# Model Curriculum

## Jack Hammer Operator

**SECTOR:** Mining
**SUB-SECTOR:** Mining Operations
**OCCUPATION:** Drilling & Cutting
**REF ID:** MIN/Q0212
**NSQF LEVEL:** 4

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

SKILL COUNCIL FOR MINING SECTOR

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Jack Hammer Operator' QP No. 'MIN/Q 0212 NSQF Level 4'

Date of Issuance: February 10th, 2017

Valid up to*: September, 9th, 2019

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

Authorised Signatory
(Skill Council for Mining Sector)

# TABLE OF CONTENTS

Skill India

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Job Role/ Qualification Pack: 'Jack Hammer Operator' QP No. 'MIN/Q 0212 NSQF Level 4'

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Authorised Signatory
(Skill Council for Mining Sector)

# Jack Hammer Operator

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Jack Hammer Operator", in the "Mining & Allied" Sector/Industry and aims at building the following key competencies amongst the learner

| | | | |
|---|---|---|---|
| **Program Name** | **Jack Hammer Operator** | | |
| **Qualification Pack Name & Reference ID.** | MIN/Q0212 | | |
| **Version No.** | 1.0 | **Version update date** | 04-06-2017 |
| **Pre-requisites to Training** | Class Xth | | |
| **Training Outcomes** | **After completing this programme, participants will be able to:**<br>• **drives and controls a jack hammer machine to break up rocks, concretes or mines surfaces.**<br>• **facilities scaling of loose rocks and mucking of broken ore or waste rock from the worksite.**<br>**Become well versed with Environment Health & Safety:** Well versed with on-site health and safety measures relating to blasting and use of personal protective equipment.<br>**Identify and use basic tools, equipment & materials:** Understanding of carrying out work on jack hammer machine and drilling & cutting techniques. | | |

This course encompasses 3 out of 3 National Occupational Standards (NOS) of "Jack Hammer Operator" Qualification Pack issued by "Skill Council for Mining Sector".

| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---|---|---|---|
| 1 | **Introduction**<br><br>**Theory Duration**<br>(hh:mm)<br>10:00<br>**Practical Duration**<br>(hh:mm)<br>20:00<br><br>**Corresponding NOS Code**<br>Bridge Module | Understanding of following<br>Understanding of its application: Jack hammers' common application is development of benches in open pit mine. The jack hammer is in regular use in Underground mines face development. The jack hammer operator is responsible for all aspects of the operation and monitoring the work of the support group.<br><br>The Jack Hammer Operator drives and controls a jack hammer machine to break up rocks, concretes or mines surfaces. Directs and facilities scaling of loose rocks and mucking of broken ore or waste rock from the worksite. An individual to have technical knowledge of rock and material type which are mined, ability to plan and prioritize, quality consciousness, sensitivity to problem solving:<br>• Understand processes and equipment requirement to complete the task.<br>• Prepare the machine, auxiliaries and work pieces for the welding process.<br>• Conduct the rock breaking operations delightfully .<br>• Ensure completion of post operations activities like inspection, storage and maintenance. | Projector System. |
| 2 | **Pre-operation checks and Operation of Jack Hammer.**<br><br>**Theory Duration**<br>(hh:mm)<br>30:00<br>**Practical Duration**<br>(hh:mm)<br>60:00<br><br>**Corresponding NOS Code**<br>MIN/N0241 | This OS is about pre-operation check and ongoing operation of Jack Hammer. Tasks associated with the operation of a jackhammer would include:<br><br>• Routine check before machines operation.<br>• Operation of the Jack hammer<br>• Process of indenting spare parts and raising requirement of consumables and parts.<br>• Process of storage and disposals of waste material in eco-friendly way.<br>• Duties of workmen under Mines act.<br>• Provision of wages and working hours as per Mines act.<br>• Knowledge of mining safety procedures.<br>• Understand the shift / day's production plan and schedule from Foreman / Mine sirdar / site engineer.<br>• Understand site information and receive idea about type of rock to be encountered / stability etc.<br>• Plan for right air flush or wet flush drilling, type of tool and mounting required.<br>• Choose the proper weight of the jackhammer for the job.<br>• carry out pre-operational inspection of jackhammer to ensure machine is in good order and all guards, handles and safety mechanisms are fitted and operational;<br>• Inspect electrical cable and junction points to determine whether the cable and plug is in good order | Drilling machine, Drill HSS 6 mm, Drill angle gauge, drilling machine motorized pillar 20 mm, steel tape 1 meter, direct reading vernier calliper, Jack Hammer, Hydraulic jack, jib crane, chisel bits / compressed air / couplings/ rods etc. Helmet, gloves, earplugs, goggles, node mask. |

