Skill Council For Mining Sector

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

NCVET
कौशल गुणवत्ता प्रगति

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RE IMAGINE FUTURE

Qualification Pack

Mine Mechanic/Fitter

U/G Metal/ Opencast/ U/G Coal/ Rare Earth Plant

Rare Earth Installation/ Repair-U/G/ Crusher

QP Code: MIN/Q3203

Version: 2.0

NSQF Level: 4

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Contents

MIN/Q3203: Mine Mechanic/Fitter

Brief Job Description

A Mine Mechanic or Fitter in a mine is responsible for repair and maintenance of plant and machinery, medium / light vehicles, drilling machines, pumps, compressors, pneumatic machines, overhaul of crushers and other mechanical equipments and assemblies. A mechanic/fitter most often works with / assists senior technicians.

Personal Attributes

This job requires analytical thinking, ability to apply theory to practical situations, quality consciousness, safety orientation, physique to sustain strenuous conditions, ability to use fingers, hands and feet with ease to complete the assigned task (Dexterity).

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. MIN/N3211: Perform installation and preventive maintenance of commonly used mine machineries/equipments
2. MIN/N3212: Perform troubleshooting and repair of commonly used mine machineries/equipment
3. DGT/VSQ/N0102: Employability Skills (60 Hours)

Electives*(mandatory to select at least one):*

Elective 1: U/G Metal

1. MIN/N1702: Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)

Elective 2: Opencast

1. MIN/N1703: Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)

Elective 3: U/G Coal

1. MIN/N1704: Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)

Elective 4: Rare Earth Plant

1. MIN/N1705: Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant

Options*(Not mandatory):*

Option 1: Rare Earth Installation

1. MIN/N3208: Unique requirements for installing, mechanical maintenance, and repair of equipments in Rare Earth (RE) Chemical plant

Option 2: Repair-U/G

1. MIN/N3209: Troubleshooting and repair/ maintenance of UG mine equipment/machineries

Option 3: Crusher

1. MIN/N3210: Perform repair and maintenance of crusher and it's equipments

Qualification Pack (QP) Parameters

Sector	Mining
Sub-Sector	Engineering Services
Occupation	Mechanical Services
Country	India
NSQF Level	4
Credits	30
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7231.0401

Minimum Educational Qualification & Experience	8th grade pass plus 2-year NTC plus 1 Year NAC OR 8th pass plus 1-year NTC plus 1-Year NAC plus CITS OR 10th grade pass and pursuing continuous schooling OR 10th grade pass (with 2 years relevant experience) OR Previous relevant Qualification of NSQF Level (3.0 Jr. Mine Fitter with minimum education as 5th Grade pass with 2 years relevant experience)
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	20 Years
Last Reviewed On	NA
Next Review Date	17/11/2025
NSQC Approval Date	17/11/2022
Version	2.0
Reference code on NQR	2022/MIN/SCMS/06985
NQR Version	1

Remarks:

Total Notional Duration: 450 Hours; Additional 60 hours for Optional NOS= Domain Theory Duration: 90 Hours; Additional 20 hours for Optional NOS Theory Duration+ Domain Practical Duration: 150 Hours; Additional 20 hours for Optional NOS Practical Duration+ Domain OJT (Mandatory) Duration: 150 Hours; Additional 20 hours for Optional NOS OJT Duration+ Employability Skills Duration: 60 Hours

MIN/N3211: Perform installation and preventive maintenance of commonly used mine machineries/equipments

Description

This unit is about installation and preventive maintenance activities for plant machinery, medium and light vehicles, pumps, compressors, pneumatic machines and other machine assemblies.

Scope

The scope covers the following :

- Installing machines, mechanical components and equipments
- Performing preventive maintenance of machine components in plant machinery, pumps, compressors, pneumatic and other machines/vehicles tracking
- Tracking and logging preventive maintenance, repairs, operational faults and other activities

Elements and Performance Criteria

Installing machines, mechanical components and equipments

To be competent, the user/individual on the job must be able to:

PC1. use ropes, slings, towing and lifting devices while assembling/disassembling machine/equipments and safely operate various types of hand and powertools

PC2. follow drawings and blue-prints given in the instruction sheet and installation manual

PC3. carry out various assembly of machines and conveyors etc.

PC4. follow the manufacturers 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

Performing preventive maintenance of machine components in plant machinery, pumps, compressors, pneumatic and other machines/vehicles tracking

To be competent, the user/individual on the job must be able to:

PC6. follow maintenance schedule recommended by the equipment manufacturer

PC7. carry out greasing and lubrication of pivot points in a machine

PC8. open and re-assemble various types of bearings in machines

PC9. adjust valves, linkages, bearings, hydraulic, pneumatic and systems for smooth operation

Tracking and logging preventive maintenance, repairs, operational faults and other activities

To be competent, the user/individual on the job must be able to:

PC10. track hours-in-operation and adhere to preventive maintenance schedules of various machines assigned to them

PC11. maintain a checking/maintenance logbook to record all activities performed

PC12. inform the supervisor of problems that are beyond scope

PC13. ensure availability of fuel, lubricants, consumables and other supplies

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. job-specific documents e.g. daily maintenance checklist and importance of the same
KU2. risk and impact of not following defined procedures/work instructions
KU3. the hierarchy for reporting identified problems
KU4. cost of equipment and loss for the company that results from damage of equipment
KU5. implications of delays in the process
KU6. handover and takeover procedures of the mine fitter according to company's SOP
KU7. safety guidelines specified by Directorate General of MInes Safety (DGMS) specific to mechanical operations
KU8. different types of mines and detail of the mine one is working in
KU9. benching in quarries, dressing of overhangs, undercuts, fencing
KU10. importance of first aid and hygiene
KU11. code of practice in specific areas of the mine
KU12. standing orders in force at the mine
KU13. importance of safety in the vicinity of machinery
KU14. about shot-firing / blasting related safety regulations including taking shelter during blasting
KU15. duties of workmen under the Mines Act-1952
KU16. provision of compensation and working hours, leaves, etc. as per Mines Act-1952
KU17. the outcome of violation of safety procedures
KU18. different types of machines used in open cast and underground mines and their specific functions
KU19. safety management plan prepared by the organization
KU20. various types of hand and power tools (spanners, jacks, drills etc.) and their use.
KU21. various types of lubricants and its importance, storage, handling etc.
KU22. various types of fasteners, nuts and bolts, threads, seals and couplings
KU23. various types of bearings used in machines and their assembly techniques
KU24. air systems, compressors its uses and pneumatic controls
KU25. various types of pumps and control valves of hydraulic systems
KU26. construction and operation crawlers
KU27. steering systems and various linkages
KU28. safety rules while using tools and tackling machine parts
KU29. different types of tyres and wheels used in medium and light vehicles, tracks, final drive etc., in case of crawling equipment
KU30. hot and cold tyre pressure as per size of tyre and methods of repairs
KU31. repair of overhauling electrical and mechanical engines, manual and power shift transmissions, hydraulic and pneumatic systems etc.
KU32. condition and performance of equipment using condition monitoring tools
KU33. Standard Operating Procedure (SOP) for performing preventive maintenance tasks
KU34. importance of sensitization towards different genders and PWD (Persons with Disabilities)

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations
GS2. read and interpret symbols and readings
GS3. read and write information documents or enter the information in register and entry of data in Management Information System (MIS)
GS4. read and interpret drawings, symbols, readings and measurements
GS5. read information documents
GS6. discuss task lists, schedules and activities
GS7. effectively communicate, listen and comprehend the information given by various sources about the site
GS8. operate computer and use its basic applications
GS9. understand and read basic english
GS10. make decisions pertaining to the concerned area of work
GS11. plan and organize the work order and tasks
GS12. organize all operation and service manuals so that sorting/ accessing information is easy
GS13. detect problems in day to day tasks
GS14. discuss possible solution with the supervisor for problem solving
GS15. make decisions in emergency conditions
GS16. follow instructions and work on areas of improvement identified
GS17. complete the assigned tasks timely
GS18. use reasoning skills to identify and resolve basic problems
GS19. analyze and detect any potential problems which could arise during operation

