

QUALIFICATIONS PACK - OCCUPATIONAL STANDARD 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
- OS are performance standard 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-HEMM Mechanic

SECTOR: MINING

SUB-SECTOR: Open Cast and Underground Mines

OCCUPATION: Mechanical Maintenance

REFERENCE ID: MIN/Q 0433

ALIGNED TO: NCO-2004/NIL

An HEMM Mechanic ensures end to end servicing of HEMM.

Brief Job Description: This job diagnoses, repairs, overhauls and services Heavy Earth Moving Machinery (HEMM) to keep them in good running order. Also carries out repairs of internal combustion engines

Personal Attributes: This job requires the individual to concentrate on the job at hand and complete it efficiently and effectively without any accidents so diligence and hard-working are desired attributes for individuals performing this role. He must also demonstrate strong work ethics, an ability to communicate courteously with co-workers, and must be good with following instructions of the supervisor.

Job Details	Qualification Pack Code	MIN/Q 0433		
	Job Role	HEMM Mechanic		
	Credits(NSQF)	TBD	Version number	1.0
	Industry	Mining	Drafted on	15/12/2014
	Sub-sector	Open cast and Underground Mines	Last reviewed on	24/03/2015
	Occupation	Mechanical Maintenance	Next review date	24/03/2017

Job Role	HEMM Mechanic
Role Description	Repairs, overhauls and services Heavy Earth Moving Machinery to keep them in good running order. Also carries out repairs of internal combustion engines
NSQF level Minimum Educational Qualification Minimum Educational Qualification	4 ITI (Motor Vehicle Mechanic) NA
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> 1. Technical and gallery training as per first schedule, Mining Vocational Training Rules (MVTR) 1966. 2. Refresher training if absent from mines for a period of one year or more before re-employment.
Experience	1 year
Applicable National Occupational Standards	<p>Compulsory: Click on the hyperlink to read/download the required NOS</p> <ol style="list-style-type: none"> 1. MIN/N 0491 (Diagnose HEMM for repair requirements) 2. MIN/N 0492 (Carry out service, repair and maintenance activities) 3. MIN/ N 0901 (Health and Safety) <p>Optional: Not Applicable</p>
Performance Criteria	As described in the relevant OS units

Definitions

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 standard 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 Standard 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 Standard which apply uniquely in the Indian context.
Qualification Pack Code	Qualification Pack Code is a unique reference code that identifies a qualification pack.
Qualification Pack	Qualification Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualification 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 Understanding	Knowledge and Understanding are statements which together specify the 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 Skills	Core Skills or Generic Skills are a group of skills that are key to learning 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.

Acronyms	Keywords /Terms	Description
	SCMS	Skill council for Mining Sector
	NOS	National Occupational Standard
	NSQF	National Skill Qualification Framework
	NVEQF	National Vocational Educational Qualification Framework
	NVQF	National Vocational Qualification Framework
	OS	Occupational Standard
	PC	Performance Criteria
	QP	Qualification Pack
SSC	Sector Skill Council	

National Occupational Standard



Overview

This Occupational Standard is about the knowledge, understanding and skill required of an individual to assist in diagnosing faults and troubleshooting problems in a Heavy Earth Moving Machine (HEMM)

Unit Code	MIN/ N0491
Unit Title(Task)	Diagnose HEMM for repair requirements
Description	This unit is about diagnosing faults in HEMM and troubleshooting problems
Scope	This OS unit/task covers the following: <ul style="list-style-type: none"> Identify and diagnose operational faults
Element	Performance Criteria
Identify and diagnose operational faults	<p>PC1. Conduct scheduled, routine examination methods and assessments against vehicle specifications to identify damage, corrosion, inadequate fluid levels, leaks, wear, security problems and general condition and serviceability</p> <p>PC2. Review complaint sheet and understand repair requirements</p> <p>PC3. Understand original equipment manufacturers' specifications and follow standard operating procedure set out for diagnosing faults</p> <p>PC4. Use diagnostic procedures as defined in the troubleshooting checklist prepared by the equipment manufacturer</p> <p>PC5. Use diagnostic tools as required to assess the problem, this includes using on board diagnostic computer to attain vehicle data and compare the same with standard output to detect faults in the system</p> <p>PC6. check and make adjustments to clearances, gaps, settings, alignment, pressures, tension, speeds and levels relevant to the engine area, transmission area, chassis area, electrical area and body (including to valves, ignition, fuel and emissions, brakes, transmission, lights, tyres, steering and body fittings).</p> <p>PC7. Check routine service components and materials, including filters, drive, belts, wiper blades, brake linings and pads, lubricants and fluids.</p> <p>PC8. recognise cosmetic damage to vehicle components and units outside normal service items</p> <p>PC9. Check lubricant levels and identify codes and grades of lubricants to be used for specific components of HEMM</p> <p>PC10. Dismantle specific components and assemblies to identify faults</p> <p>PC11. Report malfunctions or repair requirements observed in vehicles beyond what is mentioned in the complaint sheet</p>

