

Model Curriculum

Concrete Pump Operator

SECTOR: INFRASTRUCTURE EQUIPMENT
SUB-SECTOR: EQUIPMENT OPERATIONS
OCCUPATION: OPERATOR
REF. ID: IES /Q 0107 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: **'Concrete Pump Operator'** QP No. **'IES/Q 0107 NSQF Level 4'**

Date of Issuance: **December 30th, 2015**

Valid up to: **March 31st, 2017**



Authorised Signatory
(Infrastructure Equipment Skill Council)

TABLE OF CONTENTS

1. Curriculum	01
2. Trainer Prerequisites	07
3. Annexure: Assessment Criteria	08

Concrete Pump Operator

CURRICULUM / SYLLABUS

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

Program Name	Concrete Pump Operators Course		
Qualification Pack Name & Reference ID.	IES/Q 0107		
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 Concrete Pump Operations preferred • In lieu of minimum qualification, should have 2 year experience in operating Concrete Pump 		
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 concrete pump operations. General introduction to concrete pump, basic working of engine, hydraulic and electrical systems, operational controls and instrument panel, preparing machine and related systems for operations • Operate a concrete pump. Properties of concrete, starting of concrete pump, monitoring and regulating flow, testing of concrete using various parameters, shutting down the machine; post-operative checks • Carry out maintenance and troubleshooting of concrete pump. 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 “Concrete Pump 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 0119</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"> • Various types of concrete pumps, features and performance. • Basic working of engine and all systems; hydraulic & electrical. • Controls, levers, switches and instrument panel & fuse box • 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 in the body and leakages. • Check all fluid levels in the engine, transmission & hydraulic systems; top up where necessary • 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 	<ul style="list-style-type: none"> • Concrete Pump Machine with standard tools and equipment. • Class room with audio-video system • Manufacturers O and M Manual & Video • Safety video • PPE Items • <u>Open ground</u>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Check water level in tank and contamination Check transfer mechanism: lines, tubes, valves for wear and tear, sealing gaps. Check delivery lines : supports, couplings, bends, wedges, tensioners, reducers. Check all controls, gauges, lights and horns are functional 	
2	<p>Operate a Concrete Pump</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 68:00</p> <p>Corresponding NOS Code IES/N 0120</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: Properties of concrete; pressure and flow at / for different heights. Methods of testing concrete: slump test, compression test etc. Procedure for turning on and off the concrete pump. Method of reversing flow of the pump when required. Interconnections and capacities of pumps, pipe lines, valve manifolds Basic principles of hydraulics, symbols and reading of hydraulic circuit diagrams. Best practices in pipe laying. Various hand signals and safety & emergency signs at work site <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. <p>Performance Criteria.</p> <ul style="list-style-type: none"> Concrete Pump Start - up: Carry out all pre- use and running checks as laid down 	<ul style="list-style-type: none"> <u>Concrete Pump Machine</u> with standard tools, equipment. <u>Adequate cement stocks</u> Class room with audio-video system Manufacturers O and M Manual & Video Safety video PPE Items <u>Open ground</u>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Inspect work site and layout / integrity of pipelines Pumping Operation. Organise and execute job as per instructions: Amount of concrete to be pumped Type of mix and consistency Monitor and regulate flow appropriately. Check levels and pressure of concrete using calibrated rods/gauges Record all operating data; quantity pumped, gauging results, timings and stocks Concrete Pump Shutdown: Shut down as per procedure Clean and lubricate pumps and valves as per procedure Inspect for damages; leaks etc and report / take appropriate action as laid down. 	
3	<p>Maintenance and Trouble Shooting of Concrete Pump</p> <p>Theory Duration (hh:mm) 11:00</p> <p>Practical Duration (hh:mm) 27:00</p> <p>Corresponding NOS Code IES/N 0121</p>	<p>Organisational Context:</p> <ul style="list-style-type: none"> Organisation structure and maintenance policy. Location of special tools and equipment/ accessories. <p>Technical Knowledge</p> <ul style="list-style-type: none"> Maintenance and service Schedule Common defects and general causes for breakdown. Best practices in pipe cleaning methods <p>Skills - Core & Professional</p> <ul style="list-style-type: none"> In addition to core and generic skills listed above; Plan maintenance & servicing keeping op needs in mind. <p>Performance Criteria</p> <ul style="list-style-type: none"> Routine Maintenance: Clean machine outside and inside Clean pumps and valves as per standing op procedure 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 machine correctly and safely using supports as necessary. Diagnose the defect/ problem and 	<ul style="list-style-type: none"> <u>Concrete Pump Machine</u> with standard tools, equipment. Class room with audio-video system. Manufacturers O and M Manual & Video Safety video PPE Items <u>Lab/workshop</u>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>rectify; if need be seek advice from supervisor.</p> <ul style="list-style-type: none"> • Documentation & Reporting: 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/N 7601</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. • Support in administering basic first aid. • Record and report details as related to operations, incidents or accidents as applicable. 	<ul style="list-style-type: none"> • <u>Concrete Pump Machine</u> with standard tools and equipment. • Class room with audio-video system. • Company's ESH video. • PPE Items & Safety Gear. • <u>Firefighting Eqpt.</u> • <u>First Aid Kit.</u> • <u>Open ground.</u>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Total Duration: Theory Duration (hh:mm) 57:00 Practical Duration (hh:mm) 135:00	Unique Equipment Required: <ul style="list-style-type: none"> • Concrete Pump Machine with standard tools and equipment. • Adequate stocks of cement and water required for training • Class room with audio-video projection system • Manufacturers O and M Manual & Video • Safety video • PPE Equipment: Helmet, gloves, harness, earplugs, goggles, mask • Firefighting equipment • First Aid Box and Charts • Open ground and Lab/workshop 	

