

Model Curriculum

Junior Crusher Operator

SECTOR: INFRASTRUCTURE EQUIPMENT
SUB-SECTOR: EQUIPMENT OPERATIONS
OCCUPATION: OPERATOR
REF ID: IES/Q0113, V1.0
NSQF LEVEL: 3



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: 'Junior Crusher Operator' QP No. 'IES/ Q 0113 NSQF Level 3'

Date of issuance: June 1st, 2017

Valid up to: April 30th, 2018

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



Authorized Signatory
(Infrastructure Equipment Skill Council)

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Junior Crusher Operator

CURRICULUM / SYLLABUS

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

Program Name	Junior Crusher Operator		
Qualification Pack Name & Reference ID	IES/Q0113		
Version No.	1.0	Version Update Date	01 June 2017
Pre-requisites to Training	Preferably Class 8th Standard Certification Training in Crushing Operations preferred Preferably 6 months to 1 year experience in assisting in Crushing Operations.		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Assist in carrying out pre-operation checks on a crusher. General introduction to crushers, basic working of parts and systems; engine, hydraulic and electrical, operational controls and instrument panel, preparing machine for operations • Assist in carrying out crusher operations. Properties of materials and aggregates, starting of crusher, loading of materials, monitoring and regulating flow, shutting down and post-operative checks • Assist in carrying out maintenance and trouble shooting of crusher. 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 “Junior Crusher Operator” Qualification Pack issued by “Infrastructure Equipment Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Assist in carrying out pre-operation checks on a crusher</p> <p>Theory Duration (hh:mm) 12:00</p> <p>Practical Duration (hh:mm) 24:00</p> <p>Corresponding NOS Code IES/N0137</p>	<p>Organisational Context: Acquire a working knowledge of the following:</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. • Safety policy of the organisation and emergency procedures <p>Technical Knowledge: Understand the fundamentals of the following:</p> <ul style="list-style-type: none"> • Different types of crushing equipment, features, performance and <u>installation procedures</u>: <ul style="list-style-type: none"> ○ Static ○ Wheeled ○ Tracked • Parts and systems of crushers and its functioning to include: <ul style="list-style-type: none"> ○ Control Panel ○ Dump & Surge Hopper ○ Feeders & Screeners ○ Jaw and Cone Crusher ○ Vertical Shaft Impactor ○ Conveyor Belts • <u>Basics of Engine</u> and its systems; procedure for filling and topping up of fuel, coolant, oils. • <u>Basics of Electricals</u>; types of motors used in crushers and its functioning. • <u>Basics of Hydraulics</u>; types of pumps and motors and its functioning • Types of aggregates and its physical characteristics • Method of greasing and lubrication different parts of the equipment • Cabin controls and Instrument panels; their operation. • Optimal working condition of components and monitoring systems • Documents and log books to be maintained for recording activities. • Procedures for reporting defects if beyond his scope. 	<ul style="list-style-type: none"> • <u>Scaled Model of a Crusher for theory sessions</u> • <u>Live Crusher Plant at nearby project site for practical sessions</u> • Class room with audio-video system • Manufacturers O and M Manual & Video • Safety video • PPE Items & Safety Gear

