



QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR MINING INDUSTRY

What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack – Mechanic / Fitter

SECTOR: MINING

SUB-SECTOR: Industrial Minerals

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OCCUPATION: Equipment maintenance

REFERENCE ID: MIN/Q 0406

ALIGNED TO: NCO-2004/7231

Brief Job Description: A Fitter is responsible for repair, maintenance and overhaul of crushers, heavy earth moving machinery, medium and light vehicles, pumps and compressors and other mechanical equipment and assemblies used in a mine. A fitter most often works with / assists technicians who are more qualified and experienced. The individual must be trained to work safely and assure that he/she can protect himself and others working around him from getting injured.

Personal Attributes: This job requires the individual to diagnose and analyze the cause of the breakdown so analytical thinking and ability to apply theory to practical situations is a desired attribute. The individual will frequently need to perform repair work in inclement weather hence must possess sound health and fitness level. He/she must be meticulous in his/her work to ensure all preventive maintenance schedules are tracked and adhered to.



Qualifications Pack For Fitter/Mechanic



Qualifications Pack Code	MIN /Q 0406		
		Mechanic / Fitter	
Job Role	This job role is applicable	in both national and i	nternational scenarios
Credits(NVEQF/NVQF/NSQF) [OPTIONAL]	Level 3	Version number	1.0
Sector	Mining	Drafted on	27/01/2014
Sub-sector	Industrial Minerals	Last reviewed on	24/03/2014
Occupation	Equipment maintenance	Next review date	24/03/2015

Job Role	Auto Electrician		
Role Description	Maintenance and repair of mechanical systems in HEMM and		
	other vehicles /machine assemblies.		
NVEQF/NVQF level	Level 3		
Minimum Educational Qualifications*	Class X, ITI		
Training (mandatory)	Mandatory 1. Technical and gallery training as per first schedule,		
	Mining Vocational Training Rules (MVTR) 1966.		
	2. Refresher training if absent from mining work for a		
	continuous period of one year or more before re-		
	employment.		
	3. Heavy vehicle driving license required.		
	Optional		
Experience	Not required		
Applicable National Occupational Standards (NOS)	Compulsory: 1. MIN/N 0419 (Perform preventive maintenance) 2. MIN/N 0420 (Perform troubleshooting and repair) 3. MIN/N 0901(Health and Safety)		
Performance Criteria	As described in the relevant OS units		



Qualifications Pack For Fitter/Mechanic



Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar
	businesses and interests. It may also be defined as a distinct subset of the
	economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the
	characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of
	functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the
	sector, occupation, or area of work, which can be carried out by a person or a
	group of persons. Functions are identified through functional
	analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique
	employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve
	when carrying out a function in the workplace, together with the
	knowledge and understanding they need to meet that standard
	consistently. Occupational Standards are applicable both in the Indian and
· .	global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard
	of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian
	context.
Qualifications Pack	Qualifications Pack Code is a unique reference code that identifies a
Code	qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the
	educational, training and other criteria required to perform a job role. A
	Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is
	denoted by an 'N'.
Unit Title	Unit Title gives a clear overall statement about what the incumbent
	should be able to do.
Description	Description gives a short summary of the unit content. This would be
	helpful to anyone searching on a database to verify that this is the
	appropriate OS they are looking for.
Knowledge and	Knowledge and Understanding are statements which together specify the
Understanding	technical, generic, professional and organizational specific knowledge that
	an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured
	and how it operates, including the extent of operative knowledge
	managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish
	specific designated responsibilities.
Core Skills or Generic	Core Skills or Generic Skills are a group of skills that are key to learning
Skills	and working in today's world. These skills are typically needed in any work
	environment. In the context of the OS , these include communication
	related skills that are applicable to most job roles.





National Occupational Standard



Overview

This unit is about installation and preventive maintenance activities for HEMM, light vehicles and other machine assemblies.





