



NATIONAL OCCUPATIONAL STANDARD FOR MINING BLASTER

**NOS.MB.01
FIRST EDITION**

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board on 7th May, 2021.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards shall be revised every after **5 years**, or whenever necessary, by the issue of either amendments or of revised editions. It is important that users of National Occupational Standards (NOS) should ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Mining National Occupational Standards Development Team, upon which the following organisations were represented:

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10. Northern Technical College
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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Higher Education established by ZAQA Act No. 13 of 2011 to “**provide for the development and implementation of a national qualifications framework; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing**”.

Among other functions, ZAQA is responsible for “**determining national standards for any occupation**”, through various sector specific National Occupational Standards Development Teams (NOSDTs) of experts composed of representation from appropriate authorities, government departments, industry, academia, regulators, consumer associations and non-governmental organisations, etc.

This National Occupational Standard (NOS) has been developed by the Mining National Occupational Standards Development Team in accordance with the procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as National Occupational Standards are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula and learning programmes, in various sectors where the occupation exists. In the Mining sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

Blasting is a very important operation in mining; because it is certainly the only economic way to break up hard rocks. Blasting is a process of reducing a solid body, such as rock, to fragments by using an explosive. Conventional blasting operations include drilling holes, placing a charge and detonator in each hole, detonating the charge, and clearing away the broken material. However, the process comes with serious risks to blasting personnel and other mine workers, as well as equipment. Both harm to people and equipment can happen if anything or anyone is hit with the flying rock. The other risk associated with blasting in mines is the smoke and fumes that are created.

Therefore, it is of paramount importance that Mining Blasters are adequately and properly trained in order to reinforce safety for themselves, other mine workers and equipment.

This National Occupational Standard highlights core knowledge, skills/competences and personal attributes that Mining Blasters must possess to be successful in their jobs.

ACRONYMS AND ABBREVIATIONS

CS	Core Skill
MB	Mining Blaster
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organisational Knowledge
PC	Performance Criteria
PS	Professional Skill
RK	Regulatory Knowledge
RPL	Recognition of Prior Learning
TK	Technical Knowledge
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Blasting: is the act of detonating holes charged with explosives for the purpose of fragmenting virgin ground or boulders at any mine or works.

Core Skills/Generic Skills: are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

Function: is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.

Job Title: defines a unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: 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.

National Occupational Standards (NOS): are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: is a unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): means an established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: is a set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: includes the way the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: are statements that together specify the standard of performance required when carrying out a task.

Scope: is the 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 the quality of performance required.

Sector: is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub Sector: is derived from a further breakdown based on the characteristics and interests of its components.

Technical Knowledge: is the specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: gives a clear overall statement about what the incumbent should be able to do.

1. OVERVIEW

This is an introductory section providing a brief summary and specific information or commentary about the content of the NOS and the targeted sector and occupation to help the user judge whether it is relevant to them.

NOS Code	NOS.MB.01
Occupation	Mining Operations
Job Title	Mining Blaster
Job Description	A Mining Blaster, also known as Shot Firer, uses explosives to break or dislodge rocks, demolish structures and large earth masses
Job Purpose	The Mining Blaster handles and uses explosives to fragment rocks in a mine. He is also responsible for transporting, storing and destroying explosives as prescribed by Mining and Explosives Regulations.
ZQF Level	3
Sector	Mining
Sub sector	Underground and Opencast Mines
Other Economic Sector(s) in which the Occupation is Practiced	Construction
Other Similar Jobs that can be performed by the Mining Blaster	Explosives Handler/Supervisor, Blasting Manager/Person in Charge (PIC), Blasting Technician, Magazine Master, Explosives Transporter Foreman, etc.
Minimum Educational Job Entry Qualification(s)	Grade 12 Certificate
Practicing License Requirements (if any)	Blasting License and membership with the Engineering Institution of Zambia.
Training/RPL (Suggested)	1. Latest blasting techniques and materials 2. Mine and blasting safety 3. 5S workplace organisation methods 4. First Aid Training 5. PIC Training (Basic Training)
Minimum Job Entry Age	21
Prior Experience (Suggested)	1-2 years as blasting helper
Performance Criteria	As described in the Units under Section 4

2. SCOPE

This National Occupational Standard specifies the fundamental knowledge and understanding, skills and competences that Mining Blasters must possess to be successful in their jobs.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

This job requires an individual to possess the ability to plan and prioritise, quality consciousness, safety orientation, physique to withstand strenuous conditions, good eye sight, high precision and sensitivity to problem solving and towards safety for self, others and equipment, good communication skills, as well as ability to use fingers, hands and feet with ease to complete the assigned task (dexterity), etc.