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>Skills - Core & Professional. Acquire the ability to:</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: Execute the following tasks and procedures:</p> <p>Crusher Equipment Checks; assist the operator to</p> <ul style="list-style-type: none"> • Conduct visual inspection of crusher parts and systems for any leakages/damage. • Check movable parts like conveyor belts, rollers, stringers for wear and tear. • Check the feeder systems for any wear and tear. • Check power connections of the electrical/diesel generators. • Check fuel in the power generator is as per requirement • Check fittings, bolts, bearings, pads and linings in each sub unit. • Check VSI (Vertical Shaft Impactor) tips, liners etc • Check/clean the filters of impurities as applicable • Inspect all greasing points/ moving joints and lubricate as applicable. • Inspect the screeners are suitable for the production requirements. • <u>Wheeled crusher:</u> Check condition of tyres for cuts /damage and air pressure; wheel bolts/nuts and brakes. • <u>Tracked crusher:</u> Check condition of track pads, bolts and nuts; tighten as necessary. • Check all monitoring and warning systems as per operational manual. • Ensure safety equipment in place before operating the plant. <p>Material Checks</p>	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Ensure requisite amount of raw material are present at the site before commencement of operations. Coordinate with other vehicle operators for procurement of raw materials as per organisational standards <p>Reporting & Documentation</p> <ul style="list-style-type: none"> Assist in maintaining log book to record actions done before starting operations. Follow laid down procedure for reporting defects beyond his scope. 	
2	<p>Assist in carrying out crusher operations.</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 20:00</p> <p>Corresponding NOS Code IES/N0138</p>	<p>Organisational Context: Acquire working knowledge of the following:</p> <ul style="list-style-type: none"> Procedures and guidelines related to breakdown & maintenance services. Location of tools and equipment and procedure for issue and return. Safety policy of the organisation and emergency drills. <p>Technical Knowledge. Understand the fundamentals of the following:</p> <ul style="list-style-type: none"> Basics of equipment operations listed under pre-op checks. Starting procedure as per correct sequence and specs. Operating the various systems to ensure efficient production. Monitoring systems to ensure optimal output/productivity. Stopping procedure including emergency shutdown. Various hand signals, safety & emergency signs at project site. Documents and log books to be maintained for recording activities. Procedures for reporting defects and mal-functions if beyond his scope. <p>Skills - Core & Professional. Acquire the ability to:</p> <ul style="list-style-type: none"> In addition to core and generic skills listed above Interpret signage at project work site correctly. Use correct terminology while interacting with others at site Help plan work schedule in time bound and cost effective way. Help identify operational slow-downs and take timely remedial action. 	<ul style="list-style-type: none"> Scaled Model of Crusher Plant for theory sessions Live Crusher Plant at nearby project site for practical sessions Adequate stocks of aggregates and consumables. Class room with audio-video system Manufacturers O and M Manual & Video Safety video PPE Items & Safety Gear

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>Performance Criteria. Execute the following tasks and procedures:</p> <p>Preparatory Activities.</p> <ul style="list-style-type: none"> • Assist operator to read work orders to determine specifications for production. • Assist examine materials, both visually and with hands, to ensure conformance. • Clean work area and check for obstructions. • Dislodge and clear jammed materials form machinery. • Assist to transfer materials between work areas using appropriate moving eqpt and tools <p>Crushing Operations.</p> <ul style="list-style-type: none"> • Assist to start the machine as per sequential procedure and ensure proper flow of materials; after setting the mill gauges • Assist monitor / observe gauges /indicators to ensure continuity of flow and efficient operation. • Coordinate with co- workers to ensure regular flow of raw materials into the crusher. • Assist in testing materials/ products at specified intervals to ensure conformance to standards. • Coordinate with vehicle operators for collecting the output safely and efficiently. <p>Safety during operations</p> <ul style="list-style-type: none"> • Ensure PPE is worn especially dust mask; eye goggles and safety gloves when operating the equipment. • Identify various hazards at work site like flying stones etc and take appropriate preventive measures. • Maintain positive eye contact with co-workers/other eqpt operators. • Assist to perform lockout and tag out whenever necessary. <p>Reporting and Documentation</p> <ul style="list-style-type: none"> • Maintain log book to record all activities (input and output flow) carried out. • Report any defects which are beyond his scope to the supervisor 	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
3	<p>Assist in carrying out routine maintenance and trouble shooting of a crusher.</p> <p>Theory Duration (hh:mm) 12:00</p> <p>Practical Duration (hh:mm) 26:00</p> <p>Corresponding NOS Code IES/N0139</p>	<p>Organisational Context: Acquire working knowledge of the following:</p> <ul style="list-style-type: none"> Emergency organisation structure and maintenance policy. Location of special tools and equipment/ accessories. <p>Technical Knowledge. Understand the fundamentals of the following:</p> <ul style="list-style-type: none"> Maintenance and service Schedule including related checklists. Common defects and general causes for breakdown. Documents and log books to be maintained for recording activities. Procedures for reporting defects if beyond his scope. <p>Skills - Core & Professional. Acquire the ability to:</p> <ul style="list-style-type: none"> In addition to core and generic skills listed above; Plan maintenance & servicing keeping operational needs in mind. <p>Performance Criteria. Execute the following tasks and procedures:</p> <p>Routine Maintenance:</p> <ul style="list-style-type: none"> Assist in carrying out scheduled maintenance as per manufacturers specs Clean all filters and replace as necessary. Assist in checking bearings of gear boxes, rollers and motors Replenish/replace lubricants, coolants and screeners as per specs Lubricate/grease all the moving joints/pivot pins and control levers regularly. Check crusher plates, liners and other critical parts for wear and tear; take necessary action to restore. Assist in carrying out periodic structural inspection and take corrective measures like welding etc. Adjust crusher settings: before, during and after operations <p>Repairs and Trouble Shooting:</p> <ul style="list-style-type: none"> Assist in identifying service needs and defects through visual inspection. 	<ul style="list-style-type: none"> Scaled Model of Crusher Plant for theory sessions Live Crusher Plant at nearby project site for practical sessions Class room with audio-video system Manufacturers O and M Manual & Video Safety video PPE Items & Safety Gear