	Min/N 0419 Machine Installation and Preventive Maintenance National Skill Develop Corporation
Unit Code	MIN/N 0419
Unit Title (Task)	Assembly, Installation and preventive maintenance
Description	This unit is about installation and preventive maintenance activities for HEMM, light vehicles and other machine assemblies.
Scope	 This OS unit/task covers the following: Installing machines, mechanical components and equipment. Conducting preventive maintenance of machine components in HEMM and other vehicles. Tracking and logging preventive maintenance activities.
Performance Criteria	(PC) w.r.t. the Scope
Element	Performance Criteria
Install Machines and assemblies	To be competent, the user/individual on the job must be able to: PC1. Use ropes, slings, towing and lifting devices while assembling equipment. PC2. Safely operate various types of hand and power-tools PC3. Follow drawings and blue-prints given in the installation manual. PC4. Follow the manufacturer's instructions which apply to the care and safe handling of the machine / automobile PC5. Test assembled machine for proper performance before handing over for operations
Preventive maintenance	 PC6. Adhere to maintenance schedule recommended by the equipment manufacturer. PC7. Lubricate sufficiently and neatly all pivot points in a machine. PC8. Open and re-assemble various types of bearings in machines. PC9. Adjust valves and hydraulic systems for smooth operation. PC10. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk.

PC11. Track hours-in-operation and adhere to preventive maintenance schedules

PC12. Maintain a checking/maintenance logbook to record all activities

PC13. Inform supervisor of problems that are beyond scope of his role

PC14. Maintain inventory and order fuel and other supplies.

of various vehicles assigned to him.

performed.

Tracking and Logging





Knowledge and Understanding (K)		
A. Regulatory	The user/individual on the job needs to know and understand:	
context	KA1. Different types of mines and detail of the mine he is working in	
(knowledge of	KA2. Mine Organisation, time keeping, need for discipline and punctuality	
safety guidelines	KA3. Benching in quarries, Dressing of overhangs, undercuts, Fencing, First aid and	
specified by	Hygiene	
Director General	KA4. Code of traffic in specific areas of mine. Significance of fences	
of Mine Safety	KA5. Standing orders in force at the mine. Safety in the vicinity of machinery	
(DGMS))	KA6. Shot-firing and Safety regulations. How and where to take shelter	
	KA7. Tramways and siding, Haulage rooms, Winding rooms, Boilers, Electrical Gears	
	KA8. Duties of workmen under Mines act	
	KA9. Provision of compensation and working hours as per Mines act	
	KA10. Knowledge of mining safety procedures	
	KA11. Outcome of violation of safely procedures	
	KA12. Refresher training as per fourth schedule MVTR (1966) within one month of	
	joining duties following absence from duties for a period exceeding one	
B. Organizational	The user/individual on the job needs to know and understand:	
Context	KB1. Job specific documents e.g. daily maintenance checklist and its significance.	
(Knowledge of	KB2. Safety policy of the company	
the company /	KB3. Locally prepared emergency response/ disaster management plan	
organization and	KB4. Escalation matrix for reporting identified problems	
its processes)	KB5. Cost of equipment and loss for the company that results from un-operational	
	equipment	
	KB6. Cost (direct/ indirect) of accidents for the company	
	KB7. Implications of delays in process to the company	
	The user/individual on the job needs to know and understand:	
	KC1. Different types of heavy earth moving machines (H.E.M.M) used in open cast	
	mines and their specific functions	
C. Technical	KC2. Various types of tools(spanners, jacks etc.) and their use.	
Knowledge	KC3. Various types of lubricants and their importance. Storage and handling of	
	lubricants.	
	KC4. Various types of fasteners, nuts and bolts, threads, seals and couplings	



National Occupational Standards MIN/N 0419

N·S·D·C National Skill Development Corporation

Machine Installation and Preventive Maintenance

	Machine Installation and Preventive Maintenance Skill Developm Corporation
	KC5. Various types of bearings used in machines and their assembly techniques
	KC6. Air systems, compressors and their use. Pneumatic controls
	KC7. Hydraulic systems. Various types of pumps and control valves.
	KC8. Crawlers - construction and operation
	KC9. Steering systems and various linkages
	KC10. Safety rules while using tools and tackling machine parts.
	KC11. different type of tyres of heavy earth moving machines and wheels
	KC12. Hot & Cold tyre pressure as per size of tyre,
	KC13. Repair and overhauling Electronic and mechanical engines, manual and power
	shift transmissions
	KC14. Monitor the condition and performance of equipment using condition
	monitoring tools.
	KC15. Should be able to understand SOP for performing preventive maintenance
	jobs.
Skills	
	Writing Skills
	The user/ individual on the job needs to know and understand how to:
	SA1. Fill out check-list /maintenance logbooks detailing maintenance activities
	conducted
	SA2. Fill out administrative forms
	Reading Skills
	The user/individual on the job needs to know and understand how to:
	SA3. Read maintenance manual
A. Core Skills/	SA4. Read and understand checking/maintenance logbook
Generic Skills	SA5. Read and comprehend banners /signage
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to:
	SA6. Communicate with supervisors and peers in a proper manner adhering to the
	values of respect for individual
	Integrity
	The user/individual on the job needs to know and understand how to:
	SA7. Maintain integrity with respect to company property and time
	SA8. Resolve difficulties in relationships with colleagues amicably
	Motivation