Knowledge and Understanding (K)	
A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	The user/individual on the job needs to know and understand: KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation as per Mines act KA8. Knowledge of mining safety procedures KA9. Impact of violation
B. Organizational Context (Knowledge of organization processes)	The user/individual on the job needs to know and understand: KB1. Job specific documents e.g. daily maintenance checklist and importance of the same KB2. Risk and impact of not following defined procedures/work instructions KB3. Escalation matrix for reporting identified problems KB4. Cost of equipment and loss for the company that results from damage of equipment KB5. All direct /indirect cost of accidents to the company KB6. Implications of delays in process to the company KB7. Locally prepared emergency response /disaster management plan.

<p>C. Technical</p> <p>Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KC1. The basic technology used in and functioning of various components and aggregates of the vehicle including:</p> <ul style="list-style-type: none"> • engines and fuel system (diesel, petrol, electrical etc.) • cooling system • air supply systems • emission and exhaust system • ignition systems • clutch assembly • clutch operating system • gearbox (manual and automatic) • drivelines and hubs • drive-train assembly and transmission systems (manual, automatic etc.) • steering system • suspension system • brake system • tyres and wheels (including wheel alignment) • cooling system • batteries and power storage system • power-generating/transmission systems (including charging and interlocking systems) • electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. • electronic systems including active and passive safety, media and other systems • electronic control unit • hydraulic and pneumatic system • various lubrication systems <p>KC2. The tools used to assess and confirm technical faults that cannot be determined through a visual inspection, including use of (but not limited to):</p> <ul style="list-style-type: none"> • pressure indicators: fuel pressure testers, manifold gauge sets, oil pressure gauges, tire pressure gauges • measuring equipment: vernier callipers, micrometer, feeler gauges, multi-metre, flow metre, temp gauge, dial gauge etc. <p>KC3. The various sources of information available for assessing service and repair requirements of the vehicle including</p> <ul style="list-style-type: none"> • diagnostic displays • visual inspections • test drives • vehicle/equipment manufacturer specifications • standard operating procedures for diagnosis
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Skills (S) [Optional]	
Element	Skills
Element A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. note down observations (if any) SA2. write information documents or enter the information in online ERP systems under guidance of the supervisor
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA3. read and interpret symbols and measurements SA4. read information documents SA5. understand and analyse the available data about the site
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA6. discuss task lists, schedules and activities SA7. effectively communicate SA8. attentively listen with full attention and comprehend the information given by various sources about the site
B. Professional Skills	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB1. plan and organize the work order and jobs SB2. organize all process manuals so that sorting/ accessing information is easy
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB3. use common sense and make judgments during day to day basis SB4. use reasoning skills to identify and resolve basic problems SB5. use intuition to detect any potential problems which could arise
	Desire to learn and take initiatives
	The user/individual on the job needs to know and understand how to: SB6. follow instructions and work on areas of improvement identified SB7. complete the assigned tasks with minimum supervision SB8. complete the job within timelines and quality norms
	Problem Solving and Decision making
	The user/individual on the job needs to know and understand how to: SB9. detect problems in day to day tasks SB10. discuss possible solution with the supervisor for problem solving SB11. make decisions in emergency conditions

NOS Version Control

NOS Code	MIN/ N0491		
Credits(NSQF)	TBD	Version number	1.0
Industry	Mining	Drafted on	15/12/2014
Industry Sub-sector	Open cast and Underground mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017

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National Occupational Standard



Overview

This unit is about carrying out service and repairs of a HEMM, including Loader, Dozer, Excavator, Grader etc.