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| | | or needs replacing; Check whether the electrical lead is connected to an approved safety switch.<br>• Check pneumatic connection and hose joints for Pneumatic Jack hammers.<br>• Inspect whether right type of chisel bit is fitted and whether the bit/point is in good order or needs replacing.<br>• Check whether scaling of loose rocks have been done and the area is safe for operation.<br>• Overseeing the support group for bolting, resining plate tightening etc.<br>• Check and as and when required, to ensure proper scaling/dressing of loose rocks from the roof and wall of the worksite.<br>• Ensure cleaning of the drill site.<br>• Operate the Jack Hammer as per production plan and schedule.<br>• Periodically check chisel bits for spending need and other operating parameters etc.<br>• Shut off the air supply and relieve pressure from the supply hose before changing tool points. Do the same when leaving the jackhammer unattended.<br>• Ensure all machine consumables and spares (chisel bits / compressed air / couplings/ rods etc.) are used to their maximum potential.<br>• Reduce downtime and wastage.<br>• Check and ensure ongoing proper ventilation of the worksite for UG mines.<br>• Understanding of different types of jackhammer: Pneumatic, Electro mechanical or electro pneumatic, Hydraulic. Type of stand and mounting rigs and their operating principle like Percussive, Rotary Percussive etc.<br>• Understanding about the machines i.e. it is components, assemblies and accessories.<br>• Knowledge about compressor, storage and compressed air, pipeline for transmission and assembly of pipes.<br>• How to remove and fit handles, mount on the carriage, replace chisels to the body of the jackhammer.<br>• Know how to troubleshoots and maintain the jackhammer.<br>• Knowledge of Hazardous manual tasks and ergonomic issues associated with the operation of a jackhammer. | |
| 3 | **Perform routine check, fault repair and troubleshooting on the Jackhammer.**<br><br>**Theory Duration**<br>(hh:mm)<br>20:00<br><br>**Practical Duration** | Performing routine check, carrying out minor repair / maintenance and troubleshooting of the Jack Hammer. This OS unit/task covers the following:<br><br>• Routine inspection and periodic maintenance<br>• Repairing the fault / breakdown<br>• Carry out preliminary & visual checks. Observe any unusual noise, crack, vibration, leak, spillage, accumulation etc. on the Jack Hammer and supply pneumatic / hydraulic /electro pneumatic system and seek corrective measures. | Drilling machine, Drill HSS 6 mm, Drill angle gauge, drilling machine motorized pillar 20 mm, steel tape 1 meter, direct reading vernier calliper, Jack Hammer, Hydraulic jack, jib crane, chisel bits / compressed air / couplings/ rods etc. |