Grand Total Course Duration: 192 Hours, 0 Minutes

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

Trainer Pre-requisites for Job role: “Concrete Pump Operator” Mapped to Qualification Pack: “IESC/Q 0107 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 “IESC/Q 0107 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: “Concrete Pump Operator” mapped to QP: “IES/Q 0107 – Version 1.0”. Minimum accepted score 70%. Desired: Certification Training in Concrete Pump Operations
4b	Platform Certification	Certified for Job Role: “Concrete Pump Trainer” 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 concrete pump operations. • Desirable: Should have conducted O and M programs at work sites.

Annexure: Assessment Criteria

Assessment Criteria for Concrete Pump Operator	
Job Role	Concrete Pump Operator
Qualification Pack	IES/Q 0107 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
IES/N0119 Carry out pre-operations checks on a concrete pump	PC1. Adhere to time limits given by supervisor	45	2	0	2
	PC2. Visually inspect the body and components for cracks, leakages, and ensure all switches are in neutral.		2	0	2
	PC3. Check that oil levels of engine, transmission, radiant coolant and brake are as per manufacturer's indicators		4	1	3
	PC4. Check differential and hydraulic oil levels		3	0	3
	PC5. Check water level and contamination in the water tank		4	1	3
	PC6. Conduct visual inspection to check the various controls, gauges, warning lamp, emergency button and other safety devices		4	1	3
	PC7. Check Transfer tube/Rock Valve/Gate Valve/S tube for wear and tear and adjust sealing gap if required		3	0	3
	PC8. Check delivery line for tensioners, reducers, bends, couplings, wedges/clips, leakages, and pipe support and wall thickness		4	1	3
	PC9. Check and set out all necessary work signs as required		4	1	3
	PC10. Clean air filter dust bowls and check the gasket and inner filter		3	0	3
	PC11. Top up coolant and oil in engine, transmission, etc. if necessary as per manufacturer's indicators		2	0	2
	PC12. Inspect all greasing points to ensure that all greasing pins and pivots points are well greased.		3	1	2
	PC13. Examine the compressor unit (if available)and all fittings		2	0	2
	PC14. Walk completely around the concrete pump checking that no one is under or on the machine before operating		3	1	2
	PC15. Maintain a checking/maintenance logbook to record all activities performed before starting the concrete pump		1	0	1
	PC16. Report defects precisely to the supervisor if beyond scope of his role		1	0	1
		Total	45	7	38