	Corporation	1
	The user/individual on the job needs to know and understand how to:	
	SA9. Take responsibility for completing one's own work assignment	
	SA10. Take initiative to enhance/learn skills in one's area of work	
	Reliability	
	The user/individual on the job needs to know and understand how to:	
	SA11. Avoid absenteeism and be punctual	
	SA12. Work in a disciplined environment	
	Time Management	
	The user/individual on the job needs to know and understand how to:	
	SB1. Prioritize and execute tasks within the scheduled time limits.	
	Fault Diagnostic and Maintenance	
B. Professional Skills	The user/individual on the job needs to know and understand how to:	
	SB2. Safely install and uninstall various machine components	
	SB3. Conduct maintenance tasks e.g. checking and replenishing oils and other	
	fluids, replacing worn parts, adjusting hydraulic valves, servicing wheels and	
	crawlers etc.	





NOS Version Control

NOS Code	MIN/N 0419		
Credits(NVEQF/NVQF/NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	01/02/14
Sub-sector	Industrial Minerals	Last reviewed on	24/03/14
Occupation	Equipment maintenance	Next review date	24/03/15

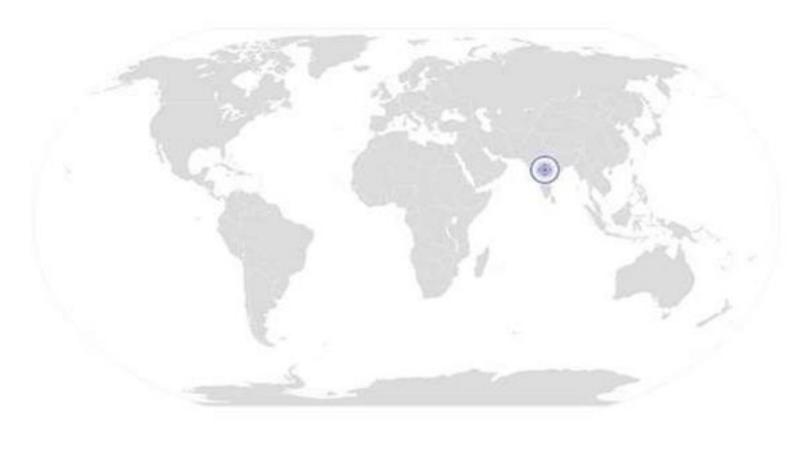








National Occupational Standard



Overview

This unit is about performing troubleshooting and repair of mechanical components in HEMM, light vehicles and other machines.





Unit Code	MIN/N 0420
Unit Title (Task)	Perform troubleshooting and repair activities of mechanical systems in HEMM
Description	This unit is about performing troubleshooting and repair activities of mechanical
	systems in HEMM, light vehicles and other machines.
Scope	This OS unit/task covers the following:
	1. Perform Diagnostics, Troubleshooting and repair of mechanical
	components in HEMM
	2. Perform systematic recording and reporting of repair activities conducted.
Performance Criteria (F	PC) w.r.t. the Scope
Element	Performance Criteria
	To be a competent Fitter, the individual on the job must also be able to:
	PC1. Use various measuring and testing instruments and record readings
	PC2. Compare measured readings to optimal readings to pin-point faults
	PC3. Service, diagnose and repair faults in mechanical systems such as gears, steering
	systems, hydraulic pumps, transmission, crawlers, conveyor belts etc.
	PC4. Ensure the machine is on firm and level ground before attempting to carry out
	any maintenance activity.
	PC5. Ensure the locking bar is in position to prevent the front and rear chassis moving
	and creating a crushing zone (articulated machines only)
Troubleshooting	PC6. Ensure that no maintenance task on the engine is performed when running or
Troubleshooting	still hot
	PC7. Repair or replace faulty parts
	PC8. Use various kinds of hand held and power-tools to lift, dismantle or assemble
	machine components.
	PC9. Fine tune and adjust valves, belt tensions for optimal operation.
	PC10. Test repaired equipment to ensure everything is working correctly and safely
	(this may include road testing the vehicle)
	PC11. Complete timely and legibly daily/weekly maintenance/defect sheets as
	provided by the company.
Recording and Logging	PC12. Assess when the problem is beyond his competence and report the problem to
	suitably qualified and competent personnel.
	PC13. Inventory and order spares and consumables as required.





