







Model Curriculum

Tyre Mounted Crane Operator

SECTOR: INFRASTRUCTURE EQUIPMENT

SUB-SECTOR: EQUIPMENT OPERATIONS

OCCUPATION: OPERATOR

REF ID: IES/Q0109, V1.0

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: 'Tyre Mounted Crane Operator' QP No. 'IES/ Q 0109 NSQF Level 4'

Date of Issuance: April 1st, 2017

Valid up to: March 31st , 2019

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

Authorized Signatory (Infrastructure Equipment Skill Council)









TABLE OF CONTENTS

1. Curriculum	01
2. Trainer Prerequisites	09
3. Annexure: Assessment Criteria	10









CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "<u>Tyre Mounted Crane Operator</u>", in the "<u>Infrastructure Equipment</u>" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Tyre Mounted Crane	e Operator	
Qualification Pack Name & Reference ID	IES/Q0109		
Version No.	1.0	Version Update Date	31 March 2015
Pre-requisites to Training	Certification Training	Class 8th Standard preferably Certification Training in Tyre Mounted Crane Operations preferred 2 years' experience in operating a Tyre Mounted Crane	
Training Outcomes	 Carry out pr Introduction to hydraulic and alarms, instruiction. Carry out ty work site insy hooking, lifting parking & she Carry out re General mair schedule; condocuments. Comply with safety and equipment, fire 	e-operation checks for the control of the control o	eyre mounted crane. sic working of engine, ational controls and achine for operations. tions. Load charts, mbling crane, rigging, and stacking stably, post-operative checks. re mounted crane. edures, periodic service gnosis; reports and fety guidelines. Health, personal protective asic first aid for common









This course encompasses <u>4</u> out of <u>4</u> National Occupational Standards (NOS) of "<u>Tyre Mounted Crane Operator</u>" Qualification Pack issued by "<u>Infrastructure Equipment Skill Council</u>".

Sr.			
No.	Module	Key Learning Outcomes	Equipment Required
1	Carry out preoperation checks on tyre mounted crane Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 16:00 Corresponding NOS Code IES/N0125	Organisational Context: Acquire a working knowledge of the following: Organisation structure, reporting and escalation line. Time frame for resolution of problems reported. Performance standards and procedures in the company. Work target and review mechanism with supervisor. Location of special tools and accessories/equipment Location and process for storage and disposal of waste. Technical Knowledge: Understand the fundamentals of the following: Overview of different types of cranes and its use/applications. Basic working of engine, hydraulic & electrical systems in a tyre mounted crane. Platform, tower, turntable, scissor stack structures, wear pads. Outriggers and wheels, drive wheel and motor. Controls, levers, switches and alarms, instrument panel & fuse box Procedure for checking, filling and topping up of fuel, coolants and oils Method of greasing and lubrication. Optimal working condition of components and monitoring systems Skills - Core & Professional: Acquire the ability to: Read & understand general instructions/guidelines related to equipment & worksite ops. Write and record any incidents & deviations on the prescribed formats.	 Tyre Mounted Crane with standard tools, accessories and equipment. Class room with audiovideo system Manufacturers O and M Manual & Video Safety video PPE Items & Safety Gear Open ground









Sr.	Module	Key Learning Outcomes	Equipment Required
No.	Module	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. Performance Criteria: Execute the following tasks and procedures: Pre-op checks Visually inspect the machine for	Equipment Required
		structural components. Excessive rust or corrosion /oxidation in components Oil leaks and damages to hoses and lines. Check all critical structural components, associated fasteners and pins are in place. Check all compartment covers are in place and properly secured/latched. Check all components in engine, hydraulic and electrical systems are fitted correctly/not missing Check all levels in the engine (fuel, lube, coolant), 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 Check footplates and steps are free of mud and oil spills. Check platform, tower, turntable, scissor stack structures, wear pads. Check tire pressure and wheel nuts for tightness. Check all controls, gauges, switches, lights, reflectors and horns are functional especially limit switches 	