Unit Code	MIN/ N0492
Unit Title(Task)	Carry out service, repair and maintenance activities
Description	This unit is about performing HEMM maintenance operation for activities that need to be carried out during a shift
Scope	This OS unit/task covers the following: <ul style="list-style-type: none"> Carry out service, repair and maintenance activities
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Carry out service, repair and maintenance activities	<p>PC1. ensure OEM recommended procedure and checklist is followed for routine servicing</p> <p>PC2. in case of non-routine service or repair, confirm tasks to be carried out with superior</p> <p>PC3. ensure that the correct spare parts, lubricants, tools and other materials required have been obtained</p> <p>PC4. calibrate, align and adjust settings, alignment, pressures, tension, speeds and levels relevant to:</p> <ul style="list-style-type: none"> engine and aggregates transmission system load bearing arms and structure Safety devices and components installed electrical and electronic components other components (including to valves, ignition, fuel and emissions, brakes, transmission, lights, tyres, steering and body fittings) <p>PC5. Identify and change components requiring change due to continuous wear and tear including:</p> <ul style="list-style-type: none"> oil and air filters drive belts braking system drive <p>PC6. ensure disposal of materials in accordance with the organization's policies</p> <p>PC7. refill correct grade of coolants, lubricants and other fluids as per OEM</p>

Knowledge and Understanding (K)	
A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation as per Mines act KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures
B. Organizational Context (Knowledge of the organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> KB1. Types of documentation in organization e.g. daily maintenance checklist and importance of the same KB2. Risk and impact of not following defined procedures/work instructions KB3. Rules and regulations of mine as per standard operating procedure (SOP) KB4. Risk and impact of not following company's SOP KB5. Escalation matrix for reporting identified problems KB6. The duties and responsibilities associated with his job role as per the employer KB7. Cost of delays to the company KB8. Direct /Indirect cost of accidents to the company KB9. Locally prepared emergency response /disaster management plan.
C. Technical Knowledge	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> KC1. The basic technology used in and functioning of various components and aggregates of the vehicle including: <ul style="list-style-type: none"> • engines and fuel system (diesel, petrol, electrical etc.) • cooling system • air supply systems • emission and exhaust system • ignition systems • clutch assembly • clutch operating system • gearbox (manual and automatic) • drivelines and hubs • drive-train assembly and transmission systems (manual, automatic)

MIN/ N 0492 Carry out service and repairs of engine and aggregates

	<p>etc.)</p> <ul style="list-style-type: none"> • steering system • suspension system • brake system • tyres and wheels (including wheel alignment) • cooling system • batteries and power storage system • power-generating/transmission systems (including charging and interlocking systems) • electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. • electronic systems including active and passive safety, media and other systems • electronic control unit • hydraulic and pneumatic system • various lubrication systems <p>KC2. Selecting the standard materials for the job such as seals, sealants, fittings, gaskets, joints, fasteners etc. as per manufacturers' specification</p> <p>KC3. how to carry out routine maintenance including</p> <ol style="list-style-type: none"> a. checking vehicle condition against OEM specifications to identify damage, corrosion, wear and tear, fluid levels, leaks and other problems in serviceability b. make adjustments to settings, alignment, pressures, tension, speeds and levels relevant to <ol style="list-style-type: none"> i. engine and aggregates ii. steering system iii. clutch and brake assembly iv. transmission system v. wheels and axle, or , track system vi. electrical and electronic components vii. other components <p>KC4. the type and quality of components specified by the OEM for use as replacement parts</p> <p>KC5. the grade of lubricants specified by the OEM for use</p> <p>KC6. typical causes and symptoms of operational faults and failures of a vehicle corrective action to be taken for common engine and aggregate system faults and failures</p> <p>KC7. faults and failures that necessitate replacement of components and other units</p> <p>KC8. how to dispose of replaced components in accordance with safety, health and environmental policies and regulations</p>
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MIN/ N 0492 Carry out service and repairs of engine and aggregates

Skills (S) [Optional]	
Element	Skills
Element A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. note down observations (if any) SA2. write information documents or enter the information in online ERP systems under guidance of the supervisor
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA3. read and interpret symbols and measurements SA4. read information documents SA5. understand and analyse the available data about the site
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA6. discuss task lists, schedules and activities SA7. effectively communicate SA8. attentively listen with full attention and comprehend the information given by various sources about the site
	B. Professional Skills
	Plan and Organize
The user/individual on the job needs to know and understand how to: SB1. plan and organize the work order and jobs SB2. organize all process manuals so that sorting/ accessing information is easy	
Judgment and Critical Thinking	
The user/individual on the job needs to know and understand how to: SB3. use common sense and make judgments during day to day basis SB4. use reasoning skills to identify and resolve basic problems SB5. use intuition to detect any potential problems which could arise	
Desire to learn and take initiatives	
The user/individual on the job needs to know and understand how to: SB6. follow instructions and work on areas of improvement identified SB7. complete the assigned tasks with minimum supervision SB8. complete the job within timelines and quality norms	
Problem Solving and Decision making	
The user/individual on the job needs to know and understand how to: SB9. detect problems in day to day tasks SB10. discuss possible solution with the supervisor for problem solving SB11. make decisions in emergency conditions	