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Installing machines, mechanical components and equipments	**11**	**20**	**-**	**6**
PC1. use ropes, slings, towing and lifting devices while assembling/disassembling machine/equipments and safely operate various types of hand and powertools	2	4	-	1
PC2. follow drawings and blue-prints given in the instruction sheet and installation manual	2	4	-	1
PC3. carry out various assembly of machines and conveyors etc.	2	4	-	1
PC4. follow the manufacturers instructions which apply to the care and safe handling of the machine/automobile	2	4	-	1
PC5. test assembled machine for proper performance before handing over for operations	3	4	-	2
Performing preventive maintenance of machine components in plant machinery, pumps, compressors, pneumatic and other machines/vehicles tracking	**9**	**15**	**-**	**6**
PC6. follow maintenance schedule recommended by the equipment manufacturer	2	4	-	2
PC7. carry out greasing and lubrication of pivot points in a machine	3	4	-	1
PC8. open and re-assemble various types of bearings in machines	2	3	-	2
PC9. adjust valves, linkages, bearings, hydraulic, pneumatic and systems for smooth operation	2	4	-	1
Tracking and logging preventive maintenance, repairs, operational faults and other activities	**10**	**15**	**-**	**8**
PC10. track hours-in-operation and adhere to preventive maintenance schedules of various machines assigned to them	2	4	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. maintain a checking/maintenance logbook to record all activities performed	2	3	-	2
PC12. inform the supervisor of problems that are beyond scope	3	4	-	2
PC13. ensure availability of fuel, lubricants, consumables and other supplies	3	4	-	2
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3211
NOS Name	Perform installation and preventive maintenance of commonly used mine machineries/equipments
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Mechanical Services
NSQF Level	3
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3212: Perform troubleshooting and repair of commonly used mine machineries/equipment

Description

This unit is about performing troubleshooting and repair activities of mechanical systems in plant and machinery, medium/light vehicles, compressors, pumps, pneumatic, hydraulic and other machines.

Scope

The scope covers the following :

- Performing troubleshooting and repair/maintenance
- Recording and Logging

Elements and Performance Criteria

Performing troubleshooting and repair/maintenance

To be competent, the user/individual on the job must be able to:

PC1. explain various elements of a good maintenance system and difference between preventive and repair maintenance

PC2. use various measuring instruments and testing tools

PC3. compare measured readings with optimal readings to pin-point faults

PC4. service, diagnose and repair faults in mechanical systems such as gears, steering systems, hydraulic pumps, transmission, crawlers, conveyor belts etc.

PC5. ensure the machine is on firm and level ground before attempting to carry out any maintenance activity

PC6. ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only)

PC7. ensure that no maintenance task on the machine/engine is performed when running or still hot

PC8. adjust valves, belt tensions for optimal operation

PC9. test repaired equipment to ensure everything is working correctly and safely (this may include Pre-load testing, parking brake testing, hydraulic pressure, greasing points, air pressure, etc.)

Recording and Logging

To be competent, the user/individual on the job must be able to:

PC10. complete daily/weekly maintenance/defect sheets as provided by the company

PC11. inform the supervisor of those problems which are not under one's purview

PC12. maintain inventory of fuel, lubricants and order other spares and consumables as required

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. job-specific documents e.g. daily maintenance checklist and importance of the same
KU2. risk and impact of not following defined procedures/work instructions
KU3. the hierarchy for reporting identified problems
KU4. cost of equipment and loss for the company that results from damage of equipment
KU5. implications of delays in the process
KU6. handover and takeover procedures of the mine fitter according to company's SOP
KU7. safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mechanical operations
KU8. different types of mines and detail of the mine one is working in
KU9. benching in quarries, dressing of overhangs, undercuts, fencing
KU10. importance of first aid and hygiene
KU11. code of practice in specific areas of the mine
KU12. standing orders in force at the mine
KU13. importance of safety in the vicinity of machinery
KU14. about shot-firing/blasting related safety regulations including taking shelter during blasting
KU15. duties of workmen under the Mines Act-1952
KU16. provision of compensation and working hours, leaves, etc. as per Mines Act-1952
KU17. the outcome of violation of safety procedures
KU18. different types of machines used in open cast and underground mines and their specific functions
KU19. safety management plan prepared by the organization
KU20. basic calculations of volume, temperature, pressure, torque, unit conversions
KU21. various types of fasteners, nuts-bolts, threads, seals and couplings
KU22. various types of bearings used in machines and their assembly techniques
KU23. air systems, compressors, pneumatic controls and its uses
KU24. various types of pumps and control valves
KU25. construction and operation of crawlers
KU26. steering systems and various linkages
KU27. safety rules while using tools and tackling machine parts
KU28. repair of overhauling electrical and mechanical systems / engines, manual and power shift transmissions
KU29. condition and performance of equipment using condition monitoring tools
KU30. SOP for performing preventive maintenance jobs
KU31. importance of sensitization towards different genders and PWD (Persons with Disabilities)

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations
GS2. read and write information documents or enter the information in register and entry of data in Management Information System (MIS)

GS3. read and interpret drawings, symbols, readings and measurements
GS4. discuss task lists, schedules and activities
GS5. effectively communicate, listen and comprehend the information given by various sources about the site
GS6. operate computer and use its basic applications
GS7. understand and read basic English
GS8. make decisions pertaining to the concerned area of work
GS9. plan and organize the work order and tasks
GS10. organize all operation and service manuals so that sorting/ accessing information is easy
GS11. detect problems in day to day tasks
GS12. discuss possible solution with the supervisor for problem solving
GS13. make decisions in emergency conditions
GS14. follow instructions and work on areas of improvement identified
GS15. complete the assigned tasks timely
GS16. use reasoning skills to identify and resolve basic problems
GS17. analyze and detect any potential problems which could arise during operation

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Performing troubleshooting and repair/maintenance	**24**	**38**	**-**	**16**
PC1. explain various elements of a good maintenance system and difference between preventive and repair maintenance	3	4	-	2
PC2. use various measuring instruments and testing tools	2	4	-	2
PC3. compare measured readings with optimal readings to pin-point faults	3	4	-	2
PC4. service, diagnose and repair faults in mechanical systems such as gears, steering systems, hydraulic pumps, transmission, crawlers, conveyor belts etc.	3	4	-	2
PC5. ensure the machine is on firm and level ground before attempting to carry out any maintenance activity	3	4	-	1
PC6. ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only)	2	4	-	2
PC7. ensure that no maintenance task on the machine/engine is performed when running or still hot	3	5	-	2
PC8. adjust valves, belt tensions for optimal operation	2	4	-	1
PC9. test repaired equipment to ensure everything is working correctly and safely (this may include Pre-load testing, parking brake testing, hydraulic pressure, greasing points, air pressure, etc.)	3	5	-	2
Recording and Logging	**6**	**12**	**-**	**4**
PC10. complete daily/weekly maintenance/defect sheets as provided by the company	2	4	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. inform the supervisor of those problems which are not under one's purview	2	4	-	2
PC12. maintain inventory of fuel, lubricants and order other spares and consumables as required	2	4	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3212
NOS Name	Perform troubleshooting and repair of commonly used mine machineries/equipment
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Mechanical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

DGT/VSQ/N0102: Employability Skills (60 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

PC1. identify employability skills required for jobs in various industries

PC2. identify and explore learning and employability portals

Constitutional values – Citizenship

To be competent, the user/individual on the job must be able to:

PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.

