresponding NOS Code IES/N7601</p>	<ul style="list-style-type: none"> Comply with all safety, health, security and environmental regulations and guidelines at the worksite Utilise Personal Protective Equipment (PPE) and other safety gear related to protection of body in an effective manner. Follow safety measures during operations to ensure that the health and safety of all including members of the public is not at risk. Handle the transportation, storage and disposal of hazardous materials and waste in compliance with workshop health, safety and environmental guidelines Operate various types and grades of fire extinguishers, as applicable to the different categories of equipment Support in administering basic first aid and report to concerned staff in case of an accident Respond promptly and appropriately to an accident/ incident or emergency, within limits of one's roles and responsibilities Record and report essential details related to operations, incidents or accidents as per the organisation's procedures. 	<ul style="list-style-type: none"> Borewell Drilling Equipment with standard tools, accessories and equipment. Class room with audio-video system Organisation's ESH / Safety video PPE Items & Safety Gear Firefighting equipment & Charts First Aid Kit and Charts
	<p>Total Duration</p> <p>Theory Duration 40:00</p> <p>Practical Duration 80:00</p>	<p>Unique Equipment Required:</p> <ul style="list-style-type: none"> Borewell Drilling Equipment with standard tools, accessories and equipment. Class room with audio-video projection system Manufacturers O and M Manual & Video Safety video PPE Equipment: Helmet, gloves, earplugs, goggles, safety shoes Firefighting equipment and 'How to Use' Charts First Aid Box and 'How to Do' Charts Open ground and Lab/Workshop/Covered Shed 	

Grand Total Course Duration: **120 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Infrastructure Equipment Skill Council](#))

Trainer Pre-requisites for Job role: “Junior Borewell Drilling Machine Operator” mapped to Qualification Pack: “IES/Q0125, v1.0”

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 0125 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 10 th
4a	Domain Certification	Certified for Job Role: “ <u>Junior Borewell Drilling Machine Operator</u> ” mapped to QP: “ <u>IES/Q 0125 – Version 1.0</u> ”. Minimum accepted score 70%. Desired: Certification Training in Borewell Drilling Operations & Maintenance
4b	Platform Certification	Certified for Job Role: “ <u>Trainer</u> ” mapped to Qualification Pack: MEP/Q0102. Minimum accepted score 80%.
5	Experience	<ul style="list-style-type: none"> • Have 3 to 4 years’ site experience in Borewell Drilling Operations. • Have 1 to 2 years’ experience in conducting O and M training programs.

Assessment Criteria	
Job Role	Junior Borewell Drilling Machine Operator
Qualification Pack	IES/Q 0125 Version 1.0
Sector Skill Council	Infrastructure Equipment

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3	Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
5	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion
6	To pass the Qualification Pack, trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment
7	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack

Compulsory NOS				Marks Allocation	
Total Marks: 100					
Assessment Outcomes	Assessment Criteria for Outcomes	Total Marks	Out Of	Theory	Skills Practical
1. IES/N0173 Assist in carrying out pre-operation checks on bore well drilling equipment	PC1. check for tires-damages and bulges and report to the operator/supervisor	35	3	1	2
	PC2. check for wheels, loose lug bolts, bent rims, cracks as per instructions from the operator/supervisor		3	1	2
	PC3. tightening of bolts as per the instructions from the operator/supervisor		1.5	0.5	1
	PC4. assist operator in checking fluid levels of engine crank case, radiator coolant and battery electrolyte		1.5	0.5	1
	PC5. check for drill rods availability as per the drilling requirements or as per instructions from the operator/supervisor		3	1	2
	PC6. check for the diesel availability and if needed, report to the operator		3	1	2
	PC7. operate jacks to level the vehicle if needed use wooden jacks as per the instructions from the operator		3	1	2

