



Model Curriculum

QP Name: Hot Mix Plant Operator

QP Code: IES/Q0114

QP Version: 3.0

NSQF Level: 4

Model Curriculum Version: 1.0

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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-2015/8342.1800
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
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 hot mix plant operations.
- Explain the roles and responsibilities of the hot mix plant Operator.
- Explain the different types of hot mix plants and their applications.
- Describe the controls, levers and switches needed to operate the hot mix plant efficiently.
- Describe the process to check the hot mix plant as per the operation & maintenance manual.
- Understand all the typical occupational hazards and techniques to overcome them.
- 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 0140 NOS Name Carry out pre-operation checks of hot mix plant NOS Version No. 3.0 NSQF Level - 4	30	30	60	0	120
NOS Code – IES/N 0141 NOS Name Operate a hot mix plant NOS Version No. 3.0 NSQF Level - 4	30	60	30	0	120
NOS Code - IES/N 0142 NOS Name - Perform routine maintenance and troubleshooting of hot mix plant NOS Version - 3.0 NSQF Level - 4	30	30	60	0	120

NOS Code - IES/N 7601 NOS Name - Comply with worksite health and safety guidelines NOS Version - 3.0 NSQF Level - 4		30	0	0	30
NOS Code - DST/VSQ/N0101 NOS Name - Employability Skills 30 hrs NOS-Version-1.0	0	30	0	0	30
Total Duration	90	180	150	0	420

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 hot mix plant Operator.

Duration: <04:00>	Duration: <00:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the scope of employment opportunities in the industry. • Explain the roles and responsibilities of a hot mix plant Operator. • Describe the different types of trainings conducted in IESC. 	NIL
Classroom Aids:	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster	
Tools, Equipment and Other Requirements	

Module 2: Pre-op checks on Hot Mix Plant

Mapped to NOS Code – IES/N0140 v 3.0

Terminal Outcomes:

- Outline the performance standards & procedures related to hot mix plant operations.
- Know the basic working of motor, power generator and other systems of the hot mix plant.
- Classify the different types of hydraulic mechanisms of the hot mix plant.
- Perform a visual inspection of the entire hot mix plant 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.
- Know the emergency organization of the specific work site.

Duration: <30:00>	Duration: <90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Outline the organization’s procedures and guidelines related to operation, breakdown & maintenance services. • Explain the difference between a batch type hot mix plant and a drum mix hot mix plant, their applications and functions. • List the components of each type of hot mix plant. • Describe the types of aggregates and their physical qualities. • Explain the basic electrical functioning and repairs. • List the different types of motors used in the hot mix plant- drum, exhaust, conveyor, gathering conveyor, drum hydraulic, slinger, pollution bank. • Explain the installation procedure of a basic hot mix plant. • Know parameters to be included in the checklist for pre-operation inspection of the plant to detect damage, flaws, cracks or leaks. 	<ul style="list-style-type: none"> • Demonstrate how visual inspection of the hot mix plant for cracks, damage, flaws, leaks and malfunctioning parts is performed before operation. • Check that the conveyor belts are in operating condition. • Examine the roller filters for contaminants. • Show how to check for hydraulic oil leaks and ensure that the oil level is according to the manufacturer's indication. • Inspect all incoming electrical connections and the motors in the plant to ensure that they are in working condition. • Check the panel to confirm that the controls are in the proper position for starting. • Ensure that the power generator has enough amount of diesel as per the plant requirement. • Inspect gauges, dials and machinery operation to ensure compliance to processing standards.

<ul style="list-style-type: none"> • List the series of pre-op actions that must be completed before starting the hot mix plant. • Explain why the bitumen pipeline needs to be heated before starting the operation. • Expound the relevance of greasing and oiling components that require routine lubrication. • Know about the various types of hand signals & emergency signs used on the site. • Record any deviations or occurrences that do not conform to the specified standards. • Notify the supervisor immediately if a defect is discovered that is outside the scope of the position. • Know the importance of maintaining a logbook to record all actions completed prior to starting the hot mix plant. 	<ul style="list-style-type: none"> • Prepare a daily top-up plan of fuel and lubricants to ensure that the levels in the burners are adequate. • Examine the different controls, gauges, warning lights and other safety devices to ensure that they are working. • Ensure that the required amount and size of coarse aggregate and gravel are fed into the hoppers before starting. • Check if the quantity of the bitumen in the plant is as per the requirement of the mix design. • Ensure that all the hoppers are clean and free of obstacles.
<p>Classroom Aids:</p>	
<p>Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer’s Service and Repair Manual</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Safety Gear, Tool Kit, PPE</p>	

Module 3: Operation of a Hot Mix Plant

Mapped to NOS Code – IES/N0141 v 3.0

Terminal Outcomes:

- Outline the reporting structure of the Organization.
- Explain the responsibilities of the operator in his assigned job role.
- Explain the controls, levers and switches for efficient operation of the hot mix plant.
- Determine the causes of equipment related accidents and associated preventive measures.
- Know the temperature and time for which the bitumen needs to be heated and why.
- Check that the output is in accordance with the mix design/customer requirements.