PC4. follow environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

PC5. recognize the significance of 21st Century Skills for employment

PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

To be competent, the user/individual on the job must be able to:

PC7. use basic English for everyday conversation in different contexts, in person and over the telephone

PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English

PC9. write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

To be competent, the user/individual on the job must be able to:

PC10. understand the difference between job and career

PC11. prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

To be competent, the user/individual on the job must be able to:

PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings

PC13. work collaboratively with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

PC14. communicate and behave appropriately with all genders and PwD

PC15. escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

PC16. select financial institutions, products and services as per requirement

PC17. carry out offline and online financial transactions, safely and securely

PC18. identify common components of salary and compute income, expenses, taxes, investments etc

PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

PC20. operate digital devices and carry out basic internet operations securely and safely

PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively

PC22. use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

To be competent, the user/individual on the job must be able to:

PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research

PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion

PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

To be competent, the user/individual on the job must be able to:

PC26. identify different types of customers

PC27. identify and respond to customer requests and needs in a professional manner.

PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC29. create a professional Curriculum vitae (Résumé)

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC31. apply to identified job openings using offline /online methods as per requirement

PC32. answer questions politely, with clarity and confidence, during recruitment and selection

PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills and different learning and employability related portals

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU6. importance of career development and setting long- and short-term goals

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

KU10. different types of financial institutes, products, and services

KU11. how to compute income and expenditure

KU12. importance of maintaining safety and security in offline and online financial transactions

KU13. different legal rights and laws

KU14. different types of digital devices and the procedure to operate them safely and securely

KU15. how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

KU16. how to identify business opportunities

KU17. types and needs of customers

KU18. how to apply for a job and prepare for an interview

KU19. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and write different types of documents/instructions/correspondence

GS2. communicate effectively using appropriate language in formal and informal settings

GS3. behave politely and appropriately with all
GS4. how to work in a virtual mode
GS5. perform calculations efficiently
GS6. solve problems effectively
GS7. pay attention to details
GS8. manage time efficiently
GS9. maintain hygiene and sanitization to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**2**	**4**	**-**	**-**
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
Career Development & Goal Setting	**1**	**2**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
Communication Skills	**2**	**2**	**-**	**-**
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**2**	**-**	**-**
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
Financial and Legal Literacy	**2**	**3**	**-**	**-**
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
Essential Digital Skills	**3**	**4**	**-**	**-**
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Entrepreneurship	**2**	**3**	**-**	**-**
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	**1**	**2**	**-**	**-**
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**2**	**3**	**-**	**-**
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0102
NOS Name	Employability Skills (60 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	NA
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1702: Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)

Description

This unit is about adhering to health, safety and environmental guidelines in Underground Metalliferous Mines (UMM) during the execution of various tasks and operations and maintenance.

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work

PC2. comply with safety, health and security-related regulations/guidelines at the mine e.g. follow Standard Operating Procedure (SOP) for material handling in underground (U/G) mine

PC3. operate various types of fire extinguishers to control different types of fire at a worksite when required

PC4. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area

PC5. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment

PC6. use self-rescue apparatus, appropriately when required

PC7. follow appropriate emergency response procedure during emergency such as fire, water inrush, fall of ground etc.

PC8. follow precautions against U/G electrical appliances

PC9. follow appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine

PC10. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire

PC11. follow the manufacturer’s instructions for care and safe operation of mine machinery and equipment

PC12. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face

PC13. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)

PC14. follow gas detecting alarm signal on leakage of inflammable gases and laid out procedure to ensure safety

PC15. follow process for reporting any unsafe act/condition in work area to the concerned person
PC16. use underground mine communication system
PC17. ensure positive isolation near the work place if applicable
PC18. use appropriate PPE as per the requirement
PC19. maintain hand hygiene by washing hands with alcohol based sanitisers/soap
PC20. disinfect the machine/tools before and after work/task
PC21. maintain hygiene at the work site
PC22. report any symptoms of illness to the shift-incharge
PC23. identify six directional hazards at workplace and take decisions accordingly

Follow environmental guidelines

To be competent, the user/individual on the job must be able to:

PC24. identify the environmental impact of mining related operations and follow steps to reduce those impact
PC25. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery
PC26. ensure that the stowing practices produce minimum disturbance to the surface
PC27. ensure that the subgrade ore is carried out to surface and stacked separately at the earmarked place
PC28. ensure the productivity of the machine for material/fuel conservation
PC29. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines
PC30. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. safety guidelines specified by Directorate General of Mine Safety (DGMS)
KU2. duties and rights of workers
KU3. selection process of person for rescue training
KU4. about Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR)
KU5. isolation and sealed off area of the mine
KU6. various types of gases found in the mine and their effect
KU7. self-rescue apparatus and their uses
KU8. provision of medical examination (IME & PME) of person employed as per Mines Rules 1955
KU9. importance of first aid and hygiene
KU10. about different types of machinery used in U/G mines
KU11. different types of supporting systems used in U/G mines as per SSP and SSR
KU12. about precautions to be taken when handling heavy equipment
KU13. various problems/incidents likely to occur
KU14. role of Internal Safety Organization, safety committee, workman's inspector and DGMS

KU15. about mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site
KU16. common sources of pollution in the mines and ways to minimize it
KU17. various types of fire extinguishers
KU18. safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots, ear plugs, Face Mask, etc.
KU19. shot-firing / blasting related safety regulations including taking shelter during blasting
KU20. emergency response /disaster management plan prepared by the organization as per DGMS guideline
KU21. mining area-specific signs, and other safety and emergency signals
KU22. the outcome of violation of safety procedures
KU23. Take-5 (Personal Risk Assessment) training (DGMS Tech. circulars 2/2014)
KU24. rules and regulations for safety and security while handling hazardous materials
KU25. safety appliances and rescue equipment
KU26. importance and use of various communication system used in UG mines
KU27. importance of positive isolation at working site
KU28. safety and occupational health policy of organisation
KU29. six directional hazard identification process
KU30. basic personal and workplace hygiene
KU31. importance of FAB (Fresh Air Base)
KU32. basic provisions in Mines Creche Rules, 1966 (MCR) for females employed in the mines
KU33. the role and responsibilities of rescue room and rescue station and how to contact them in case of emergency
KU34. importance of taking shelter at the miner's station during blasting operation
KU35. importance of sensitization towards different genders and persons with disabilities (PWD)
KU36. importance of following infection control policies, '5-S' practices, and waste management
KU37. importance of water/material/energy conservation and management
KU38. importance of SMP and EMP, prepared by the organization, as per DGMS guideline

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's role
GS2. make decisions on the concerned area of work
GS3. read basic English language
GS4. read and interpret manuals, health, and safety instructions, memos, etc.
GS5. use the digital information from machine
GS6. use basic applications of a computer
GS7. plan and organize the work order and tasks
GS8. use reasoning skills to identify and resolve fundamental problems