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| | (hh:mm)<br>74:00<br><br>**Corresponding NOS Code**<br>MIN/N0242 | • To check for proper functionality of gauges, indicators, and sensor. Observe any fault message and diagnose the problem solution. Inform Technician and Fitters for any major repair.<br>• Track machine-operating hours to assess the right service schedule.<br>• Clean air filters dust bowls.<br>• Replace chisel bits when required.<br>• Check structural integrity and any crack failure of stand or support structure.<br>• Drain water and sediment /fuel separators. Replenish coolants, lubricants and fluids.<br>• Carry out required lubrication, greasing and oil change as required.<br>• Ensure proper Lock out and Tag out. Ensure the Jack Hammer air supply is shut off and pressure is relieved in the supply hose before changing tool points or carry out any maintenance activity.<br>• Ensure cleaning of the drilling site and dispose of waste material and broken parts at appropriate place.<br>• Check the machine parameters before restart the machine operation.<br>• Assess when the problem is beyond his competence and report the problem to Technicians / Site engineer.<br>• Update the logbook with works carried out and further works to be done.<br>• Understand the process of indenting spare parts and raising requirement of consumables and parts.<br>• Understand the process of storage and disposals of waste material in eco-friendly way.<br>• Understand the duties of workmen under Mines act.<br>• Aware provisions of wages and working hours as per Mines act.<br>• Understand the process of mining safety procedures.<br>• Understand the knowledge about the different types of Jackhammer: Pneumatic, Electro mechanical or electro pneumatic, Hydraulic. Type of stand and mounting rigs and their operating principle like Percussive, Rotary Percussive etc.<br>• Understand the knowledge about the machines i.e. it is components, assemblies and accessories.<br>• Knowledge about compressor, pipeline for transmission and assembly of pipes.<br>• Able to remove and fit handles, mount on the carriage, replace chisels to the body of the jackhammer.<br>• Know how to troubleshoots and maintain the jackhammer.<br>• Awareness of Tools and tackles required for minor repair and breakdown servicing.<br>• Awareness of hazardous manual tasks and ergonomic issues associated with the operation of a jack hammer. | Helmet, gloves, earplugs, goggles, node mask. |

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| 4 | **Health & Safety:**<br><br>**Theory Duration**<br>(hh:mm)<br>10:00<br><br>**Practical Duration**<br>(hh:mm)<br>26:00<br><br>**Corresponding NOS Code**<br>MIN/N0901 | This unit provides the information regarding worksite health and safety. This unit is about adhering to health and safety requirements at the worksite during equipment operations.<br><br>• Comply with occupational health and safety regulations adopted by the employer.<br>• Follow mining operations procedures with respect to materials handling and accidents.<br>• Comply with safety, health, security and environment related regulations / guidelines at the work site.<br>• Use Personal Protective Equipment (PPE) and other safety gear such as seat belt, body protection, respiratory protection, eye protection, ear protection and hand protection.<br>• 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.<br>• Carry out operations as per the manufacturer's and worksite related health and safety guidelines.<br>• Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines.<br>• Follow safety regulations and procedures with regard to worksite hazards and risks.<br>• Operate various grades of fire extinguishers, as applicable.<br>• Support in administering basic first aid and report to concerned team members, as required, in case of an accident.<br>• Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility.<br>• Record and report details related to operations, incidents or accidents, as applicable<br>• Follow the manufacturer's instructions for care and safe operation of the equipment.<br>• Awareness about benching in quarries, dressing of overhangs, undercuts, fencing.<br>• Uses of First aid and Hygiene.<br>• Awareness of Code of traffic in specific areas of mine. Significance of fences.<br>• Standing orders in force at the mine. Safety in the vicinity of Machinery.<br>• Shot-firing and Safety regulations. How and where to take shelters? Knowledge of mining safety procedures.<br>• Outcome of violation of safety procedures.<br>• Locally prepared Emergency Preparedness / Disaster Management Plan.<br>• Process for reporting any unsafe act/condition in work area which may endanger his or his colleague's life.<br>• Sources of dust, noise and vibration and measures to minimize.<br>• Hazardous material safety and security rules and regulations as prescribed by DGMS. | Gloves, Safety shoes, Safety goggles, Safety helmet, Fire extinguisher, Types of log book, First Aid box. |

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| | | • In-depth knowledge of operation of the Jack Hammer and chipped materials flow.<br>• Knowledge of technical and gallery training as per first schedule, Mining Vocational Training Rules (MVTR) 1966. | |
| | **Total Duration**<br><br>**Theory Duration**<br>70:00<br><br>**Practical Duration**<br>180:00 | **Unique Equipment Required:**<br>Drilling machine, Drill HSS 6 mm, Drill angle gauge, drilling machine motorized pillar 20 mm, steel tape 1 meter, direct reading Vernier calliper, Jack Hammer, Hydraulic jack, jib crane, chisel bits / compressed air / couplings/ rods etc. Helmet, gloves, earplugs, goggles, node mask. | |
| | | | |