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> • Assist monitor indicators that signal need for replacement of parts • Assist in repairs and replacement of defective components. • Assist in diagnosing the defect/problem and rectify; as per instructions from operator/supervisor. <p>Documentation & Reporting:</p> <ul style="list-style-type: none"> • Assist operator in maintaining all records/documents. • Report defects and problems in time and escalate as necessary 	
4	<p>Comply with Worksite Health and Safety Guidelines</p> <p>Theory Duration (hh:mm) 06:00</p> <p>Practical Duration (hh:mm) 10:00</p> <p>Corresponding NOS Code IES/N7601</p>	<p>Organisational Context. Acquire working knowledge of the following:</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. • Location of first aid room / station and assembly points. • Reporting channel and documentation procedure for all HSE related matters. <p>Technical Knowledge. Understand the fundamentals of the following:</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. • 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 <p>Skills - Core & Professional. Acquire the ability to:</p> <ul style="list-style-type: none"> • In addition to the core and generic skills 	<ul style="list-style-type: none"> • <u>Scaled Model of Crusher Plant for theory sessions</u> • <u>Live Crusher Plant at nearby project site for practical sessions</u> • Class room with audio-video system • Organisation's ESH / Safety video • PPE Items & Safety Gear • Firefighting equipment & Charts • First Aid Kit and Charts

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>listed above</p> <ul style="list-style-type: none"> • Use correct PPE and other safety gear while in the work site. <p>Performance Criteria. Execute the following tasks and performances:</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 for common injuries at work site. • Record and report details as related to operations, incidents or accidents as applicable. 	
	<p>Total Duration</p> <p>Theory Duration 40:00</p> <p>Practical Duration 80:00</p>	<p>Unique Equipment Required:</p> <ul style="list-style-type: none"> • <u>Scaled Model of Crusher Plant for theory sessions</u> • <u>Live Crusher Plant at nearby project site for practical sessions</u> • Adequate stocks of aggregates and consumables. • Class room with audio-video projection system • Manufacturers O and M Manual & Video; Safety video • PPE Equipment: Helmet, masks, gloves, earplugs, goggles, safety shoes • Firefighting equipment and 'How to Use' Charts • First Aid Box and 'How to Do' 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: “Junior Crusher Operator” mapped to Qualification Pack: “IES/Q0113, 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 0113 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 ; preferably 10 th
4a	Domain Certification	Certified for Job Role: “ <u>Junior Crusher Operator</u> ” mapped to QP: “ <u>IES/Q 0113 – Version 1.0</u> ”. Minimum accepted score 70%. Desired: Certification Training in Crusher Operations & Maintenance
4b	Platform Certification	Certified for Job Role: “ <u>Trainer</u> ” mapped to Qualification Pack: SSC/1402. Minimum accepted score 70%.
5	Experience	<ul style="list-style-type: none"> • Around 3 to 4 years’ site experience in Crusher Operations. • At least 1 to 2 years’ experience in conducting O and M training programs.

Assessment Criteria	
Job Role	Junior Crusher Operator
Qualification Pack	IES/Q 0113 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.SSC will also lay down proportion of marks for Theory and Skill 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 center (as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria.
5	To pass the Qualification Pack, every trainee should score a minimum of 40% in each NOS and 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.

Assessment Outcomes	Assessment Criteria for the outcome	Total Mark	Marks allocation		
			Out Of	Theory	Skills Practical
1. IES/N0137 Assist in carrying out pre-operation checks on a crusher	PC1. Assist in conducting visual inspection around the crushing equipment as per instructions from the operator/ supervisor	35	3	1	2
	PC2. Check for power connections electrical/diesel generators including fuel checks as per instructions from the supervisor		2	0	2
	PC3. Check the moveable parts in crushers like conveyor belts, rollers, stringers, etc. for wear and tear		2	0	2
	PC4. Clear the filters of impurities as per instructions from the operator/supervisor		3	1	2
	PC5. Assist in lubricating all the moving joints of the crushers as per instruction from the operator/supervisor		2	0	2