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into 3 units representing the tasks that a job holder should undertake in his/her day to day work. Each unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

UNIT 1 [This unit is about demonstrating competence to carry out preparatory activities for blasting. The unit covers receiving explosive materials from store and/or delivery vehicle, handling explosive materials on-site, determining blast requirements and designing and arranging authorisation for blast specification].

Unit No.	01
Unit Title	Receive and handle explosive materials on-site
Description	This unit is about demonstrating competence to receive and handle explosive materials. It covers receiving explosive materials from store and/or delivery vehicle, handling explosive materials on-site, determining blast requirements and designing and arranging authorisation for blast specification
Scope	This unit covers the following: <ul style="list-style-type: none"> • Receive and handle explosive materials on-site • Determine the blasting requirements • Must be able to read and implement Charging and Blast Design as recommended and authorised by the Drill & Blasting Engineer • Storage and Issue of explosives in and from approved facilities
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Receive and handle explosive materials on-site	To be competent, the individual must be able to: PC1. Obtain all explosive materials correctly and ensure conformity with the requirements of the guide to the explosive regulations and in-house blasting specifications. PC2. complete the records accurately and make them available to authorised persons PC3. handle the explosive materials and move safely in accordance with operational and organisational procedures and relevant legislation requirements PC4. contain all explosive materials safely and securely and take precautions to avoid any loss or damage PC5. separate the explosives and detonators and handle them in conformity with operational and organisational rules and procedures and in accordance with relevant legislation PC6. use approved routes when transporting explosive materials PC7. display relevant danger notices in conformity with operational and organisational rules and procedures and with relevant legislation
Determine the blasting requirements	To be competent, the individual must be able to: PC8. be aware of the location and area for blasting and requirements to conform to the overall development plans of the site PC9. be aware of the geotechnical characteristics and confirm with the relevant persons (e.g. manager; explosives supervisor; blasting team; contractors: geotechnical/ geology specialists) and the operational requirements PC10. survey the geological makeup of the ground and mineral strata visually and evaluate for matching with the specified requirements PC11. identify the geological anomalies of the blast site visually and take into account in the blast design

	<p>PC12. collect and record the dimensional information in accordance with the blast specification requirements</p> <p>PC13. ensure that the output of the blast is confirmed to meet with the site requirements</p> <p>PC14. determine the extent of the blast from the production requirements, the fragmentation and geological makeup of the ground and mineral strata, face provision and availability and drill size</p> <p>PC15. be aware of the effects of a blast on plant, buildings, external features and the surrounding environment</p> <p>PC16. be aware of the drill plan</p> <p>PC17. identify the potential hazards and danger sources and record in the blast specification</p> <p>PC18. carry out the work to approved procedures and practices and in compliance with statutory requirements</p>
<p>Design and arrange for authorisation of the blast specifications</p>	<p>To be competent, the individual must be able to:</p> <p>PC19. collect information from previous blasts at the site and examine and evaluate information in determining the blast design</p> <p>PC20. analyse constraints and capabilities of plant and equipment used for moving and processing mineral materials and factor the same in the blast design</p> <p>PC21. determine types of explosive materials, method of initiation and blasting system and clearly stipulate in accordance with operational and organisation rules and procedures and compliance with legislative requirements</p> <p>PC22. ensure rules and procedures for the storing, transporting and handling of explosives are clearly established which comply with legislative requirements</p> <p>PC23. ensure that requirements for safety and security of the blast operations are clearly identified and communicated</p> <p>PC24. obtain authorisation of the blast specification in accordance with operational and organisational rules and procedures and comply with legislative requirements</p> <p>PC25. communicate the agreed upon blast specifications to concerned stakeholders, in accordance with operational and organisational rules and procedures and comply with legislative requirements</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organisational Context (Knowledge of the company/ organisation and its processes)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. relevant standards and procedures followed in the company</p> <p>OK2. different types of electrical requirements at the mine</p> <p>OK3. processes like procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>OK4. Blasting Engineer, Mine Planning Engineer and Geotechnical Engineer, MSD guidelines/Safety Letter</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. responsibilities of a blaster according to Explosives Regulation 833</p>