Grand Total Course Duration: 250 Hours, 0 Minutes

(This syllabus/ curriculum has been approved by SSC: Skill Council for Mining Sector)

## Trainer Prerequisites for Job role: "Jack Hammer Operator" mapped to Qualification Pack: "MIN/Q0212"

| Sr. No. | Area | Details |
|---|---|---|
| 1 | **Description** | To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "MIN/Q0212". |
| 2 | **Personal Attributes** | Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field. |
| 3 | **Minimum Educational Qualifications** | Class Xth Pass certificate. |
| 4a | **Domain Certification** | Statutory Certificate (if any) from Directorate General of Mines Safety (DGMS) for Job Role: "Jack Hammer Operator" mapped to QP: "MIN/Q0212". Minimum accepted score for domain certification will be 80%. |
| 4b | **Platform Certification** | Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q0102". Minimum accepted score for platform certification will be 80%. |
| 5 | **Experience** | 2-3 years of experience of mining / maintenance environment. |

## Annexure: Assessment Criteria

| Assessment Criteria for Jack Hammer Operator | |
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| Job Role | Jack Hammer Operator |
| Qualification Pack | MIN/Q0212 |
| Sector Skill Council | Mining |

| 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 of the theory/knowledge will be based on written test/viva-voce or both while skill test shall be hands on practical. Behavior and attitude will be assessed while performing the task. |
| 3 | Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training Centre (as per assessment criteria given) |
| 4 | Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training Centre based on these criteria. |
| 5 | To pass the Qualification Pack, every trainee should score a minimum of 70% in skills, 30 % in knowledge and 70% in practical including Behavior separately in each attributes. |
| 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 | |
|---|---|---|---|---|---|
| **Assessment outcomes** | **Assessment Criteria for outcomes** | **Total Mark** | **Out Of** | **Theory** | **Skills Practical** |
| | | **100** | **100** | **30** | **70** |
| 1. MIN/N0241: pre-operation checks and operation of the Jack Hammer. | PC1.Understand the shift / day's production plan and schedule from Foreman / Mine sirdar / site engineer. | **50** | 4 | 2 | 2 |
| | PC2.Understand site information and receive idea about type of rock to be encountered / stability etc. | | 3 | 2 | 1 |
| | PC3. Plan for right air flush or wet flush drilling, type of tool and mounting required. | | 3 | 1 | 2 |
| | PC4.Choose the proper weight of the jackhammer for the job. | | 3 | 2 | 1 |
| | PC5. carry out pre-operational inspection of jackhammer to ensure machine is in good order and all guards, handles and safety mechanisms are fitted and operational; | | 4 | 1 | 3 |
| | PC6. Inspect electrical cable and junction points to determine whether the cable and plug is in good order or needs replacing; Check whether the electrical lead is connected to an approved safety switch. | | 3 | 0 | 3 |
| | PC7.Check pneumatic connection and hose joints for Pneumatic Jack hammers. | | 3 | 0 | 3 |

