



## **Tyre Mounted Crane**

# **Model Curriculum**

**QP Name: Tyre Mounted Crane Operator**

**QP Code: IES/Q0109**

**QP Version: 3.0**

**NSQF Level: 4**

**Model Curriculum Version: 1.0**

Infrastructure Equipment Skill Council (IESC). Jubilee Building (Second Floor), No.45, Museum Road, Bengaluru - 560025

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## Training Parameters

Sector	Infrastructure Equipment
Sub-Sector	Equipment Operation
Occupation	Operator
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8343.0500
Minimum Educational Qualification and Experience	8th Grade pass with 2 year NTC plus 1 year NAC OR 10th Grade pass plus 1 year NTC/ NAC OR 10th Grade pass with 2 years of relevant experience OR 10th Grade pass and pursuing continuous schooling OR 11th Grade Pass OR IES/Q0111 - Junior Operator Crane NSQF Level 3 with minimum education as 5th Grade pass with 2 year relevant experience
Pre-Requisite License or Training	NIL
Minimum Job Entry Age	18 Years
Last Reviewed On	17/11/2022
Next Review Date	17/11/2025
NSQC Approval Date	17/11/2022
QP Version	3.0
Model Curriculum Creation Date	30/10/2022
Model Curriculum Valid Up to Date	17/11/2025
Model Curriculum Version	1.0
Minimum Duration of the Course	420 Hours

Maximum Duration of the Course

420 Hours

## Program Overview

This section summarizes the end objectives of the program along with its duration.

### Training Outcomes

At the end of the program, the learner should be able to:

- Outline the organization's procedures and guidelines related to tyre mounted crane operations.
- Explain the roles and responsibilities of the tyre mounted crane Operator.
- Explain the different types of tyre mounted crane and their applications.
- Understand all the typical occupational hazards and techniques to overcome them.
- Explain how to record machine running hours to determine the best service plan.
- Prepare and maintain a logbook to keep track of all actions.
- Describe the guidelines for health, safety and security requirements.

### Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	4	0	0	0	4
NOS Code – IES/N 0125 NOS Name: Carry out pre-operation checks on Tyre mounted crane NOS Version - 2.0 NSQF Level - 4	30	30	60	0	120
NOS Code – IES/N 0126 NOS Name – Operate a Tyre mounted crane NOS Version - 2.0 NSQF Level - 4	30	60	30	0	120
NOS Code - IES/N 0127 NOS Name - Perform routine maintenance and troubleshooting of Tyre mounted crane NOS Version - 2.0 NSQF Level - 4	30	30	60	0	120
NOS Code - IES/N 7601 NOS Name - Comply with worksite health and safety guidelines	0	30	0	0	30

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NOS Version - 2.0					
NSQF Level - 4					
NOS Code - DGT/VSQ/N0101					
NOS Name - Employability Skills 30 hrs	<b>0</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>30</b>
NOS Version -1.0					
<b>Total Duration</b>	<b>90</b>	<b>180</b>	<b>150</b>	<b>0</b>	<b>420</b>

## Module Details

### Module 1: Orientation

#### Bridge Module

##### Terminal Outcomes:

- Describe the operations of the infrastructure industry in India.
- Elaborate the skill training schemes in the Skill Sector Councils.
- Discuss the different types of job roles available in IESC.
- Explain the roles and responsibilities of a tyre mounted crane Operator.

<b>Duration:</b> <4:00>	<b>Duration:</b> <0:00>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Describe the scope of employment opportunities in the industry.</li> <li>• Explain the roles and responsibilities of a tyre mounted crane Operator.</li> <li>• Describe the different technical trainings conducted in SSC.</li> </ul>	NIL
<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster	
<b>Tools, Equipment and Other Requirements</b>	

## Module 2: Pre-op checks on Tyre Mounted Crane

Mapped to NOS Code – IES/N0125 v 2.0

### Terminal Outcomes:

- Outline the performance standards & procedures related to tyre mounted crane operations.
- Know the basic working of engine, transmission and other systems of the tyre mounted crane.
- Explain the process to check for engine oil leaks and fluid levels.
- Perform a visual inspection of the entire tyre mounted crane for cracks in welds and the structural components.
- Understand the risks and consequences of not adhering to established processes and job instructions.
- Know the reporting structure in the organization, schedule for resolving the complaint/problem and escalation matrix for reporting unresolved problems.