				Marks Allocation	
NOS	PC	Total Mark	Out of	Theory	Skills Practical
IES/N0120 Operate a Concrete Pump	PC1. Plan and organize the job according to given instructions	55	3	0	3
	PC2. Carry out all pre-use and running checks		3	0	3
	PC3. Ensure the integrity of pipelines that are connected to pumps and truck mixers prior to concrete transfer		3	0	3
	PC4. Receive verbal orders or over radio to determine amount of concrete to be pumped.		4	1	3
	PC5. Appropriately regulate the concrete flow to match the requirement of the project		3	0	3
	PC6. Inspect the concrete mix to ensure that the concrete is pumpable		3	0	3
	PC7. Communicate with other workers and supervisors using signals, radios, or telephones, to start and stop flow of concrete.		4	1	3
	PC8. Inspect equipment to ensure that tank levels, temperatures, chemical amounts, and pressures are at specified levels		4	1	3
	PC9. Report any abnormalities if necessary.		3	0	3
	PC10. Record operating data such as products and quantities pumped, stocks used, gauging results, and operating times.		4	1	3
	PC11. Clean, lubricate, and repair pumps and vessels, using hand tools and equipment as per industry standard		3	0	3
	PC12. Check pressure levels of concrete is as per requirement, by using calibrated pressure gauges or by reading mercury gauges and tank charts		4	1	3
	PC13. Check levels of concrete is as per requirement, by using calibrated rods or by reading mercury gauges and tank charts		4	1	3
	PC14. Check appropriate consistency of the concrete solution for smooth flow		3	0	3
	PC15. Check appropriate consistence of the concrete solution for smooth flow		1	0	1
	PC16. Carry out reverse flow in case required to clear the pump of concrete		3	0	3

		Marks Allocation			
NOS	PC	Total Mark	Out of	Theory	Skills Practical
	PC17. Use the emergency stop button to disable all power to the concrete pump in case of a crisis, as per operator manual		3	0	3
		Total	55	6	49
IES/N0121 Perform routine maintenance and troubleshooting for a concrete Pump	PC1. Assess the right service schedule by tracking machine operating hours	45	4	1	3
	PC2. Clean air filter dust bowls at regular intervals		2	0	2
	PC3. Clean the pump and valves as per standard operating procedures		2	0	2
	PC4. Replenish coolants, lubricants and fluids everyday		3	1	2
	PC5. Grease all greasing pins and pivot points everyday		2	0	2
	PC6. Check battery levels and condition of the terminals and carry out minor adjustments if required		2	0	2
	PC7. Check and maintain the tyre rims, air pressure, wheel nuts and treads as per manufacturer's indications		3	0	3
	PC8. 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		3	0	3
	PC9. Complete timely and legibly daily/weekly maintenance sheets as provided by the company		3	0	3
	PC10. Ensure that no maintenance task on any part of the equipment is performed when running or still hot		3	1	2
	PC11. Assess when the problem is beyond his competence and report the problem to suitably qualified and competent personnel		3	1	2
	PC12. Diagnose the problem		1	0	1
	PC13. Handle and dispose waste based on environmental guidelines at the work place		4	1	3
	PC14. Follow reporting procedures as laid down by the employer		3	1	2
	PC15. Complete all documentation in the prescribed standards in a timely manner		3	0	3
	PC16. Report and escalate problems/incidents as required in a timely manner		2	0	2
	PC17. Report defects precisely to the supervisor if beyond scope of his role		2	0	2

				Marks Allocation	
NOS	PC	Total Mark	Out of	Theory	Skills Practical
		Total	45	6	39
IES/N7601 Comply with worksite health and safety guidelines	PC1. Comply with safety, health, security and environment related regulations/ guidelines at the work site	35	2	0	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		4	1	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	0	3
	PC4. Carry out operations as per the manufacturer’s and worksite related health and safety guidelines		4	1	3
	PC5. Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines		4	1	3
	PC6. Follow safety regulations and procedures with regard to worksite hazards and risks		3	0	3
	PC7. Operate various grades of fire extinguishers, as applicable		3	0	3
	PC8. Support in administering basic first aid and report to concerned team members, as required, in case of an accident		4	1	3
	PC9. Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility		4	1	3
	PC10. Record and report details related to operations, incidents or accidents, as applicable		4	1	3
			Total	35	6



Infrastructure Equipment Skill Council

23-29, FF5, First Floor, "White House Building" St. Marks Road, (Opp SBI) Bengaluru - 560001