	PC8. tighten all the pipes, valves and bolts before running the machine as per operator's instructions		2.5	0.5	2
	PC9. connect the oil pipe to the main machine (which contains rig mast) that is used for hammer lubrication as directed by the operator		3	1	2
	PC10. check the availability of tools required to maintain the machine		3	1	2
	PC11. assist the operator in servicing the hammer before connecting it to the mast		1.5	0.5	1
	PC12. polish the drill bit for better drilling as per instructions from the operator		2	1	1
	PC13. assist in cleaning the area to level the surface for performing drilling		2	1	1
	PC14. report defects precisely to the operator/ supervisor if beyond scope of the role		1.5	0.5	1
	PC15. assist in maintaining a checking/maintenance logbook to record all activities performed before starting the paver operation		1.5	0.5	1
	Total		35	12	23
2. IES/N0174 Assist in bore well drilling operations	PC1. pick up required material or equipment from storage and place them near the drilling area	30	3	1	2
	PC2. grease the drill rods as per the instructions from the operator/supervisor		3	1	2
	PC3. assist the operator in placing casing pipe and connecting drill rods to the rotate motor		3	1	2
	PC4. assist the operator in monitoring RPM, air discharge temperature and pressure, engine water temperature and pressure and sump pressure displayed in the compressor unit		3	1	2
	PC5. check the engine oil regularly in two machines i.e. main truck and the supporting truck		3	1	2
	PC6. assist the operator in adding fluids, coolants and fuel into the equipment		3	1	2
	PC7. monitor the drilling operation when the operator is not around the equipment		3	1	2
	PC8. clean the area regularly while drilling is in process as per instructions from the operator/supervisor		3	1	2

	PC9. place the tools and other parts at its place when drilling is completed		3	1	2
	PC10. assist the operator in recording the drilling process as per the organization standards		3	1	2
	Total		30	10	20
3. IES/N0175 Assist in regular maintenance of the bore well drilling equipment	PC1. assist in checking fluid levels, coolant, oils and topping	20	2	1	1
	PC2. check for leakages, tightening and compressor conditions after every drill operation		2.5	1	1.5
	PC3. assist the operator in repairing and maintenance of the equipment		1.5	0.5	1
	PC4. check the battery level and condition of the terminals as per instructions from the operator		2	0.5	1.5
	PC5. ensure all the tools are kept in the designated place after usage		1.5	0.5	1
	PC6. report defects precisely to the supervisor if beyond scope of his role		1.5	0.5	1
	PC7. use appropriate tools while troubleshooting		1.5	0.5	1
	PC8. assist operator in diagnosing problem and identifying appropriate repair procedures		1.5	0.5	1
	PC9. dispose waste as per the guidelines of the site/ organization		1.5	0.5	1
	PC10. follow reporting procedures as laid down by the employer		1.5	0.5	1
	PC11. assist in completing all documentation in the prescribed standards in a timely manner		1.5	0.5	1
	PC12. report defects precisely to the operator/ supervisor if beyond scope of his role		1.5	0.5	1
	Total		20	7	13
4. IES/N7601 Comply with worksite health and safety guidelines	PC1. comply with safety, health, security and environment related regulations/ guidelines at the work site	15	1.5	0.5	1
	PC2. use Personal Protective Equipment (PPE) and other safety gear as applicable to the equipment and the worksite		2.5	0.5	2
	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		2	1	1

	PC4. carry out operations as per the manufacturer's and worksite related health and safety guidelines		1.5	0.5	1
	PC5. handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines		1.5	0.5	1
	PC6. operate various grades of fire extinguishers, as applicable		1.5	0.5	1
	PC7. support in administering basic first aid and report to concerned team members, as required, in case of an accident		1.5	0.5	1
	PC8. respond promptly and appropriately to an accident/incident or emergency situation, within limits of role and responsibility		1.5	0.5	1
	PC9. record and report details related to operations, incidents or accidents, as applicable		1.5	0.5	1
	Total		15	5	10
	Grand Total		100	34	66