GS9. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**24**	**42**	**-**	**17**
PC1. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work	-	2	-	2
PC2. comply with safety, health and security-related regulations/guidelines at the mine e.g. follow Standard Operating Procedure (SOP) for material handling in underground (U/G) mine	1	3	-	-
PC3. operate various types of fire extinguishers to control different types of fire at a worksite when required	1	4	-	1
PC4. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area	1	1	-	-
PC5. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment	1	2	-	1
PC6. use self-rescue apparatus, appropriately when required	-	4	-	1
PC7. follow appropriate emergency response procedure during emergency such as fire, water inrush, fall of ground etc.	1	2	-	1
PC8. follow precautions against U/G electrical appliances	2	2	-	2
PC9. follow appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine	2	2	-	1
PC10. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire	2	4	-	-
PC11. follow the manufacturer’s instructions for care and safe operation of mine machinery and equipment	1	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face	1	1	-	-
PC13. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)	1	-	-	-
PC14. follow gas detecting alarm signal on leakage of inflammable gases and laid out procedure to ensure safety	1	2	-	1
PC15. follow process for reporting any unsafe act/condition in work area to the concerned person	-	2	-	1
PC16. use underground mine communication system	-	1	-	-
PC17. ensure positive isolation near the work place if applicable	1	1	-	1
PC18. use appropriate PPE as per the requirement	2	4	-	2
PC19. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	1	1	-	1
PC20. disinfect the machine/tools before and after work/task	1	1	-	-
PC21. maintain hygiene at the work site	1	1	-	1
PC22. report any symptoms of illness to the shift-incharge	1	-	-	-
PC23. identify six directional hazards at workplace and take decisions accordingly	2	-	-	-
Follow environmental guidelines	**6**	**8**	**-**	**3**
PC24. identify the environmental impact of mining related operations and follow steps to reduce those impact	1	2	-	-
PC25. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery	-	1	-	-
PC26. ensure that the stowing practices produce minimum disturbance to the surface	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC27. ensure that the subgrade ore is carried out to surface and stacked separately at the earmarked place	1	-	-	1
PC28. ensure the productivity of the machine for material/fuel conservation	1	1	-	-
PC29. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines	1	1	-	1
PC30. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.	1	2	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1702
NOS Name	Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions, Mine Surveying, Drilling/Cutting, Shot firing/Blasting, Loading and Hauling - Underground, Specialized Operations, Electrical Services, Mechanical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1703: Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)

Description

This unit is about adhering to health, safety and environmental guidelines at the Open Cast Mines while executing various tasks, maintenance and operations.

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow Environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. comply with safety, health, and security-related regulations/guidelines at the opencast mine

PC2. follow the safety instructions given by the workman's inspector

PC3. follow adequate safety while working at haul roads, heights, overburden dumps, sump area, stockyard, near moving parts, etc.

PC4. take safety precautions while working on sites (sub-station, workshop etc.), with equipment, and conducting welding and cutting operations

PC5. follow appropriate Safe Operating Procedure (SOP) while dealing with explosives

PC6. respond promptly and appropriately to an accident/ incident or an emergency situation, within limits of the role and responsibility

PC7. provide first aid to an injured person

PC8. operate various types of fire extinguishers to control different types of fire at a worksite when required

PC9. use appropriate PPE as per the requirement

PC10. maintain hand hygiene by washing hands with alcohol based sanitisers/soap

PC11. disinfect the machine/tools before and after work/task

PC12. maintain hygiene at the work site

PC13. report any symptoms of illness to the shift-incharge

Follow Environmental guidelines

To be competent, the user/individual on the job must be able to:

PC14. identify the environmental impact of related opencast mining operations

PC15. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines

PC16. ensure not to mix topsoil with waste in day to day tasks

PC17. ensure that HEMM is washed at the designated location

PC18. ensure the productivity of the machine for material/fuel conservation

PC19. follow the mineral conservation practices specified by the organization in accordance with MCDR-2017 (Mineral Conservation and Development Rules)

PC20. assist supervisor for reducing environmental impact caused due to related mining operations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. about various environmental awareness program related to mining, organized by the various government bodies/company

KU2. safety guidelines specified by Directorate General of Mine Safety (DGMS)

KU3. basic mining terminologies and definitions

KU4. means of access and egress from the mines, location of workshop, haul roads and working face including dump yards

KU5. duties of workers under The Mines act-1952

KU6. working hours and accident compensation as per The Mines act-1952

KU7. about precautions to be taken when handling heavy equipment

KU8. various problems/incidents likely to occur

KU9. hierarchy of the reporting

KU10. machine operation, condition of the machine and worksite

KU11. proper documents specific to the machine

KU12. role of workmen inspector, safety committee and internal safety organization

KU13. the process of top soil removal and management

KU14. mine sump and pumping system of the mines

KU15. about mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site

KU16. common sources of pollution in the mines and ways to minimize it

KU17. safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, gas detector, safety lamp, self-contained breathing apparatus, gum boots, ear plugs, face mask, etc.

KU18. shot-firing / blasting related safety regulations including taking shelter during blasting

KU19. emergency response /disaster management plan prepared by the organization

KU20. signages, mining area-specific signs, and other safety and emergency signals

KU21. the outcome of violation of safety procedures

KU22. basic personal and workplace hygiene

KU23. importance of sensitization towards different genders and PWD (Persons with Disabilities)

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's role

GS2. make decisions on the concerned area of work
GS3. read and interpret manuals, health, and safety instructions, memos, etc.
GS4. plan and organize the work order and jobs
GS5. use reasoning skills to identify and resolve fundamental problems
GS6. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**20**	**34**	**-**	**15**
PC1. comply with safety, health, and security-related regulations/guidelines at the opencast mine	2	2	-	1
PC2. follow the safety instructions given by the workman's inspector	1	3	-	1
PC3. follow adequate safety while working at haul roads, heights, overburden dumps, sump area, stockyard, near moving parts, etc.	3	3	-	1
PC4. take safety precautions while working on sites (sub-station, workshop etc.), with equipment, and conducting welding and cutting operations	1	3	-	1
PC5. follow appropriate Safe Operating Procedure (SOP) while dealing with explosives	2	3	-	2
PC6. respond promptly and appropriately to an accident/ incident or an emergency situation, within limits of the role and responsibility	2	3	-	1
PC7. provide first aid to an injured person	2	3	-	1
PC8. operate various types of fire extinguishers to control different types of fire at a worksite when required	1	3	-	1
PC9. use appropriate PPE as per the requirement	2	4	-	2
PC10. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	1	2	-	1
PC11. disinfect the machine/tools before and after work/task	1	2	-	1
PC12. maintain hygiene at the work site	1	1	-	1
PC13. report any symptoms of illness to the shift-incharge	1	2	-	1
Follow Environmental guidelines	**10**	**16**	**-**	**5**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. identify the environmental impact of related opencast mining operations	2	2	-	1
PC15. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines	1	2	-	1
PC16. ensure not to mix topsoil with waste in day to day tasks	2	2	-	1
PC17. ensure that HEMM is washed at the designated location	2	2	-	1
PC18. ensure the productivity of the machine for material/fuel conservation	1	3	-	-
PC19. follow the mineral conservation practices specified by the organization in accordance with MCDR-2017 (Mineral Conservation and Development Rules)	1	3	-	1
PC20. assist supervisor for reducing environmental impact caused due to related mining operations	1	2	-	-
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1703
NOS Name	Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions, , Exploration, Mineral Estimation, Planning, Mine Surveying, Drilling/Cutting, Shot firing/Blasting, Loading and Hauling - Opencast, Specialized Operations, Electrical Services, Mechanical Services, Instrumentation and Control Systems, Ore Processing
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1704: Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)

Description

This unit is about adhering to health, safety and environmental guidelines in Underground Coal Mines (UCM) during execution of various tasks, operations and maintenance.

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. follow preventive measures against firedamp, whitedamp, blackdamp etc.