	PC6. Check all the feeders for any wear and tear or malfunctioning as per instruction from operator/supervisor	2	0	2
	PC7. Check the fittings, bolts, bearings, pads and lining in each crushers of the crushing unit and adjust it as per instruction from operator/supervisor	3	1	2
	PC8. Assist the operator in checking the suitability of screeners with the production requirement	3	1	2
	PC9. Check Vertical Shaft Impactor (VSI) crusher, tips, liners, etc. as per instructions from the operator/supervisor	1	0	1
	PC10. Check the tyre condition for required air pressure, cut/damage in wheeled crusher as per instructions from operator/supervisor	1	0	1
	PC11. Check the wheel bolts, brakes, etc. in wheeled crusher as per instructions from operator/supervisor	1	0	1
	PC12. Check and tighten the track pads bolts, nuts, etc. in tracked crusher as per instructions from operator/supervisor	2	1	1
	PC13. Check the hoses, pipes for any leakage and take actions as per instructions from operator/supervisor	2	1	1
	PC14. Check raw materials at the site before starting the operation as per instructions from the operator/supervisor	2	1	1
	PC15. Coordinate with other vehicle operators for procurement of the raw material as per standards of the organisation	2	1	1
	PC16. Assist in maintaining a checking/maintenance logbook to record all activities performed before starting the operation	2	1	1

	PC17. Report defects precisely to the operator/supervisor		2	1	1
		Total	35	10	25
2. IES/N0138 Assist in crushing operations	PC1. Check materials, ingredients, or products, visually or with hands, to ensure conformance to established standards	30	3	1	2
	PC2. Clean work areas and check for obstructions before starting the operations as per instructions from the operator/ supervisor		2	0	2
	PC3. Assist in checking chains, gear box, rollers, belts, scrolls, etc. for signs of wear during the operation		3	1	2
	PC4. Clear jammed materials or other items from machinery and equipment using appropriate tools as per instructions from the operator/ supervisor		2	0	2
	PC5. Transfer materials, supplies, and products between work areas, using moving equipment and hand tools as per instructions from the operator/ supervisor		2	1	1
	PC6. Give appropriate signals to the operator to start or stop the equipment		1	0	1
	PC7. Assist in setting mill gauges as per the fineness required for the grind as per instructions from the operator/ supervisor		1	0	1
	PC8. Check the continuity of flow, safety, and efficient operation as per the instructions from the operator/ supervisor		2	1	1
	PC9. Weigh or measure materials, ingredients, or products at specified intervals as per instructions from the operator/ supervisor		1	0	1

	PC10. Check for proper graded flow of materials into the crushers and control the speed and flow of material through conveyors		1	0	1
	PC11. Test samples materials or products to ensure compliance with Indian Standard (IS) specifications		2	1	1
	PC12. Coordinate with the vehicle operators for collection of the output as per instructions from operator/ supervisor		2	1	1
	PC13. Wear dust masks, safety eye glasses, safety helmet, protective cloth, safety gloves as per the standards		1	0	1
	PC14. Make positive eye contact with other equipment operators' at the site before crossing		2	1	1
	PC15. Assist in performing lockout and tagout whenever necessary		2	1	1
	PC16. Assist in maintaining a checking/maintenance logbook to record all activities performed		1	0	1
	PC17. Assist in recording input and output flow		2	1	1
		Total	30	9	21
3. IES/N0139 Assist in regular maintenance of the crusher	PC1. Assist in performing scheduled maintenance	20	2	1	1
	PC2. Check the tyre condition – proper air pressure, any cut/damage in wheeled crusher as per instructions from the operator/ supervisor		1	0	1
	PC3. Assist in checking of bearings at gearboxes, rollers and motor		2	1	1
	PC4.Replenish coolants, lubricants, fluids and screeners as per instructions from the operator/ supervisor		1	0	1
	PC5.Check the fuel tanks for any leaks as per instructions from the operator/ supervisor		2	1	1

	PC4. Carry out operations as per the manufacturer's and worksite related health and safety guidelines		1	0	1
	PC5. Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines		2	1	1
	PC6. Operate various grades of fire extinguishers, as applicable		1	0	1
	PC7. Support in administering basic first aid and report to concerned team members, as required, in case of an accident		2	1	1
	PC8. Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility		2	0	2
	PC9. Record and report details related to operations, incidents or accidents, as applicable		3	1	2
		Total	15	4	11