Sr.	Module	Key Learning Outcomes	Equipment Required
No.		 Inspect cables, grappling devices, safety chains, hitch components, outriggers and engaging tools. Check the parking and electrical braking system including breakaway mechanism. Check all decals are legible and in place 	
		Maintain a logbook to record all checks /activities carried out before starting the hydra crane Report defects and problems in time and, if beyond his scope, escalate as necessary	
2	Operate a tyre mounted crane. Theory Duration (hh:mm) 18:00 Practical Duration (hh:mm) 36:00 Corresponding NOS Code IES/N0126	Organisational Context: Acquire a working knowledge of the following: Responsibilities and time frame for assigned jobs/work targets. Emergency organisation and reporting channel at work site. Escalation matrix and time frame for resolution of problems Equipment costs and delay implications to company. Location and process for storage and disposal of waste. Work target and performance review mechanism with supervisor.	 Tyre Mounted Crane with standard tools, accessories and equipment. Range of weighted loads with lifting hooks. Class room with audiovideo system Manufacturers O and M Manual & Video Safety video PPE Items & Safety Gear Open ground
		 Technical Knowledge: Understand the fundamentals of the following: Besides technical knowledge related to pre-op checks should know Types of material, methods and tools used in various construction activities where cranes are used. Manufacturers criteria for: Equipment operations Equipment modification Load capacity limitations Reading of load charts and their correct interpretation & application Rigging: Hardware and tools, methods and procedures, different configurations, hook up points 	









Sr.	Module	Koy Loorning Outcomes	Equipment Degreed
No.	Module	Key Learning Outcomes	Equipment Required
		 Hoisting: Hook up points, operation techniques, safety measures and stability conditions. Hauling: Rules of the road/walkways, safety dos and don'ts, stability during move. Stacking: Procedures for stacking loads in designated manner, correctly and safely; Crane tipping prevention techniques Multi crane operations Regulations, standards and safety rules for tyre mounted crane operations. Various hand signals, safety and emergency signs at work site. 	
		Skills - Core & Professional: Acquire the ability to:	
		 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 actions. 	
		Performance Criteria. Execute the following tasks and procedures:	
		 Understand the task, plan and organise the methodology for execution as per the site conditions. Starting up: After pre- use and running checks, start engine and assemble/station near load on firm level ground. Rigging: Assist in extending outriggers and check locking pins Hooking: Assist in hooking to attach sling, shackle and chains as required. 	
		 Lifting: Lift the load, release at a small height to check holding and control brakes; test its stability before moving. Hauling. Move the load to the desired area safely observing all precautions Stacking. Discharge load in the designated area safely and correctly. 	









Sr. No.	Module	Key Learning Outcomes	Equipment Required
		 Shutting down: Uninstall outriggers, 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	Carry out routine maintenance and trouble shooting of a tyre mounted crane. Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 16:00 Corresponding NOS Code IES/N0127	Organisational Context: Acquire working knowledge of the following: Breakdown and maintenance policy and services. Emergency organisation structure and reporting channel at work site. Escalation matrix and time frame for resolution of problems. Location of special tools and equipment/ accessories. Safety policy and procedures Technical Knowledge. Understand the fundamentals of the following: Maintenance and service Schedule including related checklists Common defects and general causes for breakdown. Skills - Core & Professional. Acquire the ability to: In addition to core and generic skills listed above; Plan maintenance & servicing keeping operational needs in mind. Performance Criteria. Execute the following tasks and procedures: Routine Maintenance: Ensure machine correctly and safely positioned before carrying out maintenance. Clean machine outside and inside thoroughly of all spilt oils, grease, mud and dirt Check crane structure and boom for deformed, cracked or corroded members Check boom for extension alignment, cords, lattices and end connections Check wire ropes for wear and tear. Check all control mechanisms and monitoring devices. Check engine, hydraulic & electrical systems / components.	 Tyre Mounted Crane with standard tools, accessories and equipment. Class room with audiovideo system Manufacturers O and M Manual & Video Safety video PPE Items & Safety Gear Lab/workshop/covered shed