PC2. use the flame safety lamp for detecting the methane gas as per Standard Operating Procedure (SOP)

PC3. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work

PC4. comply with safety, health and security-related regulations/guidelines at the mine e.g. SOP for material handling in underground (U/G) mine

PC5. ensure that oil, grease, canvas or other inflammable material are stored in fire-proof receptacle

PC6. ensure that every instrument, apparatus and equipment are DGMS approved before these are used

PC7. ensure that Armoured face conveyor (AFC) and chocks must be kept in a straight line for every cycle of operations and tightened up to the setting pressure while keeping it in full contact with the roof, applicable for longwall mining

PC8. provide first aid to an injured person

PC9. follow safety precautions against spontaneous heating of the coal

PC10. operate various types of fire extinguishers to control different types of fire at worksite, if required

PC11. ensure that no person is traveling/working/staying under unsupported roof

PC12. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area

PC13. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment

PC14. use self-rescue apparatus appropriately when required

PC15. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)

PC16. follow precautions against U/G electrical appliances

PC17. take proper care against damage and accidents while loading, transporting, dismantling and erecting of roof supports

PC18. follow appropriate SOP while working near any isolated and sealed off area of the mine

PC19. ensure that the roof and the sidewalls of the mine face (or newly exposed area of the mines) have been scaled/dressed properly

PC20. take relevant safety precautions during depillaring operation in UCM

PC21. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire

PC22. follow the manufacturer's instructions for care and safe operation of mine machinery and equipment

PC23. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face

PC24. follow laid out SOP in case of alarm signal for leakage of inflammable gases

PC25. follow the process of reporting any unsafe act/condition in the working area to the concerned person

PC26. use underground mine communication system

PC27. ensure positive isolation near the work place if applicable

PC28. use appropriate Personal Protective Equipment (PPE) as per the requirement

PC29. maintain hand hygiene by washing hands with alcohol based sanitisers/soap

PC30. disinfect the machine/tools before and after work/task

PC31. maintain hygiene at the work site

PC32. report any symptoms of illness to the shift-incharge

PC33. identify six directional hazards at workplace and take decisions accordingly

Follow environmental guidelines

To be competent, the user/individual on the job must be able to:

PC34. identify the environmental impact of mining related operations and follow steps to reduce those impact

PC35. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery

PC36. ensure that the stowing practices produce minimum disturbance to the surface

PC37. ensure that the subgrade coal is carried out to surface and stacked separately at the earmarked place

PC38. ensure the productivity of the machine for material/fuel conservation

PC39. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines

PC40. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. safety guidelines specified by Directorate General of Mine Safety (DGMS)
KU2. duties and rights of workers
KU3. selection process of person for rescue training
KU4. about Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR)
KU5. isolation and sealed off area of the mine
KU6. various types of gases available in the mine and their effects; and their control measures
KU7. self-rescue apparatus and their uses
KU8. provision of medical examination (Initial Medical Examination (IME) & Periodical Medical Examination (PME)) of a person employed, as per Mines Rules 1955
KU9. importance of first aid and hygiene
KU10. about different types of machineries used in U/G mines
KU11. different types of supporting system used in U/G mines as per SSP and SSR
KU12. about precautions to be taken when handling heavy equipment
KU13. various problems/incidents likely to occur
KU14. role of Internal Safety Organization, safety committee, workman's inspector and DGMS
KU15. about mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site
KU16. common sources of pollution in the mines and ways to minimize it
KU17. various types of fire extinguishers
KU18. safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots, ear plugs, Face Mask, etc.
KU19. shot-firing / blasting related safety regulations including taking shelter during blasting
KU20. mining area-specific signs, and other safety and emergency signals
KU21. the outcome of violation of safety procedures
KU22. Take-5 (Personal Risk Assessment) training (DGMS Tech. circulars 2/2014)
KU23. hazardous material safety, security rules and regulations
KU24. safety appliances and rescue equipment
KU25. importance and use of various communication system used in UG mines
KU26. importance of positive isolation at working site
KU27. safety and occupational health policy of organisation
KU28. six directional hazard identification process
KU29. basic personal and workplace hygiene
KU30. importance of FAB (Fresh Air Base)
KU31. basic provisions in Mines Creche Rules, 1966 (MCR) for any females employed in the mines
KU32. about basic safety regulations of Coal Mines Regulation,2017 (CMR)
KU33. types of stone dust barrier and its importance
KU34. coal dust explosion and its preventive measures
KU35. classification of coal mines as per the degree of gassiness of coal seams such as first degree, second degree, and third-degree mines
KU36. precautions as per the gassiness of the coal mines

KU37. use of flame safety lamp and its parts
KU38. about coal mines occupational disease such as pneumoconiosis or 'black lung' and their preventive measures
KU39. Standard of Ventilation as per the section 153 of the CMR 2017
KU40. Standard of Lighting as per the section 178 of the CMR 2017
KU41. the roles, duties and responsibilities of rescue team members, rescue room and rescue station and how to contact them in case of emergency
KU42. the correct steps for conducting any rescue work as per Mine Rescue Rule (MRR)
KU43. importance of taking shelter at the miner's station during blasting operation
KU44. importance of sensitization towards different genders and persons with disabilities (PWD)
KU45. importance of following infection control policies, '5-S' practices, and waste management
KU46. importance of water/material/energy conservation and management
KU47. importance of SMP and EMP, prepared by the organization, as per DGMS guideline

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's role
GS2. make decisions on the concerned area of work
GS3. read basic English language
GS4. read and interpret manuals, health, and safety instructions, memos, etc.
GS5. use the digital information from a machine
GS6. plan and organize the work order and tasks
GS7. use basic applications of the computer
GS8. use reasoning skills to identify and resolve fundamental problems
GS9. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**24**	**43**	**-**	**14**
PC1. follow preventive measures against firedamp, whitedamp, blackdamp etc.	1	1	-	-
PC2. use the flame safety lamp for detecting the methane gas as per Standard Operating Procedure (SOP)	-	1	-	-
PC3. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work	1	1	-	1
PC4. comply with safety, health and security-related regulations/guidelines at the mine e.g. SOP for material handling in underground (U/G) mine	1	1	-	1
PC5. ensure that oil, grease, canvas or other inflammable material are stored in fire-proof receptacle	-	1	-	-
PC6. ensure that every instrument, apparatus and equipment are DGMS approved before these are used	1	1	-	-
PC7. ensure that Armoured face conveyor (AFC) and chocks must be kept in a straight line for every cycle of operations and tightened up to the setting pressure while keeping it in full contact with the roof, applicable for longwall mining	3	3	-	-
PC8. provide first aid to an injured person	1	2	-	1
PC9. follow safety precautions against spontaneous heating of the coal	1	1	-	-
PC10. operate various types of fire extinguishers to control different types of fire at worksite, if required	-	2	-	-
PC11. ensure that no person is traveling/working/staying under unsupported roof	1	-	-	-
PC12. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area	-	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment	-	1	-	1
PC14. use self-rescue apparatus appropriately when required	-	2	-	-
PC15. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)	1	2	-	1
PC16. follow precautions against U/G electrical appliances	2	2	-	1
PC17. take proper care against damage and accidents while loading, transporting, dismantling and erecting of roof supports	1	2	-	-
PC18. follow appropriate SOP while working near any isolated and sealed off area of the mine	1	1	-	1
PC19. ensure that the roof and the sidewalls of the mine face (or newly exposed area of the mines) have been scaled/dressed properly	1	1	-	-
PC20. take relevant safety precautions during depillaring operation in UCM	-	2	-	1
PC21. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire	1	1	-	-
PC22. follow the manufacturer's instructions for care and safe operation of mine machinery and equipment	-	1	-	1
PC23. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face	-	1	-	1
PC24. follow laid out SOP in case of alarm signal for leakage of inflammable gases	1	1	-	-
PC25. follow the process of reporting any unsafe act/condition in the working area to the concerned person	-	1	-	1
PC26. use underground mine communication system	-	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC27. ensure positive isolation near the work place if applicable	1	1	-	-
PC28. use appropriate Personal Protective Equipment (PPE) as per the requirement	2	2	-	1
PC29. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	-	1	-	-
PC30. disinfect the machine/tools before and after work/task	1	1	-	-
PC31. maintain hygiene at the work site	1	1	-	-
PC32. report any symptoms of illness to the shift-incharge	1	1	-	-
PC33. identify six directional hazards at workplace and take decisions accordingly	-	1	-	1
Follow environmental guidelines	**6**	**7**	**-**	**6**
PC34. identify the environmental impact of mining related operations and follow steps to reduce those impact	1	1	-	1
PC35. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery	1	1	-	1
PC36. ensure that the stowing practices produce minimum disturbance to the surface	1	1	-	-
PC37. ensure that the subgrade coal is carried out to surface and stacked separately at the earmarked place	1	1	-	1
PC38. ensure the productivity of the machine for material/fuel conservation	1	1	-	1
PC39. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines	-	1	-	1
PC40. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.	1	1	-	1