<b>Duration: &lt;30:00&gt;</b>	<b>Duration: &lt;90:00&gt;</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Outline the organization’s procedures and guidelines related to breakdown &amp; maintenance services.</li> <li>• Explain the different types of cranes and their applications and functions.</li> <li>• Expound the relevance of greasing and oiling crane components that require routine lubrication.</li> <li>• Know about the various types of hand signals &amp; emergency signs used on the site.</li> <li>• Record any deviations or occurrences that do not conform to the specified standards.</li> <li>• Know the escalation matrix for reporting unresolved problems.</li> <li>• Know the parameters to be included in a checklist for pre operation inspection of the</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how visual inspection for cracks, damage, flaws, or leaks is performed before operation.</li> <li>• Show how to check for hydraulic oil leaks and ensure that the oil level is according to the manufacturer's indication.</li> <li>• Hoist and release the load at a low height to ensure that the holding and control brakes are working properly.</li> <li>• Check the electrical components, wiring and electrical cables hydraulic power unit, hoses, fittings, cylinders and manifolds platform for damage, improper installation or missing parts.</li> <li>• Check the turntable and wear pads for damage, improper installation or missing parts.</li> <li>• Check the tyres and wheels, trailer lights and reflectors, parking brake</li> </ul>

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<p>equipment to detect damage, flaws, cracks or leaks.</p> <ul style="list-style-type: none"> <li>• Explain the importance of maintaining a log book to record all actions completed prior to starting the tyre mounted crane.</li> <li>• Ensure that the different controls, gauges, warning lights, and other safety devices are working.</li> <li>• Make sure that all compartment lids are in place and locked properly.</li> <li>• Describe the steps to check the tyre pressure and lug nut torque.</li> </ul>	<p>and electric braking system (including the breakaway system), drive wheel and motor for damage, improper installation or missing parts.</p> <ul style="list-style-type: none"> <li>• Check the outriggers and wheels, hoist limit switches, hitch components and safety chains.</li> <li>• Check that all associated fasteners and pins are in position and properly fastened.</li> <li>• Prepare a maintenance logbook in which all actions conducted prior to operating the crane are recorded.</li> <li>• Prepare a daily top-up plan of coolants, lubricants and fluids to ensure conformity with the manufacturer's specifications.</li> <li>• Test that the parking brake, main horn, reverse horn, and headlights are in good working order.</li> <li>• Demonstrate how to adjust the operator's seat, rear and side mirrors and seat belt for ease of operation.</li> <li>• Demonstrate the procedure to check that the greasing points and pivots are properly greased.</li> <li>• Show how to clean the air filter dust bowls and check that the gasket and inner filter are in good condition.</li> <li>• Demonstrate how to drain water and debris from the fuel tank.</li> <li>• Show how to check fan belt tension, battery electrolyte level and tightness of the terminals.</li> </ul>
<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer's Service and Repair Manual	
<b>Tools, Equipment and Other Requirements</b>	
Safety Gear, Tool Kit, PPE	

## Module 3: Operation of a Tyre Mounted Crane

Mapped to NOS Code – IES/N0126 v 2.0

Terminal Outcomes:

- Outline the reporting structure of the company.
- Explain the responsibilities of the operator in his assigned job role.
- Explain the controls, levers and switches for efficient operation of the tyre mounted crane.
- Summarize the methods to read load charts and accurately determine the load to be lifted.
- Determine the causes of tyre mounted crane related accidents and associated preventive measures.
- Expound the importance of position and application of the tyre mounted crane.
- Examine the soil condition of the worksite to identify where to station the tyre mounted crane so that it does not get trapped.