MIN/ N 0492 Carry out service and repairs of engine and aggregates

NOS Version Control

NOS Code	MIN/ N0492		
Credits(NSQF)	TBD	Version number	1.0
Industry	Mining	Drafted on	15/12/2014
Industry Sub-sector	Open cast and Underground mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017



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National Occupational Standard



Overview


This unit is about health and safety measures critical in mines

MIN/ N0901 Health and Safety

Unit Code	MIN/N 0901
Unit Title (Task)	Health and Safety
Description	This unit is about health and safety measures critical in mines
Scope	This OS unit/task covers the following: <ul style="list-style-type: none"> Health and safety measures critical in mines
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Safety, Security and Administrative	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. Comply with occupational health and safety regulations adopted by the employer.</p> <p>PC2. Follow mining operations procedures with respect to materials handling and accidents</p> <p>PC3. Follow the correct safety steps in case of accident or major failure</p> <p>PC4. Comply with safety regulations and procedures in case of fire hazard.</p> <p>PC5. Operate various grades of fire extinguishers.</p> <p>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</p> <p>PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS.</p> <p>PC8. Deal with misfires as per statutory requirement</p> <p>PC9. Identify characteristics of post-blast fumes and take necessary precautions.</p> <p>PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection</p> <p>PC11. Follow the manufacturer's instructions for care and safe operation of the equipment.</p>

MIN/ N0901 Health and Safety

Knowledge and Understanding (K)	
<p>A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))</p>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> KA1. Benching in quarries, Dressing of overhangs, undercuts, Fencing KA2. First aid and Hygiene KA3. Code of traffic in specific areas of mine. Significance of fences KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Knowledge of mining safety procedures KA7. Impact of violation of safety procedures KA8. Locally prepared Emergency Preparedness / Disaster Management Plan. KA9. Environmental impact of mining KA10. Sources of dust, noise and vibration and measures to minimise KA11. Hazardous material safety and security rules and regulations as prescribed by DGMS KA12. Code of practice for safe handling and transport of dangerous material and heavy equipment.

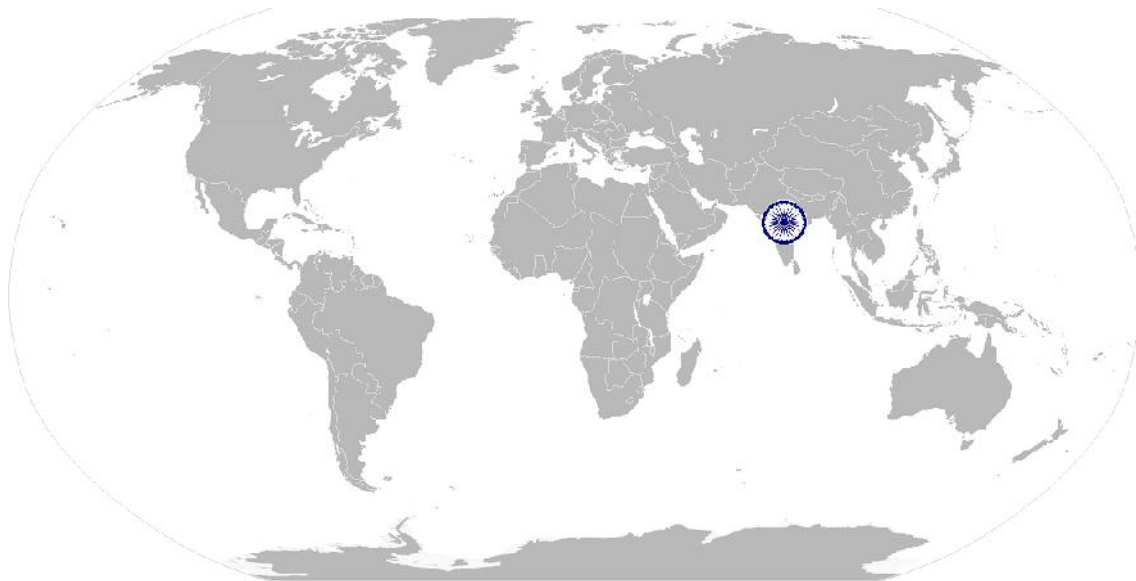




MIN/ N0901 Health and Safety

NOS Version Control

NOS Code	MIN/N 0901		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Industrial Minerals	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017



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