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1704
NOS Name	Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions, Mine Surveying, Drilling/Cutting, Shot firing/Blasting, Loading and Hauling - Underground, Specialized Operations, Electrical Services, Mechanical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1705: Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant

Description

This unit is about adhering to health, safety and environmental guidelines critical in RE chemical plants

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

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 the correct safety steps in case of accident or major failure

PC3. operate various grades of fire extinguishers

PC4. follow general safety precautions while handling cables; working near electrical installations, overhead lines and while working with various electrical equipment in the plant

PC5. provide first-aid to an injured person

PC6. use appropriate PPE as per the requirement

PC7. identify the hazards and risks

PC8. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)

PC9. maintain hand hygiene by washing hands with alcohol based sanitisers/soap

PC10. disinfect the site/panel/tools before and after work/task

PC11. maintain hygiene at the work site

PC12. report any symptoms of illness to the shift-incharge

PC13. identify six directional hazards at workplace and take decisions accordingly

Follow environmental guidelines

To be competent, the user/individual on the job must be able to:

PC14. identify the environmental impact of operations related to RE chemical plant and take steps to reduce the impact

PC15. ensure the productivity of the machine for material/fuel conservation

PC16. follow the process for collecting, storing, and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines and safety guidelines as prescribed by regulatory authorities like Atomic Energy Regulatory Board (AERB), United Nations Development Group (UNDG), etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the outcome of violation of safety procedures
KU2. duties and rights of workers
KU3. process for reporting any unsafe act/condition in work area
KU4. different types of RE chemical factories and detail of the plant one is working in
KU5. fencing, guarding, spillage control, etc.
KU6. importance of first aid and hygiene
KU7. provision of wages, working hours and accident compensation as per Atomic Energy Factory Rules
KU8. various types of chemical processes carried out in the plant
KU9. RE chemical plant safety procedures
KU10. about installation and handling of safety devices
KU11. code of practice for safe handling and transport of dangerous material and heavy equipment
KU12. safety and occupational health policy of organisation
KU13. basic personal and workplace hygiene
KU14. six directional hazard identification process
KU15. Internal Safety Organisation and role of safety committee, workman's inspector and AERB etc.
KU16. importance of sensitization towards different genders and persons with disabilities (PWD)
KU17. importance of following infection control policies, '5-S' practices, and waste management as prescribed by regulatory authorities like Atomic Energy Regulatory Board (AERB), United Nations Development Group (UNDG), etc.
KU18. importance of water/material/energy conservation and management
KU19. importance of SMP and EMP, prepared by the organization, as per DGMS guideline

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's job role
GS2. make decisions on the concerned area of work
GS3. read and explain manuals, health, and safety instructions, memos, etc.
GS4. plan and organize the work order and jobs
GS5. use reasoning skills to identify and resolve fundamental problems
GS6. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**26**	**44**	**-**	**17**
PC1. comply with occupational health and safety regulations adopted by the employer	2	3	-	1
PC2. follow the correct safety steps in case of accident or major failure	2	4	-	1
PC3. operate various grades of fire extinguishers	2	4	-	1
PC4. follow general safety precautions while handling cables; working near electrical installations, overhead lines and while working with various electrical equipment in the plant	3	4	-	2
PC5. provide first-aid to an injured person	3	4	-	2
PC6. use appropriate PPE as per the requirement	2	5	-	2
PC7. identify the hazards and risks	3	6	-	1
PC8. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)	3	5	-	2
PC9. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	1	1	-	1
PC10. disinfect the site/panel/tools before and after work/task	2	2	-	1
PC11. maintain hygiene at the work site	1	2	-	1
PC12. report any symptoms of illness to the shift-incharge	1	2	-	1
PC13. identify six directional hazards at workplace and take decisions accordingly	1	2	-	1
Follow environmental guidelines	**4**	**6**	**-**	**3**
PC14. identify the environmental impact of operations related to RE chemical plant and take steps to reduce the impact	1	2	-	1
PC15. ensure the productivity of the machine for material/fuel conservation	2	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC16. follow the process for collecting, storing, and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines and safety guidelines as prescribed by regulatory authorities like Atomic Energy Regulatory Board (AERB), United Nations Development Group (UNDG), etc.	1	2	-	1
NOS Total	**30**	**50**	**-**	**20**

Skill Council For Mining Sector

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Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1705
NOS Name	Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3208: Unique requirements for installing, mechanical maintenance, and repair of equipments in Rare Earth (RE) Chemical plant

Description

This OS unit is about installing, troubleshooting and repairing of mechanical systems in processing equipments such as mixer settlers, filter press, agitators, valves, pumps, compressors and other material handling machines in Rare Earth (RE) chemical plant

Scope

The scope covers the following :

- Install the processing and conveying equipment
- Operations and Maintenance procedures

Elements and Performance Criteria

Install the processing and conveying equipment

To be competent, the user/individual on the job must be able to:

PC1. install and commission required mechanical components of equipment like grinding equipment, digesters, precipitation and crystallization set ups, filters press, mixer settlers, associated with the chemical plant

PC2. carry out various assembly of equipments in chemical plant processing, material handling etc

Operations and Maintenance procedures

To be competent, the user/individual on the job must be able to:

PC3. service, diagnose and repair faults in mechanical systems such as gears, pumps, agitators valves, mixer settlers etc.

PC4. ensure proper protective enclosures are provided for rotating parts, drives, belts etc. and that the locking bar is in position to prevent accidental movements and creation of crushing zone

PC5. ensure that no maintenance work is performed on the machine/engine when it is in hazardous condition (e.g. still running, or still hot, or having corrosive chemical spilled over, etc.)

PC6. test the equipment after it has been attended for maintenance, to ensure everything is working correctly and safely (this may include load testing, vibration testing etc.)