Duration:<30:00>	Duration:<90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Know the tyre mount crane load bearing capacity and types of loads it can carry.</li> <li>• Determine the usage of appropriate attachment available as ad-ons with the main crane.</li> <li>• Know how to use the rigging hardware and slings.</li> <li>• Explain the use of various sorts of rigging setups.</li> <li>• Know the hook-up points to balance the load as per its centre of gravity.</li> <li>• Outline the government regulations and other safety protocols for crane operations.</li> <li>• Know the conditions and hazards that may impact the stability of the crane.</li> <li>• Elaborate crane tipping prevention techniques.</li> <li>• Explain why the tyre mounted crane is always</li> </ul>	<ul style="list-style-type: none"> <li>• Examine the soil condition of the worksite to identify where to station the tyre mounted crane so that it does not get trapped.</li> <li>• Show how to monitor stability while moving a load.</li> <li>• Demonstrate how to use the sling, shackle and chains.</li> <li>• Illustrate how to carry out lifting of the load in coordination with the rigger.</li> <li>• Demonstrate how to check that the wind speeds are within the crane's operational limitations.</li> <li>• Demonstrate how to utilise the priming pump and pre-heater to start the engine in extreme cold weather.</li> <li>• Show how to wear the seatbelt and adjust the seat position</li> </ul>



<p>assembled /stationed on solid, level ground.</p> <ul style="list-style-type: none"> <li>• Describe the proper tyre mounted crane maintenance method.</li> <li>• Expound the importance of position and application of the tyre mounted crane.</li> <li>• Plan work according to the required schedule and location.</li> <li>• Explain the importance of having the outriggers extended fully.</li> <li>• Know the importance of walking around the tyre mounted crane. before starting it.</li> <li>• Know the hazard of improper boom extension.</li> <li>• Explain the importance of maintaining constant visibility of both ends of the crane arm.</li> <li>• Know how to choose the appropriate kind of brake in various scenarios and conditions.</li> <li>• List methods to enhance the operational efficiency of the tyre mounted crane.</li> <li>• Outline the procedure to notify the supervisor if a fault is found that is outside the scope of the operator's job role.</li> <li>• Know the cost of the tyre mounted crane and loss to the Organization resulting from its damage and the direct/ indirect cost of accidents.</li> <li>• Identify the tools in the tool kit, explain their use and know the storage place of the kit.</li> <li>• Understand significance of greasing and oiling parts of the tyre mounted crane.</li> <li>• Know the optimal engine oil pressure and radiator coolant temperature.</li> </ul>	<ul style="list-style-type: none"> <li>• Know the position of the emergency stop button to disable all power to the tyre mounted crane.</li> <li>• Describe the instrument panel, its position and its functions.</li> <li>• Demonstrate how to adjust the tyre mounted crane's speed and direction in accordance with the requirement.</li> <li>• Show how to test check product load in order to avoid overloading during operations.</li> <li>• Demonstrate turning radius of the tyre mounted crane and safe operation in limited space.</li> <li>• Show how to select the appropriate attachment as per the job requirement.</li> <li>• Ensure that there are no barriers, people, or other impediments throughout the lifting procedure.</li> <li>• Give examples of all signs, warnings, and other emergency signals.</li> <li>• Check that the laydown area is large enough to support the load and is free of obstruction.</li> </ul>
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<ul style="list-style-type: none"><li>• List immediate or temporary solutions to resolve mechanical issues.</li><li>• Describe the risk and consequences of failing to follow clearly specified procedures /work instructions.</li></ul>	
<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer’s Service and Repair Manual	
<b>Tools, Equipment and Other Requirements</b>	
Safety Gear, Tool Kit, PPE	

## Module 4: Routine maintenance & trouble shooting

Mapped to NOS Code: IES/N0127 v 2.0

- Demonstrate the process to find typical defects and general reasons of failure.
- Employ the process to check the crane structure and the accessories as per the operation & maintenance manual.
- Determine the steps to check the crane wire ropes for wear and tear.