Sr.	Module	Key Learning Outcomes	Equipment Required
Sr. No.	Comply with Worksite Health and Safety Guidelines Theory Duration (hh:mm) 06:00	 Clean air filter, replenish lubes and coolants as necessary Lubricate/grease all the moving joints/pins and pivot points. Check battery electrolyte levels and terminals Check wheel rim, tyre pressure and wheel nuts for tightness. Basic Trouble Shooting: Track machine operating hours to assess the right service schedule Place machine correctly and safely using supports as necessary. Diagnose the defect/ problem and rectify; if need be seek advice from supervisor. Documentation & Reporting: Ensure documentation on prescribed formats completed legibly and in time. Report defects and problems in time and escalate, if beyond his scope, as necessary Organisational Context. Acquire working knowledge of the following: 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. 	Hydra Crane with standard tools, accessories and equipment. Class room with audiovideo system Organisation's ESH / Safety video
	Practical Duration (hh:mm) 12:00 Corresponding NOS	 in case of emergencies. Location of first aid room / station and assembly points. Reporting channel and documentation procedure for all HSE 	Safety video PPE Items & Safety Gear Firefighting equipment & Charts
	Code IES/N7601	related matters. Technical Knowledge. Understand the fundamentals of the following: 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.	First Aid Kit and Charts









Sr.	Module	Key Learning Outcomes	Equipment Required
No.		 Firefighting equipment: Basic knowledge of handling and using them. Guidelines for transport, storage and disposal of hazardous materials and waste Safety signs/symbols and warnings used in worksites and their meaning Skills - Core & Professional. Acquire the ability to: Use correct PPE and other safety gear while at the work site. Performance Criteria. Execute the following tasks and procedures: 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. 	Equipment required
	Total Duration	Unique Equipment Required:	
	Theory Duration 80:00 Practical Duration 40:00	 Tyre Mounted Crane with standar equipment. Range of weighted loads with built in lie Class room with audio-video projection Manufacturers O and M Manual & Vide Safety video PPE Equipment: Helmet, gloves, earpl Firefighting equipment and 'How to Use First Aid Box and 'How to Do' Charts Open ground and Lab/Workshop/Cove 	fting hooks n system eo ugs, goggles, safety shoes e' Charts

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: "Tyre Mounted Crane Operator" mapped to Qualification Pack: "IES/Q0109, 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 0109 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 8th; preferably 10th
4a	Domain Certification	Certified for Job Role: "Tyre Mounted Crane Operator" mapped to QP: "IES/Q 0109 – Version 1.0". Minimum accepted score 70%. Desired: Certification Training in Tyre Mounted Crane Operations & Maintenance.
4b	Platform Certification	Certified for Job Role: "Trainer" mapped to Qualification Pack: SSC/1402. Minimum accepted score 70%.
5	Experience	 Around 3 to 4 years' site experience in Tyre Mounted Crane Operations. At least 1 to 2 years' experience in conducting O and M training programs.









Assessment Criteria	
Job Role	Tyre Mounted Crane Operator
Qualification Pack	IES/Q 0109 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	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criteria.
5	To pass the Qualification Pack, every trainee should score a minimum of 50% aggregate.
6	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	
Assessable Outcomes	Assessment criteria for the outcome	Total Mark	Out Of	Theory	Skills Practical
1. IES/N0125 Carry out pre- operation checks on tyre mounted crane	PC1. Adhere to time limits given by supervisor		1	0	1
	PC2. Ensure the crane body components is free of cracks and bearing wear		2	1	1
	PC3. Checks that all decals are egible and in place as per peration manual		3	0	3
	PC4. Confirm no hydraulic oil leaks and proper oil level as per manufacturer's indicator	40	1	0	1
	PC5. Confirm no battery fluid leaks and proper fluid level as per manufacturer's indicator		4	1	3
	PC6. Ensure proper tyre pressure and lug nut torque as per manufacturer's indicator		3	0	3
	PC7. Make sure there is no engine oil leaks and proper fuel and fluid levels as per manufacturer's indicator		4	1	3