PC7. carry out predictive, preventive and break down maintenance for the processing, conveying and other related support equipments such as pumps, valves pipelines etc. as per the frequency suitable to the chemical plants

PC8. diagnose malfunctioning systems, apparatus or components using test equipment and hand tools to locate the cause of a breakdown - rectify the problem and test the systems for proper functioning

PC9. operate and maintain the processing and conveying equipment and maintain records as required in RE chemical plants

PC10. take precautions to avoid health and safety hazards

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. different types of chemical factories and detail of the plant
KU2. plant organisation, time keeping, need for discipline and punctuality
KU3. about fencing, guarding, spillage control, etc.
KU4. risk and impact of not following defined procedures/ daily maintenance checklist
KU5. types of anti-corrosive materials and coatings etc. used in processing and conveying equipment enclosures, accessories etc.
KU6. precaution about corrosive liquids, gases that exist in the RE chemical plant
KU7. use of flameproof equipment/enclosures
KU8. importance of First aid and Hygiene
KU9. provision of wages, working hours and accident compensation as per Atomic Energy Factory Rule-1996 (AEFR-1996)
KU10. various types of chemical processes carried out in the plant
KU11. general operation of Grinding equipment, Digesters, Precipitation & Crystallization set ups, Filters, Mixer Settlers, associated with the RE chemical plant
KU12. RE chemical plant safety procedures
KU13. processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution
KU14. quality norms prescribed by the organization

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any) related to the mechanical components etc. and share the same with the supervisor
GS2. read and interpret symbols, readings and information documents
GS3. read equipment manuals and process documents to understand the equipments and processes better
GS4. read internal information documents sent by internal sources
GS5. write information documents to internal departments/ internal teams or enter the information in online Enterprise Resource Planning (ERP) systems under guidance of the supervisor
GS6. discuss task lists, schedules and activities with the supervisor
GS7. effectively communicate, listen and comprehend the information given by various sources about the site
GS8. make decisions pertaining to the concerned area of work and in emergency conditions
GS9. plan and organize the work order and tasks
GS10. detect problems in day to day tasks
GS11. support supervisor in using specific problem-solving techniques and detailing out the problems

GS12. complete the job defined by the supervisor within the timelines and quality norms

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Install the processing and conveying equipment	**6**	**10**	**-**	**4**
PC1. install and commission required mechanical components of equipment like grinding equipment, digesters, precipitation and crystallization set ups, filters press, mixer settlers, associated with the chemical plant	3	5	-	2
PC2. carry out various assembly of equipments in chemical plant processing, material handling etc	3	5	-	2
Operations and Maintenance procedures	**24**	**40**	**-**	**16**
PC3. service, diagnose and repair faults in mechanical systems such as gears, pumps, agitators valves, mixer settlers etc.	3	5	-	2
PC4. ensure proper protective enclosures are provided for rotating parts, drives, belts etc. and that the locking bar is in position to prevent accidental movements and creation of crushing zone	3	5	-	2
PC5. ensure that no maintenance work is performed on the machine/engine when it is in hazardous condition (e.g. still running, or still hot, or having corrosive chemical spilled over, etc.)	3	5	-	2
PC6. test the equipment after it has been attended for maintenance, to ensure everything is working correctly and safely (this may include load testing, vibration testing etc.)	3	5	-	2
PC7. carry out predictive, preventive and break down maintenance for the processing, conveying and other related support equipments such as pumps, valves pipelines etc. as per the frequency suitable to the chemical plants	3	5	-	2
PC8. diagnose malfunctioning systems, apparatus or components using test equipment and hand tools to locate the cause of a breakdown - rectify the problem and test the systems for proper functioning	3	5	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. operate and maintain the processing and conveying equipment and maintain records as required in RE chemical plants	3	5	-	2
PC10. take precautions to avoid health and safety hazards	3	5	-	2
NOS Total	**30**	**50**	**-**	**20**

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Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3208
NOS Name	Unique requirements for installing, mechanical maintenance, and repair of equipments in Rare Earth (RE) Chemical plant
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Mechanical Services
NSQF Level	3
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3209: Troubleshooting and repair/ maintenance of UG mine equipment/machineries

Description

This OS unit is about troubleshooting and repair/ maintenance of UG mine equipments/machineries such as ventilation fan, booster fan, power support, winding drum, skip system, haulage system, chute etc.

Scope

The scope covers the following :

- Perform troubleshooting and repair/ maintenance of UG mine equipments/machineries

Elements and Performance Criteria

Perform troubleshooting and repair/ maintenance of UG mine equipment/machineries

To be competent, the user/individual on the job must be able to:

PC1. conduct maintenance of the compressor of UG mine equipment, so that it operates properly and generates required output

PC2. check and perform basic maintenance and troubleshooting of winding engine drum and its various equipments such as rope joint, slings, cage, skip etc.

PC3. check and perform maintenance of ventilation fan, booster fan and its various sub-parts

PC4. identify and repair/reduce the air pressure loss in the ventilation system

PC5. check and repair any fault in the hoisting or winding system such as head-frame or head-gear, rope equipments and their various safety devices

PC6. perform maintenance/repair of the track and mine car if required

PC7. conduct the repairs/install of the various support system used in the mines such as hydraulic power support, rope support, steel props, shield support, rock bolting and its supporting equipments

PC8. perform various repairs of the haulage system such as various rope haulage, rail and track mounted rope haulage and other fittings etc.

PC9. ensure proper working of all safety systems used in the mines

PC10. repair the various pumps and their supporting equipment/structure

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. job-specific documents e.g. daily maintenance checklist and importance of the same

KU2. risk and impact of not following defined procedures/work instructions

KU3. the hierarchy for reporting identified problems

KU4. cost of equipment and loss for the company that results from damage of equipment

KU5. implications of delays in the process

KU6. handover and takeover procedures of the mine fitter/mechanic according to company's SOP
KU7. safety guidelines specified by Directorate General of MInes Safety (DGMS) specific to various equipments used in the mines
KU8. different types of mines and detail of the mine one is working in
KU9. importance of first aid and hygiene
KU10. code of practice in specific areas of the mine
KU11. standing orders in force at the mine
KU12. importance of safety in the vicinity of machinery
KU13. about shot-firing/blasting related safety regulations including taking shelter during blasting
KU14. duties of workmen under the Mines Act-1952
KU15. provision of compensation and working hours, leaves, etc. as per Mines Act-1952
KU16. the outcome of violation of safety procedures
KU17. use of the compressor in mines and its various parameters for required output
KU18. various types of winding engine drum/system and its various equipments such as rope joint, slings, cage, skip etc.
KU19. importance of ventilation fan, booster fan and its various sub-parts and its impact by changing various parameters
KU20. standard mine ventilation parameter as per the DGMS
KU21. various types of the hoisting or winding system such as head-frame or head-gear, rope equipments and their various safety devices and theirs uses
KU22. use of various tools for repairing/installing the track and mine car and its applications
KU23. various support system used in the mines such as hydraulic power support, rope support, steel props, shield support, rock bolting and its supporting equipment and their importances
KU24. various haulage system such as various rope haulage, rail and track mounted rope haulage, and other fittings etc.
KU25. various types of pump used for dewarting and its supporting equipments

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any)
GS2. read and interpret symbols and readings
GS3. read information documents
GS4. discuss task lists, schedules and activities
GS5. effectively communicate, listen and comprehend the information given by various sources about the site
GS6. make decisions pertaining to the concerned area of work
GS7. plan and organize the work order and tasks
GS8. organize all operation and service manuals so that sorting/ accessing information is easy
GS9. detect problems in day to day tasks
GS10. discuss possible solution with the supervisor for problem solving

GS11. make decisions in emergency conditions
GS12. follow instructions and work on areas of improvement identified
GS13. complete the assigned tasks timely
GS14. use reasoning skills to identify and resolve basic problems
GS15. analyze and detect any potential problems which could arise during operation
GS16. respect persons with disabilities
GS17. be sensitive towards all genders

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform troubleshooting and repair/ maintenance of UG mine equipment/machineries	**30**	**50**	**-**	**20**
PC1. conduct maintenance of the compressor of UG mine equipment, so that it operates properly and generates required output	3	5	-	2
PC2. check and perform basic maintenance and troubleshooting of winding engine drum and its various equipments such as rope joint, slings, cage, skip etc.	3	5	-	2
PC3. check and perform maintenance of ventilation fan, booster fan and its various sub-parts	3	5	-	2
PC4. identify and repair/reduce the air pressure loss in the ventilation system	3	5	-	2
PC5. check and repair any fault in the hoisting or winding system such as head-frame or head-gear, rope equipments and their various safety devices	3	5	-	2
PC6. perform maintenance/repair of the track and mine car if required	3	5	-	2
PC7. conduct the repairs/install of the various support system used in the mines such as hydraulic power support, rope support, steel props, shield support, rock bolting and its supporting equipments	3	5	-	2
PC8. perform various repairs of the haulage system such as various rope haulage, rail and track mounted rope haulage and other fittings etc.	3	5	-	2
PC9. ensure proper working of all safety systems used in the mines	3	5	-	2
PC10. repair the various pumps and their supporting equipment/structure	3	5	-	2
NOS Total	**30**	**50**	**-**	**20**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3209
NOS Name	Troubleshooting and repair/ maintenance of UG mine equipment/machineries
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Mechanical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3210: Perform repair and maintenance of crusher and it's equipments

Description

This OS unit is about repair and maintenance of various types of crushers and it's various crushing equipments such as conveyor, chute, etc.

