Model Curriculum

Tower Crane Operator

SECTOR: INFRASTRUCTURE EQUIPMENT
SUB-SECTOR: EQUIPMENT OPERATIONS
OCCUPATION: MACHINE OPERATION
REF ID: IES/Q0122, V1.0
NSQF LEVEL: 4

Skill India

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Transforming the skill landscape

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: '**Tower Crane Operator**' QP No. '**IES/ Q 0122 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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Tower Crane Operator

CURRICULUM / SYLLABUS

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

Program Name	**Tower Crane Operator**		
Qualification Pack Name & Reference ID	IES/Q0122		
Version No.	1.0	**Version Update Date**	28 June 2018
Pre-requisites to Training	Class 8th 1 to 2 years' experience as Junior Tower Crane Operator/Signalman		
Training Outcomes	After completing this programme, participants will be able to: • Conduct pre-operation checks for tower crane by inspecting, preparing and testing the functions of all controls and systems of the machine including its monitoring, communicating and safety devices. • Carry out tower crane operations by inspecting the worksite, understanding the task, planning the methodology and executing it precisely and safely within the allotted resources and time frame. • Carry out regular maintenance of tower crane 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 "Tower Crane Operator" Qualification Pack issued by "Infrastructure Equipment Skill Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Carry out pre-operation checks on tower crane** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 16:00 **Corresponding NOS Code** IES/N0164	• Check mounting base is free of cracks and tightness of bolts and nuts. • Inspect the mast sections for visual cracks, defects & corrosion • Check all cabin controls, gauges, switches, lights and horns are functional. • Check panel board system for requisite power supply • Inspect load bearing structure components like boom pins, pendant lines etc for correctness. • Check hoisting system for the smooth movements of components like wire rope, winch mount etc. • Check stabilising system components for levels of counter and ballasted weights. • Check all components in engine, hydraulic and electrical systems are fitted correctly/not missing • Check all levels in the engine (fuel, lube, coolant), hydraulic systems; top up where necessary • Inspect all greasing points/ pivots and ensure lubrication of components like pulley, rope, trolley and swing gear parts • Maintain a logbook to record all checks /activities carried out before starting the tower crane • Report defects and problems in time and, if beyond his scope, escalate as necessary • 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 phrase to team members /supervisor in a clear and concise manner.	• Tower Crane with standard tools, accessories and equipment. • Class room with audio-visual system • Manufacturers O and M Manual & Video • Safety video • PPE Items & Safety Gear • Open ground
2	**Operate a tower crane.** **Theory Duration** (hh:mm) 18:00 **Practical Duration** (hh:mm)	• Formulate the methodology for execution of tasks as per the site conditions and operational instructions/guidelines. • Inspect site for obstructions like high rises, power lines and wind pattern. • Establish communication with signal man and test functioning of	• Tower Crane with standard tools, accessories and equipment. • Range of weighted loads with lifting hooks. • Class room with audio-visual system

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	36:00 **Corresponding NOS Code** IES/N0165	communication devices • Commence operations by starting the engine and checking the controls of operating panel; functioning of levers, hoists and trolley gears before lifting load • Direct trolley to place it over the load and drop down the rope towards the load at appropriate speed. • Perform hoisting operations such as raising and lowering boom with load starting at lower heights and then ascending. • Monitor load movement indicators and anti-collision sensors while lifting and slewing the load • Control the unloading of the material at the desired point as per the directions of the signalman • Identify operational issues/slow-downs and take timely remedial actions; escalate if beyond scope • Terminate operations by moving trolley to home position; setting in weather -vane position and shutting down as per procedure. • Disembark the tower crane safely and conduct a walk around check for general condition of equipment. • Ensure quality service is delivered as committed to achieve high levels of customer satisfaction.	• Manufacturers O and M Manual & Video • Safety video • PPE Items & Safety Gear • Open ground
3	**Carry out routine maintenance and trouble shooting of a tower crane.** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 16:00 **Corresponding NOS Code** IES/N0166	• Determine the service requirement as per the parameters listed in the maintenance schedule • Position the machine correctly and safely before carrying out any maintenance activity • Inspect crane structure for deformed, cracked or corroded members and rectify as necessary • Inspect and check functioning of all control mechanisms and monitoring devices. • Inspect and service the hoisting and stabilizing system; as laid down in the maintenance manual • Inspect engine, hydraulic & electrical systems and service the various components as per the guidelines. • Diagnose the defect/ problem and rectify using appropriate tools/eqpt; if need be obtain advice from supervisor.	• Tower Crane with standard tools, accessories and equipment. • Class room with audio-visual 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
		• Complete documentation on prescribed formats/templates legibly and punctually. • Report defects and problems in time and escalate, if beyond his scope, as necessary	
4	**Comply with Worksite Health and Safety Guidelines** **Theory Duration** (hh:mm) 06:00 **Practical Duration** (hh:mm) 12:00 **Corresponding NOS Code** IES/N7601	• 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 publics 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 situation, 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.	• Tower Crane with standard tools, accessories and equipment. • Class room with audio-visual system • Organisation's ESH / Safety video • PPE Items & Safety Gear • Firefighting equipment & Charts • First Aid Kit and Charts
	Total Duration **Theory Duration 40:00** **Practical Duration 80:00**	Unique Equipment Required: • Tower Crane with standard tools, accessories and equipment. • Range of weighted loads with built in lifting hooks • 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: "Tower Crane Operator" mapped to Qualification Pack: "IES/Q0122, 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 0122 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 10th
4a	**Domain Certification**	Certified for Job Role: "Tower Crane Operator" mapped to QP: "IES/Q 0122 – Version 1.0". Minimum accepted score 70%.
4b	**Platform Certification**	Certified for Job Role: "Trainer" mapped to Qualification Pack: MEP/Q0102. Minimum accepted score 80%.
5	**Experience**	• 3 to 4 years' site experience in Tower Crane Operations. • 1 to 2 years' experience in conducting O and M training programs.