Knowledge and Under	standing (K)
A. Regulatory	The user/individual on the job needs to know and understand:
context	KA1. Different types of mines and detail of the mine he is working in
(knowledge of	KA2. Mine Organisation, time keeping, need for discipline and punctuality
safety guidelines	KA3. Benching in quarries, Dressing of overhangs, undercuts, Fencing, First aid and
specified by	Hygiene
Director General	KA4. Code of traffic in specific areas of mine. Significance of fences
of Mine Safety	KA5. Standing orders in force at the mine. Safety in the vicinity of machinery
(DGMS))	KA6. Shot-firing and Safety regulations. How and where to take shelter
	KA7. Tramways and siding, Haulage rooms, Winding rooms, Boilers, Electrical Gears
	KA8. Duties of workmen under Mines act
	KA9. Provision of compensation and working hours as per Mines act
	KA10. Knowledge of mining safety procedures
	KA11. Outcome of violation of safely procedures
	KA12. Environmental impact of mining
	KA13. Sources of dust, noise and vibration and measures to minimise
	KA14. Refresher training as per fourth schedule MVTR (1966) within one month of
	joining duties following absence from duties for a period exceeding one
	year.
	KA15. Precautions to be taken when handling heavy equipment.
B. Organizational	The user/individual on the job needs to know and understand:
Context	KB1.Job specific documents e.g. maintenance log and its significance.
(Knowledge of the	KB2. Escalation matrix for reporting identified problems
organization and	KB3. Cost of equipment and loss for the company that results from un-operational
its processes)	equipment
	KB4. Cost (direct/indirect) of accidents for the company
	KB5. Locally prepared emergency response / disaster management plan.
C. Technical	The user/individual on the job needs to know and understand:
Knowledge	KC1. Different types of heavy earth moving machines (H.E.M.M) used in open cast
	mines and their specific functions
	KC2. Various types of tools and their use.
	KC3. Basic calculations of volume, temperature, pressure, torque, unit conversions.
	Various types of lubricants and their importance. Storage and handling of lubricants.





	Corporation
C. Technical	KC4. Various types of fasteners , nuts and bolts, threads ,seals and couplings
Knowledge	KC5. Various types of bearings used in machines and their assembly techniques
	KC6. Air systems, compressors and their use. Pneumatic controls
	KC7. Hydraulic systems. Various types of pumps and control valves.
	KC8. Crawlers - construction and operation
	KC9. Steering systems and various linkages
	KC10. Safety rules while using tools and tackling machine parts.
	KC11. Repair and overhauling Electronic and mechanical engines, manual and power
	shift transmissions
	KC12. Monitor the condition and performance of equipment using condition
	monitoring tools.
	KC13. Should be able to understand SOP for performing preventive maintenance
	jobs.
Skills (S)	
	Reading Skills
	SA1. Read schedule given by supervisor SA2. Read and adhere to signage as per standard mining nomenclature SA3. Read maintenance manuals SA4. Read and comprehend SOP for performing preventive maintenance jobs.
	Oral Communication (Listening and Speaking skills)
A. Core Skills/	The user/individual on the job needs to know and understand how to:
Generic Skills	SA5. Communicate with supervisors and peers in a proper manner adhering to the
	values of respect for individual
	Integrity
	The user/individual on the job needs to know and understand how to:
	SA6. Maintain integrity with respect to company property and time
	SA7. Resolve any difficulties in relationships with colleagues amicably.
	Motivation
	The user/individual on the job needs to know and understand how to:
	SA8. Take responsibility for completing one's own work assignment
	SA9. Take initiative to enhance/learn skills in one's area of work