Scope

The scope covers the following :

- Perform repair and maintenance of various types of crushers and it's equipments

Elements and Performance Criteria

Perform repair and maintenance of various types of crushers and it's equipments

To be competent, the user/individual on the job must be able to:

PC1. discuss various types of crusher and their crushing principle

PC2. identify the important components of a jaw crusher, cone crusher, etc

PC3. check different types of crushing principal components such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays etc.

PC4. conduct maintenance of the crushing plant

PC5. perform daily checking of plant as per check-list followed by organization

PC6. change stoke and re- assembly properly

PC7. check and replace thrust plate of the crusher

PC8. perform replacement of various worn out parts of the crusher

PC9. replace main shaft protection sleeve of the crusher

PC10. install upper frame assembly of various crusher

PC11. replace various worn out parts of vibrating screen, feeder, conveyor etc.

PC12. test samples, materials or products to ensure compliance with Indian standard (IS) specifications

PC13. conduct operational checks on areas of potential issues like unusual noises/smells, blockages and obstruction, leaks etc. and take corrective actions if required

PC14. check indicators that signal need for replacement

PC15. replenish coolants, lubricants, fluids and screeners as and when required

PC16. follow the safe code of practice for erection, installation, operation, repairs, maintenance, dismantling of plant and ancillary equipments

PC17. identify missing or defective components or controls and replace them with genuine OEM recommended components

PC18. check oil, fuel tanks for leaks and take necessary actions as per the operational manual

PC19. lubricate all the moving parts at regular intervals

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. job-specific documents e.g. daily maintenance checklist and importance of the same
KU2. risk and impact of not following defined procedures/work instructions
KU3. the hierarchy for reporting identified problems
KU4. cost of equipment and loss for the company that results from damage of equipment
KU5. implications of delays in the process
KU6. handover and takeover procedures of the mine fitter/mechanic according to company's SOP
KU7. safety guidelines specified by Directorate General of MInes Safety (DGMS) specific to various equipment used in the mines
KU8. different types of mines and detail of the mine one is working in
KU9. importance of first aid and hygiene
KU10. code of practice in specific areas of the mine
KU11. standing orders in force at the mine
KU12. importance of safety in the vicinity of machinery
KU13. about shot-firing / blasting related safety regulations including taking shelter during blasting
KU14. duties of workmen under the Mines Act-1952
KU15. provision of compensation and working hours, leaves, etc. as per Mines Act-1952
KU16. different types of crusher and their importance
KU17. different types of crushing principal components, such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays etc.
KU18. different types of screening equipment like drive mechanism, balance wheel, rocker arms, conveyor belts, guards, etc.
KU19. hazards and safety aspects involved in ore processing activities and usage of relevant PPEs
KU20. various types of feed arrangement of the crusher

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any)
GS2. read and interpret symbols and readings
GS3. read information documents
GS4. discuss task lists, schedules and activities
GS5. effectively communicate, listen and comprehend the information given by various sources about the site
GS6. make decisions pertaining to the concerned area of work
GS7. plan and organize the work order and tasks
GS8. organize all operation and service manuals so that sorting/ accessing information is easy
GS9. detect problems in day to day tasks

GS10. discuss possible solution with the supervisor for problem solving
GS11. make decisions in emergency conditions
GS12. follow instructions and work on areas of improvement identified
GS13. complete the assigned tasks timely
GS14. use reasoning skills to identify and resolve basic problems
GS15. analyze and detect any potential problems which could arise during operation
GS16. respect persons with disabilities
GS17. be sensitive towards all genders

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform repair and maintenance of various types of crushers and it's equipments	**30**	**50**	**-**	**20**
PC1. discuss various types of crusher and their crushing principle	2	3	-	1
PC2. identify the important components of a jaw crusher, cone crusher, etc	2	3	-	1
PC3. check different types of crushing principal components such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays etc.	2	3	-	1
PC4. conduct maintenance of the crushing plant	2	2	-	1
PC5. perform daily checking of plant as per check-list followed by organization	2	3	-	1
PC6. change stoke and re- assembly properly	2	3	-	1
PC7. check and replace thrust plate of the crusher	1	3	-	1
PC8. perform replacement of various worn out parts of the crusher	2	3	-	1
PC9. replace main shaft protection sleeve of the crusher	1	3	-	1
PC10. install upper frame assembly of various crusher	2	3	-	1
PC11. replace various worn out parts of vibrating screen, feeder, conveyor etc.	1	3	-	1
PC12. test samples, materials or products to ensure compliance with Indian standard (IS) specifications	2	2	-	1
PC13. conduct operational checks on areas of potential issues like unusual noises/smells, blockages and obstruction, leaks etc. and take corrective actions if required	1	3	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. check indicators that signal need for replacement	2	2	-	1
PC15. replenish coolants, lubricants, fluids and screeners as and when required	1	3	-	1
PC16. follow the safe code of practice for erection, installation, operation, repairs, maintenance, dismantling of plant and ancillary equipments	1	2	-	1
PC17. identify missing or defective components or controls and replace them with genuine OEM recommended components	2	2	-	1
PC18. check oil, fuel tanks for leaks and take necessary actions as per the operational manual	1	2	-	1
PC19. lubricate all the moving parts at regular intervals	1	2	-	2
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3210
NOS Name	Perform repair and maintenance of crusher and it's equipments
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Mechanical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/ 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 Element/ PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.

6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N3211.Perform installation and preventive maintenance of commonly used mining machinery/equipment	30	50	-	20	100	40
MIN/N3212.Perform troubleshooting and repair of commonly used mine machineries/equipment	30	50	-	20	100	30
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	10
Total	**80**	**130**	**-**	**40**	**250**	**80**

Elective: 1 U/G Metal

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1702.Follow Health, Safety, and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)	30	50	0	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Elective: 2 Opencast

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1703.Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)	30	50	-	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Elective: 3 U/G Coal

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1704.Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)	30	50	-	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Elective: 4 Rare Earth Plant

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1705.Health & Safety for RE Chemical plant	30	50	-	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Optional: 1 Rare Earth Installation

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N3208.Unique requirements for installing, mechanical maintenance, and repair of equipment for Rare Earth (RE) chemical plant	30	50	-	20	100	40
Total	**30**	**50**	**-**	**20**	**100**	**40**

Optional: 2 Repair-U/G

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N3209.Troubleshooting and repair/ maintenance of UG mine equipment/machineries	30	50	-	20	100	40
Total	**30**	**50**	**-**	**20**	**100**	**40**

Optional: 3 Crusher

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N3210.Perform maintenance and troubleshooting of crusher and their various crushing equipments	30	50	-	20	100	40
Total	**30**	**50**	**-**	**20**	**100**	**40**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business 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.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (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 (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications 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.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation 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/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment 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.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.