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Tower Crane Operator

Qualification Pack Code IES/Q0122

Sector Skill Council IESC

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 centre (as per assessment criteria below)
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre 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 **Total Marks: 100**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
1. IES/N0164 Carry out Pre-operation checks on a tower crane	PC1. check the base is free from cracks on which the tower crane is installed	**30**	1.5	0.5	1
	PC2. check for bolts and nuts tightening		1.5	0.5	1
	PC3. inspect visually all mast sections for defects and corrosion		1	0	1
	PC4. inspect operator station components such as seat, instrument panel, crane load chart and communication devices		2	1	1
	PC5. verify panel board system for enough power supply and the function of switches		3	1	2
	PC6. check the levels of grease in components such as pulley, rope, trolley and swing gear parts		1.5	0.5	1
	PC7. inspect load bearing structure components such as boom pins, pendant lines, boom hoist reeve or bridle, mast, base and under carriage for any wear and tear		3	1	2

	PC8. check the hoisting system for smooth movement of the components such as wire rope, fittings, drums, hook, sheaves and winch mount		3	1	2
	PC9. check for stabilizing system components for levels of counter & ballasted weights		3	1	2
	PC10. inspect hydraulic system components like hydraulic fluid, filters, lines, pumps and fittings		2.5	0.5	2
	PC11. check the engine oil levels and radiator coolant temperature indicators		2.5	0.5	2
	PC12. ensure that the work site is clear from all personnel and other equipment before starting		1.5	0.5	1
	PC13. maintain a pre-operational check logbook to record all activities performed before starting the tower crane		2	1	1
	PC14. report defects precisely to the supervisor if beyond scope of role		2	1	1
	Total		**30**	**10**	**20**
2. IES/N0165 Carry out tower crane operations	PC1. inspect site visually for any source of obstruction or for any personnel in the circumference/ check for near high raise natural or Man-made structure / High voltage lines/Wind pattern	**35**	3	1	2
	PC2. test the working condition of the communication device along with the signalman		2	1	1
	PC3. start the engine and check the controls of operating panel for normal functioning		2	0	2
	PC4. test the functioning of levers, hoist and trolley gears for proper working condition before lifting the load		2	0	2
	PC5. direct the trolley to place it over the load as per the directions given by the signalman		3	1	2
	PC6. control the direction of the boom by controlling the lever movements based on the directions given by the signalman		3	1	2
	PC7. drop down the rope with appropriate speed towards the load as per the directions of the signalman		2	1	1
	PC8. perform hoisting operations such as raising and lowering boom with load starting from minimal heights to ascend to greater heights		1	0	1
	PC9. monitor the load movement indicators and anti-collision sensors while lifting and slewing the load		3	1	2

	PC10. control the speed of the boom while moving left or right side with using lever/joystick		3	1	2
	PC11. unload the material at the particular point as per the directions of the signalman		1	0	1
	PC12. take trolley to the home position		0.5	0	0.5
	PC13. set in weather- vane position before shutting down the operation		2	1	1
	PC14. turn off the power supply as per the operational manual		1	0	1
	PC15. climb down the tower crane wearing safety gear following the appropriate methods		2	1	1
	PC16. conduct walk around visual inspection to check general condition of equipment		1.5	1	0.5
	PC17. maintain a logbook to record all activities performed		1.5	1	0.5
	PC18. report defects precisely to the supervisor if beyond scope of his role		1.5	1	0.5
	Total		**35**	**12**	**23**
3. IES/N0166 Carry out maintenance and trouble-shooting of the tower crane	PC1. determine the service requirement for the equipment as per the scheduled maintenance	**20**	1.5	0.5	1
	PC2. replenish coolants, lubricants and fluids as per the running of the machine or as per the operational manual		1.5	0.5	1
	PC3. grease all greasing pins, trolley pins, hoist and rope and slewing bolts regularly as per the usage of the machine		1.5	0.5	1
	PC4. service lubrications system, electrical service system, hoisting system and stabilizing system of the tower crane		1.5	0.5	1
	PC5. service Jib/boom and mast as per the usage of the equipment		1.5	0.5	1
	PC6. check battery levels and condition of the terminals and carry out minor adjustments if required		1.5	0.5	1
	PC7. ensure all the tools are kept in the designated place after usage as per the organizational guidelines		1.5	0.5	1
	PC8. ensure the main power is turned off from panel completely before carrying out maintenance work		1.5	0.5	1
	PC9. ensure that appropriate tools are used while troubleshooting		1.5	0.5	1

	PC10. diagnose the problem and identify appropriate repair procedures		1.5	0.5	1
	PC11. report defects precisely to the supervisor if beyond scope of his role		1.5	0.5	1
	PC12. dispose waste as per the guidelines of the site/ organization		1.5	0.5	1
	PC13. follow reporting procedures as laid down by the employer		1	0.5	0.5
	PC14. complete all documentation in the prescribed standards in a timely manner		1	0.5	0.5
	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		3	1	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		1.5	0.5	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**	**100**	**34**	**66**