Duration: <30:00>	Duration: <90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Outline the organization’s procedures and guidelines related to breakdown &amp; maintenance services.</li> <li>• Explain the various components of the tyre mounted crane and their functions.</li> <li>• Elaborate the use of various control and switches needed to operate the tyre mounted crane properly.</li> <li>• List parameters to be covered in the periodic maintenance sheet.</li> <li>• Explain the importance of timely completion of daily/ weekly maintenance sheets.</li> <li>• Elaborate the fundamental mechanical system at work in the different operations of the tyre mounted crane.</li> <li>• Define safety protocols to be observed before undertaking any repair.</li> <li>• Define the scope of the position and when and to whom to escalate for help.</li> <li>• Identify common defects and general causes of breakdown.</li> <li>• Explain the importance of the optimal levels of control indicators e.g. fuel gauge, engine oil pressure and temperature.</li> </ul>	<ul style="list-style-type: none"> <li>• Check the crane structure for deformed, cracked or corroded members in the structure and boom, excessive wear on brake and clutch system parts.</li> <li>• Check the cables, brakes and levers for poor adjustment.</li> <li>• Check the marking on the load/radius indicator over full range, load moment indicator and boom angle indicator.</li> <li>• Check the working of the anti-two-block system.</li> <li>• Check lift cylinder(s), telescoping cylinder(s), hydraulic hoses / tubing &amp; fittings, holding device, auxiliary boom head structure in the main boom.</li> <li>• Demonstrate the procedure to check the alignment of the boom with the lattice boom extension.</li> <li>• Demonstrate the procedure to check the hydraulic system of crane as per the operation &amp; maintenance manual.</li> <li>• Illustrate the right steps to grease all greasing pins and pivot points.</li> <li>• Carry out periodic maintenance as per the checklist.</li> <li>• Demonstrate how to use appropriate props /support devices while doing maintenance.</li> </ul>

<ul style="list-style-type: none"> <li>• Describe the importance of regular cleaning of air filter dust bowls.</li> <li>• Identify the potential causes of any unusual noises coming from the engine and other parts of the crane.</li> <li>• Identify prominent places on the equipment for display of safety and maintenance stickers.</li> <li>• Describe the importance of daily greasing of all greasing pins and pivot points.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how to clean the air filter dust bowls.</li> <li>• Demonstrate the procedure to check and maintain air pressure in the tyres and the tightness of the wheel nuts.</li> <li>• Prepare a daily top-up plan of coolants, lubricants and fluids to ensure conformity with the manufacturer's specifications.</li> <li>• Demonstrate how to drain water and debris from the fuel tank.</li> </ul>
<p><b>Classroom Aids:</b></p>	
<p>Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer's Service and Repair Manual</p>	
<p><b>Tools, Equipment and Other Requirements</b></p>	
<p>Safety Gear, Tool Kit, PPE</p>	

## Module 5: Health and safety

Mapped to NOS Code: IES/N 7601 v2.0

Terminal Outcomes:

- Describe the organisation’s health, safety and security policies.
- Explain the emergency procedure to stop and shutdown machinery.
- Carry out basic first-aid treatment for common injuries.
- Demonstrate the operation of firefighting equipment.
- Elaborate the procedure for storage and disposal of hazardous materials and waste.
- Classify various safety signs, symbols and warnings used at site.

<b>Duration:</b> <10:00>	<b>Duration:</b> <20:00>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Describe the Health, safety, environmental (HSE) policies.</li> <li>• Explain the reporting procedure for all HSE activities.</li> <li>• List down the contact details of HSE personnel, in case of emergencies.</li> <li>• Report all health and safety related incidents/accidents.</li> <li>• Explain safe working practices to avoid common hazards and risks.</li> <li>• Classify waste based on non-recyclable, hazardous and recyclable material.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the correct use of Personal Protective Equipment (PPE).</li> <li>• Demonstrate the safe procedure for lifting loads.</li> <li>• Demonstrate the operation of the fire extinguisher.</li> <li>• Demonstrate the procedure to give basic first aid.</li> <li>• Conduct a mock drill for dealing with emergencies like fires and other calamities.</li> <li>• Demonstrate safe storage and disposal of waste.</li> </ul>
<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, marker and duster	
<b>Tools, Equipment and Other Requirements</b>	
Fire Extinguishers, Personal Protective Equipment and other safety gears	

## Module 6: Employability Skills

Mapped to NOS: DGT/VSQ/N0101

### Terminal Outcomes:

At the end of this module, the learner should have acquired the listed knowledge and skills.