PC8. Get fuel and oil filled if needed as per manufacturer's indicator	1	0	1
PC9. Check the holding and control breaks to ensure that they are functioning properly	1	0	1
PC10. Ensure the following components are free of areas for damage, improperly installed or missing parts as per the manufacturer 's manual: • Electrical components, wiring and electrical cables • Hydraulic power unit, reservoir, hoses, fittings, cylinders and manifolds. • Platform, tower, turntable, scissor stack structures, their components and wear pads • Tyres and wheels • Trailer lights and reflectors Parking brake, and electric braking system (including the breakaway system) • Drive wheel and motor	4	1	3
PC11. Ensure the following components as per operation manual: • Outriggers and Wheels • Limit switches • Pins, nuts, bolts and other fasteners • Hitch components • Safety chains • Engines their fuel systems and related components • Axle components • Personal protective devices	5	1	4
PC12. Ensure that all structural and other critical components are present as per operation manual	1	0	1
PC13. Check all associated fasteners and pins are in place and properly tightened as per operation manual	3	0	3
PC14. Ensure all compartment covers are in place and latched as per operation manual	 1	0	1









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	PC15. Visually inspect entire machine for: • Cracks in welds or structural components • Excessive rust, corrosion or oxidation • Dents or damage to machine		4	1	3
	PC16. Maintain a checking/maintenance logbook to record all activities performed before starting the crane		1	0	1
	PC17. Report defects precisely to the supervisor if beyond scope of his role		1	0	1
		Total	40	6	34
2. IES/N0126 Operate Tyre Mounted Crane	PC1. Plan and organize the job according to given instructions		1	0	1
	PC2. Inspect the worksite to identify the soil condition to station the Tyre Mounted Crane		3	0	3
	PC3. Ensure that Tyre Mounted Crane is always assembled/stationed on firm, level ground		3	0	3
	PC4. Ensure Tyre mounted crane is assembled near the load on smooth surface		3	0	3
	PC5. Appropriately Position the hook to attach sling, shackle and chains as per operation's manual		4	1	3
	PC6. Start the engine as per operation's manual	61	3	0	3
	PC7. Ensure outriggers are extended fully as per manufacturer's manual		3	0	3
	PC8. Ensure outriggers are equipped with lock pins per manufacturer's manual		3	0	3
	PC9. Check the assembly and ensure that relevant safety measures as per safety guidelines taken		2	1	1
	PC10. Use the emergency stop button to disable all power to the tyre mounted crane in case of a crisis, as per operator manual		1	0	1
	PC11. Ensure safe working load as per operation manual		1	0	1









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PC12. Check wind speeds are within the crane's operational limits		1	0	1
PC13. Ensure appropriate boom extension as per operation manual		2	1	1
PC14. Hoist and release the load at a small height to check the holding and control breaks are functioning properly, ahead of the actual lifting		4	1	3
PC15. Carry out lifting of load in coordination with rigger as per the requirement		3	0	3
PC16. Monitor stability whilst moving a load		1	0	1
PC17. Ensure good visibility of both ends of the crane arm at all times		1	0	1
PC18. Ensure no obstacles, personnel or other obstructions during lifting operation		2	1	1
PC19. Look out for people working and hazards such as trenches, potholes and cables		1	0	1
PC20. Adhere to time limits given by the supervisors		1	0	1
PC21. Perform in-operation visual checks on critical temperature and pressure gauges as per operation manual		2	1	1
PC22. Select and use the right type of brake in different situations and conditions as per the operation manual		2	1	1
PC23. Ensure that walkway rules e.g. operating the crane within the permissible/ allocated areas are followed		1	0	1
PC24. Utilize judiciously various signaling devices available in the crane		1	0	1
PC25. Keep a safe distance from other plant or vehicles		1	0	1
PC26. Work safely in accordance with operational requirements and associated Safe Systems of Work		2	1	1
PC27. Discharge the load safely at the position and in the manner designated by the supervisor		1	0	1