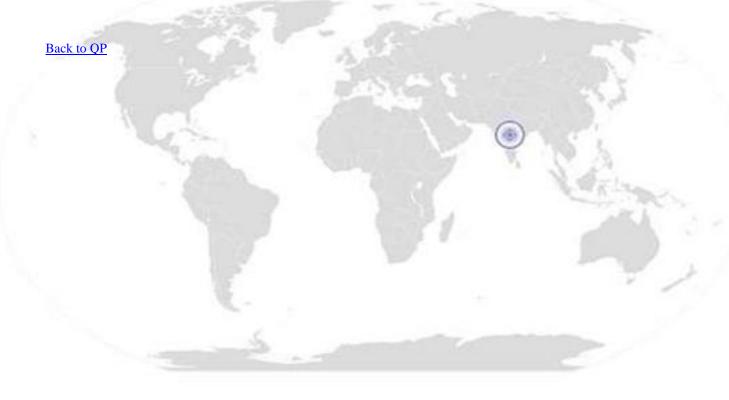
	Reliability
	The user/individual on the job needs to know and understand how to:
	SA10. Avoid absenteeism
	SA11. Work in a disciplined environment
	Analytical Thinking
	The user/individual on the job needs to know and understand how to:
	SB1. Apply theoretical understanding to symptoms and measured readings to
	identify the root of the problem.
	SB2. Identify possible ways to improve efficiency and productivity of machines
	Time Management
	The user/individual on the job needs to know and understand how to:
	SB3. Prioritize and execute tasks within the scheduled time limits
	Organizational Skills
B. Professional Skills	The user/individual on the job needs to know and understand how to:
	SB4. Be a team player and achieve collective goals
	SB5. Ensure adequate knowledge sharing with supervisors and subordinates
	Fault Diagnostic and Maintenance
	The user/individual on the job needs to know and understand how to:
	SB6. analyze available information to find the cause of a breakdown
	SB7. Check for damage in mechanical components e.g. gears, bearings, steering
	systems, pumps, compressor, hydraulic assemblies, pneumatic systems etc.





NOS Version Control

NOS Code	MIN/N 0420		
Credits(NVEQF/NVQF/NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	01/02/14
Sub-sector	Industrial Minerals	Last reviewed on	24/03/2014
Occupation	Equipment maintenance	Next review date	24/03/2015









National Occupation Standards



Overview

This unit is about health and safety measures critical in open-cast mines







Unit Code	MIN/N 0901		
Unit Title (Task)	Health and Safety		
Description	This unit is about health and safety measures critical in open-cast mines		
Scope	This OS unit/task covers the following:		
	Health and safety measures critical for personnel in open-cast mines		
Performance Crite	eria (PC) w.r.t. the Scope		
Element	Performance Criteria		
	To be competent, the user/individual on the job must be able to:		
	PC1. Comply with occupational health and safety regulations adopted by		
	the employer.		
	PC2. Follow mining operations procedures with respect to materials		
	handling and accidents		
	PC3. Ensure use of protective gear while working with mechanical systems.		
Safety, Security	PC4. Comply with safety regulations and procedures in case of fire hazard.		
and	PC5. Operate various grades of fire extinguishers.		
Administrative	PC6. Follow correct safety steps in case of major accident, major failure		
	PC7. 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		
	PC8. Identify characteristics of post-blast fumes and take necessary		
	precautions.		
	PC9. Wears safety gear such as hard hat, respiratory protection, eye		
	protection, ear protection		







Knowledge and Understanding (K)			
A. Regulatory	The user/individual on the job needs to know and understand:		
context	KA1. Different types of mines and detail of the mine he is working in		
(knowledge of	KA2. Mine Organisation, time keeping, need for discipline and punctuality		
safety guidelines	KA3. Benching in quarries, Dressing of overhangs, undercuts, Fencing, First		
specified by	aid and Hygiene		
Director General	KA4. Code of traffic in specific areas of mine. Significance of fences		
of Mine Safety	KA5. Standing orders in force at the mine. Safety in the vicinity of machinery		
(DGMS))	KA6. Shot-firing and Safety regulations. How and where to take shelter		
	KA7. Tramways and siding, Haulage rooms, Winding rooms, Electrical Gears		
	KA8. Duties of workmen under Mines act		
	KA9. Provision of compensation and working hours as per Mines act		
	KA10. Knowledge of mining safety procedures		
	KA11. Outcome of violation of safely procedures		
	KA12. Environmental impact of mining		
	KA13. Sources of dust, noise and vibration and measures to minimise		
	KA14. Refresher training as per fourth schedule MVTR (1966) within one		
	month of joining duties following absence from duties for a period		

exceeding one year.







NOS Version Control

NOS Code	MIN / N 0901		
Credits(NVEQF/NVQF/NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	01/02/14
Sub-sector	Industrial Minerals	Last reviewed on	24/03/2014
Occupation	Equipment maintenance	Next review date	24/03/2015

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List of Abbreviations

Term	Description
NOS	National occupation standards
QP	Qualification pack
NVEQF	National vocational education qualifications framework
NSQF	National skills qualifications framework
HEMM	Heavy earth moving machinery
NCVT	National council for vocational training
DGMS	Directorate general of mines safety
PC	Performance Criteria
FIMI	Federation of Indian mineral industries