- Discuss the importance of Employability Skills in meeting the job requirements
- Show how to practice different environmentally sustainable practices
- Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mind-set in different situations
- Demonstrate how to communicate in a well -mannered way with others
- Demonstrate working with others in a team
- Show how to conduct oneself appropriately with all genders and PwD
- Discuss the significance of reporting sexual harassment issues in time
- Discuss the significance of using financial products and services safely and securely
- Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws
- Show how to operate digital devices and use the associated applications and features, safely and securely
- Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely
- Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges
- Explain the significance of identifying customer needs and addressing them
- Create a biodata
- Use various sources to search and apply for jobs
- Discuss the significance of dressing up neatly and maintaining hygiene for an interview
- Discuss how to search and register for apprenticeship opportunities
- Describe opportunities as an entrepreneur

<b>Duration: &lt;00:00&gt;</b>	<b>Duration: &lt;30:00&gt;</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>

<ul style="list-style-type: none"> <li>• NA</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the importance of Employability Skills in meeting the job requirements</li> <li>• Show how to practice different environmentally sustainable practices</li> <li>• Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mind-set in different situations</li> <li>• Demonstrate how to communicate in a well -mannered way with others</li> <li>• Demonstrate working with others in a team</li> <li>• Show how to conduct oneself appropriately with all genders and PwD</li> <li>• Show how to operate digital devices and use the associated applications and features, safely and securely</li> <li>• Explain the significance of identifying customer needs and addressing them</li> <li>• Create a biodata</li> <li>• Use various sources to search and apply for jobs</li> <li>• Discuss the significance of dressing up neatly and maintaining hygiene for an interview</li> <li>• Describe opportunities as an entrepreneur</li> </ul>
<p><b>Classroom Aids:</b></p>	
<p>Computer, projector, printer, student table, whiteboard/flip chart, marker, duster</p>	
<p><b>Tools, Equipment and Other Requirements</b></p>	

## Annexure

### Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Class VIII		3	2	1		

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: Trye Mounted Crane Operator Mapped to QP: IES/Q0109 Version2.0. Minimum accepted score 70%.	Certified for Job Role: Trye Mounted Crane Operator Minimum accepted score 70%.



## Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Class VIII		3	2	1		

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: Tyre Mounted Crane Operator Mapped to QP: IES/Q0109–Version2.0 Minimum accepted score 70%.	Certified for Job Role: Tyre Mounted Crane Operator Minimum accepted score 70%.



## Assessment Strategy

Criteria for assessment for Qualification Pack have 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.

The assessment of the theory/knowledge will be based on written test/viva or both while skill test shall be hands on practical.

Behavior and attitude will be assessed while performing the assigned task.

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 centers (as per assessment criteria below)

To pass the Qualification Pack, every trainee should score a minimum of 40% in each NOS and 50% 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.

## References

## Glossary

Term	Description
<b>Declarative Knowledge</b>	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
<b>Key Learning Outcome</b>	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
<b>OJT (M)</b>	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
<b>OJT (R)</b>	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
<b>Procedural Knowledge</b>	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
<b>Training Outcome</b>	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
<b>Terminal Outcome</b>	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.



## Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
PMKVY	Pradhan Mantri Kaushal Vikas Yojana
QRC	Qualification Review Committee
SSC	Sector Skill Council
SDMS	Skill Development Management System
SIP	Skill India Portal
HSE	Health Safety Environment
PPE	Personal Protective Equipment
PwD	Persons with disabilities