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| | PC8.Inspect whether right type of chisel bit is fitted and whether the bit/point is in good order or needs replacing. | | 3 | 0 | 3 |
| | PC9.Check whether scaling of loose rocks have been done and the area is safe for operation. | | 2 | 1 | 1 |
| | PC10. Overseeing the support group for bolting, re-syncing plate tightening etc. | | 2 | 1 | 1 |
| | PC11.Check and as and when required, to ensure proper scaling/dressing of loose rocks from the roof and wall of the worksite. | | 2 | 0 | 2 |
| | PC12.Ensure cleaning of the drill site. | | 3 | 0 | 3 |
| | PC13.Operate the Jack Hammer as per production plan and schedule. | | 4 | 2 | 2 |
| | PC14.Periodically check chisel bits for spending need and other operating parameters etc. | | 2 | 1 | 1 |
| | PC15.Shut off the air supply and relieve pressure from the supply hose before changing tool points. Do the same when leaving the jackhammer unattended. | | 2 | 0 | 2 |
| | PC16.Ensure all machine consumables and spares (chisel bits / compressed air / couplings/ rods etc.) are used to their maximum potential. | | 3 | 1 | 2 |
| | PC17. Reduce downtime and wastage. | | 2 | 1 | 1 |
| | PC18. Check and ensure ongoing proper ventilation of the worksite for UG mines. | | 2 | 0 | 2 |
| | | | **50** | **15** | **35** |
| 2. MIN/N0242: Routine maintenance and troubleshooting. | PC1. Carry out preliminary & visual checks. Observe any unusual noise, crack, vibration, leak, spillage, accumulation etc. on the Jack Hammer and supply pneumatic / hydraulic /electro pneumatic system and seek corrective measures. | **30** | 3 | 1 | 2 |
| | PC2. To check this for proper functionality of gauges, indicators, and sensor. Observe any fault message and diagnose the problem solution. Inform Technician and Fitters for any major repair. | | 3 | 1 | 2 |
| | PC3. Track machine-operating hours to assess the right service schedule. | | 2 | 1 | 1 |
| | PC4. Clean air filters dust bowls. Check for any leakage / damaged hoses. | | 2 | 1 | 1 |
| | PC5. Replace chisel bits when required. | | 2 | 0 | 2 |
| | PC6. Check structural integrity and any crack failure of stand or support structure. | | 2 | 1 | 1 |

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| | PC7. Drain water and sediment /fuel separators. Replenish coolants, lubricants and fluids. | | 2 | 0 | 2 |
| | PC8. Carry out required lubrication, greasing and oil change as required. | | 3 | 1 | 2 |
| | PC9. Ensure proper Lock out and Tag out. Ensure the Jack Hammer air supply is shut off and pressure is relieved in the supply hose before changing tool points or carry out any maintenance activity. | | 2 | 1 | 1 |
| | PC10. Ensure cleaning of the drilling site and dispose of waste material and broken parts at appropriate place. | | 2 | 0 | 2 |
| | PC11. Check the machine parameters before restart the machine operation. | | 2 | 1 | 1 |
| | PC12. Assess when the problem is beyond his competence and report the problem to Technicians / Site engineer. | | 3 | 0 | 3 |
| | PC13. Update the daily/weekly maintenance sheets and logbook with works carried out and further works to be done. | | 2 | 1 | 1 |
| | | | **30** | **9** | **21** |
| 3. MIN/N0901: Comply with workplace Health and safety. | PC1. Comply with occupational health and safety regulations adopted by the employer. | **20** | 2 | 1 | 1 |
| | PC2. Follow mining operations procedures with respect to materials handling and accidents. | | 2 | 1 | 1 |
| | PC3. Follow the correct safety steps in case of accident or major failure. | | 2 | 1 | 1 |
| | PC4. Comply with safety regulations and procedures in case of fire hazard. | | 2 | 0 | 2 |
| | PC5. Operate various grades of fire extinguishers. | | 2 | 1 | 1 |
| | PC6. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk, including members of the public | | 2 | 1 | 1 |
| | PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS. | | 2 | 0 | 2 |
| | PC8. Deal with misfires as per statutory requirement | | 1 | 1 | 0 |
| | PC9. Identify characteristics of post-blast fumes and take necessary precautions. | | 2 | 1 | 1 |
| | PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection. | | 1 | 0 | 2 |

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| | PC11. Follow the manufacturer's instructions for care and safe operation of the equipment. | | 1 | 0 | 1 |
| | | **Total** | **20** | **7** | **13** |
| | **QP Total** | | **100** | **29** | **71** |
| | **Percentage Weightage:** | | | **29%** | **71%** |
| | **Minimum Pass% to qualify (aggregate):** | | | **70%** | |