	PC28. Follow the instructions by the rigger		1	0	1
	PC29. Operate and control the boom as per operation manual		1	0	1
	PC30. Ensure laydown area is sufficient in size to accommodate load		1	0	1
	PC31. Ensure laydown area is clear of any obstruction and		1	0	1
	PC32. Ensure that no other operators travel on or stand near the Tyre Mounted Crane		1	0	1
	PC33. Inform supervisor/rigger of any problems while operating the Tyre Mounted Crane		1	0	1
	PC34. Ensure machine is Shut down and secure properly when it is unattended		1	0	1
	PC35. Appropriately uninstall outriggers		1	0	1
		Total	61	8	53
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3. IES/N0127 Perform routine maintenance and troubleshooting of Tyre Mounted Crane	PC1. Assess the right service schedule by tracking machine operating hours		1	0	1
Perform routine maintenance and troubleshooting of Tyre Mounted	schedule by tracking machine	39			









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PC4. Check for the following in hydraulic system of Crane as per operation & maintenance manual: • Deterioration or leakage in air or hydraulic systems • Safe and effective operation on hoses, pumps and motors • Levels of fluid • Air cleaners for replacement or cleaning		4	1	3
PC5. Check for the following Control Mechanisms and Monitoring Devices as per operation & maintenance manual • Cables, brakes and levers for poor adjustment or excessive wear. • Marking on the load/radius indicator over full range. • Load moment indicator, • Boom angle indicator, • Boom length indicator and • Anti two-block system		3	0	3
PC6. Check wire ropes for wear and tear		1	0	1
PC7. Check the following in the main boom as per operation manual: • lift cylinder(s) • telescoping cylinder(s) • hydraulic hoses / tubing & fittings • holding device • auxiliary boom head ë structure		4	1	3
PC8. Check the following in the Lattice boom extension • Boom • extension alignment • cords • lattices • end connections		4	1	3
PC9. Replenish coolants, lubricants and fluids as per operation & maintenance manual		1	0	1
PC10. Grease all greasing pins and pivot points as per operation & maintenance manual		1	0	1









	PC11. Check battery levels and condition of the terminals and carry out minor adjustments as per manufacturer's indicators		1	0	1
	PC12. Check and maintain the tyre rims, air pressure, wheel nits and treads as per manufacturer's indicators		1	0	1
	PC13. Ensure the machine is on firm and level ground before attempting to carry out any maintenance;		1	0	1
	PC14. Track machine operating hours to assess the right service schedule		1	0	1
	PC15. Complete timely and legibly daily/ weekly maintenance sheets as provided by the company		1	0	1
	PC16. Ensure that suitable props/ support devices are used while performing maintenance		1	0	1
	PC17. Ensure that no maintenance task on the engine is performed when running or still hot		1	0	1
	PC18. Assess when the problem is beyond his competence and report the problem to suitably qualified and competent personnel		2	1	1
	PC19. Diagnose the problem		1	0	1
	PC20. Handle and dispose waste based on environmental guidelines at the work place		1	0	1
	PC21.Follow reporting procedures as laid down by the employer		1	0	1
	PC22.Complete all documentation in the prescribed standards in a timely manner		1	0	1
	PC23.Report and escalate problems/ incidents as required in a timely manner		1	0	1
	PC24.Report defects precisely to the supervisor if beyond scope of his role		1	0	1
		Total	39	5	34
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	20	1	0	1









accidents, as applic	able	otal 2		6	14
PC10. Record and related to operation		1		0	1
PC9. Respond appropriately to incident or emerg within limits of y responsibility	ency situation,	2	2	1	1
PC8. Support in basic first aid a concerned team required, in case of	members, as an accident	2	2	1	1
PC7. Operate vari fire extinguishers, a	· ·	1		0	1
PC6. Follow safety procedures with reg hazards and risks		1		0	1
PC5. Handle the tra and disposal of materials and waste with worksite heal environmental guide	of hazardous e in compliance th, safety and	4	ļ	1	3
PC4. Carry out ope the manufacturer's related health guidelines	erations as per	2	2	1	1
PC3. Follow saf during operations the health and sa others (including m public) is not at risk	fety of self or embers of the	2	2	1	1
PC2. Use Perso Equipment (PPE) a gear such as se protection, respirat eye protection, ear hand protection	nd other safety at belt, body ory protection,	4	ļ	1	3