Duration:<30:00>	Duration:<90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Outline the government regulations and other safety protocols for hot mix plant operations. • Know the conditions and hazards that may impact the operation of the hot mix plant. • List the raw materials used in the hot mix plant and their physical properties- gravel, aggregate, limestone, bitumen, etc. • Know the temperature and time for which the bitumen needs to be heated and why. • Capture input and output flow in accordance with the organization's prescribed formats for reporting. • Describe the instrument panel, its position and its functionality. • Know the importance of walking around the hot mix plant before starting it. • Outline the procedure to notify the supervisor if a fault is found when operating the plant which is outside the scope of the operator's job role. 	<ul style="list-style-type: none"> • Show how to ensure a proper flow of materials into the mixing drum by monitoring the indicators on the control panel. • Monitor the temperature of the bitumen regularly by checking the indicators on the control panel. • Coordinate with the co- workers to ensure regular supply of raw materials in the appropriate hoppers. • Ensure removal of obstructions if any during the operations. • Ensure water supply in the mixing drum and pollution bank as per the manufacturer's instructions. • Demonstrate how numeric and operational data is fed into the computer system for the asphalt plant production activities in accordance with the mix design. • Check that the output is in accordance with the mix design/customer requirements. • Maintain appropriate hot mix flow in hot mix surge silo as required. • Co-ordinate with vehicle operators to collect output.

<ul style="list-style-type: none"> • Know the cost of the equipment and loss to the Organization resulting from its damage and the direct/indirect cost of accidents. • Describe the risk and consequences of failing to follow clearly specified procedures /work instructions. 	<ul style="list-style-type: none"> • Show how the emergency stop button disables all power to the hot mix plant.
<p>Classroom Aids:</p>	
<p>Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer’s Service and Repair Manual</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Safety Gear, Tool Kit, PPE</p>	

Module 4: Routine maintenance & trouble shooting

Mapped to NOS Code: IES/N0142 v 3.0

Terminal Outcomes:

- Demonstrate the process to find the typical defects and general reasons of failure.
- Outline the process to check the structure of the hot mix plant as per the operation & maintenance manual.
- List parameters to be covered in the periodic maintenance sheet.
- Define specific safety protocols to be observed before undertaking any repair of the plant.

Duration: <30:00> Theory – Key Learning Outcomes	Duration: <90:00> Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Outline the organization’s procedures and guidelines related to breakdown & maintenance services. • Explain the various components of the hot mix plant and their functions. • List parameters to be covered in the periodic maintenance sheet. • Explain the importance of maintaining service-related records and documentation, such as logbooks, repair lists. • Elaborate the fundamental mechanical system at work in the different operations of the hot mix plant. • Define specific safety protocols to be observed before undertaking any repair of the plant. • Define the scope of the position and when and to whom to escalate for help. • Identify common defects and general causes of breakdown. • Identify the potential causes of any unusual noises coming from the motor and other parts of the hot mix plant. 	<ul style="list-style-type: none"> • Prepare a checklist for inspection of the structure for deformed, cracked or corroded members, loose bolts and rivets. • Check the conveyor belts and levers for poor adjustment or excessive wear. • Demonstrate the procedure to check the hydraulic system of the hot mix plant as per the operation & maintenance manual. • Demonstrate the function of various controls and switches needed to operate the hot mix plant properly. • Monitor signs that indicate the necessity for replacement, such as the air filter on the compressor. • Carry out maintenance as per the daily /weekly maintenance sheets in conformance with organization recommendation. • Change the filter, clean and change the flame eye regularly as per the operating hours / Manufacturer’s instructions. • Demonstrate how to use appropriate props /support devices while doing maintenance.

<ul style="list-style-type: none">• Identify prominent places on the hot mix plant for display of safety and maintenance stickers.• Describe the importance of daily greasing of all greasing pins and pivot points.	
Classroom Aids:	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer's Service and Repair Manual	
Tools, Equipment and Other Requirements	
Safety Gear, Tool Kit, PPE	

Module 5: Health and safety

Mapped to NOS Code: IES/N 7601 v3.0

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.

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

Module 6: Employability Skills

Mapped to NOS: DST/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

Duration: <00:00>	Duration: <30:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • 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 • Show how to operate digital devices and use the associated applications and features, safely and securely • 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 • Describe opportunities as an entrepreneur
Classroom Aids:	
Computer, projector, printer, student table, whiteboard/flip chart, marker, duster	
Tools, Equipment and Other Requirements	

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: Hot Mix Operator mapped to QP: IES/Q.0114- Version 2.0 Minimum accepted score 70%.	Certified for Job Role: Hot Mix Operator Minimum accepted score 70%.

Assessor Requirements

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

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: Hot Mix Operator mapped to QP: IES/Q.0114- Version 2.0 Minimum accepted score 70%.	Certified for Job Role: Hot Mix Operator Minimum accepted score 70%.

Assessment Strategy

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.

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 70%.

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
Declarative Knowledge	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.
Key Learning Outcome	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).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	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.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training .
Terminal Outcome	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