	<p>TK2. types of initiating systems</p> <p>TK3. effects on blast performance of variations in blast specification</p> <p>TK4. approved procedures and practices in the context of the operations, the work activity and the workplace environment to include organisational; environmental; regulatory; emergency and operational</p> <p>TK5. The different types of explosives, their strength and characteristics to include explosives</p> <p>TK6. relevant legislation associated to the handling and movement of explosives</p> <p>TK7. how to recognise detonator types and delays</p> <p>TK8. the operational and organisational procedures and practices for handling and transport of explosives</p> <p>TK9. the requirements for checking explosives type and condition</p> <p>TK10. reasons for, and location of, specified routes to be used when transporting explosive materials</p> <p>TK11. relevant geotechnical information at the blast site and information on geotechnical; mine gas classification category and Sources of mine Heat</p> <p>TK12. digging/loading capability of blast site loading equipment</p> <p>TK13. strength and formation of mineral strata</p> <p>TK14. the potential dangers/ hazards during transportation</p> <p>TK15. safety procedures when loading and unloading explosive materials</p> <p>TK16. the manufacturer's recommendations for handling explosives and detonators</p> <p>TK17. relevant legislation associated to the transport of explosives</p> <p>TK18. dangers associated with environmental conditions</p> <p>TK19. dangers of induced currents from external sources</p>
<p>C. Regulatory context (Knowledge of Mines Safety Rules and Regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. regulations regarding explosives that guide on his appointment, manufacturing, use, possession, storage, importation, exportation, transportation and destruction of explosives as guided by the explosives regulations of Zambia</p> <p>RK2. different types of mines (opencast and underground) ,mine organisation, time keeping, need for discipline and punctuality</p> <p>RK3. benching in quarries/ open cast mines, dressing of overhangs, undercuts, fencing, first aid and hygiene</p> <p>RK4. standing orders in force at the mine, safety in the vicinity of machinery</p> <p>RK5. Shot-firing and safety regulations, how and where to take shelter</p> <p>RK6. duties of workmen/ helpers</p> <p>RK7. provision of wages, working hours and applicable Government legislation and regulations</p> <p>RK8. mining safety procedures</p> <p>RK9. Consequences of violating safety procedures</p>

Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. note down observations (if any) CS2. prepare information (in official language) documents or enter the information in online enterprise resource planning systems under guidance of the supervisor
	Reading Skills
	The individual on the job must be able to: CS3. read and interpret symbols and measurements CS4. read and comprehend information documents CS5. read and analyse the available data about the site
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS6. discuss task lists, schedules and activities with the supervisor and co-workers CS7. effectively communicate with the supervisor and other team members CS8. listen attentively and comprehend the information given by various sources about the site
	Plan and Organise
	The individual on the job must be able to: PS1. plan and organise the work order received and jobs received from supervisor/ internal teams PS2. organise all process manuals so that sorting out/ accessing information is easy PS3. support the supervisor in scheduling tasks for helpers
B. Professional Skills	Judgment and Critical Thinking
	The individual on the job must be able to: PS4. use common sense and make judgments on day to day basis PS5. use reasoning skills to identify and resolve basic problems PS6. use intuition to detect any potential problems which could arise during operations
	Desire to Learn and Take Initiatives
	The individual on the job must be able to: PS7. follow instructions and work on areas of improvement identified PS8. complete the assigned tasks with minimum supervision PS9. complete the job defined by the supervisor within the agreed timelines and quality norms
B. Professional Skills	Problem Solving and Decision Making
	The individual on the job must be able to: PS10. detect problems in day to day tasks PS11. discuss possible solutions to address problems, with the supervisor PS12. support supervisor in using specific problem solving techniques and detailing out the problems PS13. make decisions in emergency conditions in the absence of the supervisor (as per the authority matrix defined by the organisation)

UNIT 2 [This unit is about demonstrating competence to charge blast holes and blasting to specifications. The unit also deals with the handling of misfires].

Unit No.	02
Unit Title	Charge blast holes, blast to specifications and deal with misfires
Description	The unit covers checking blast sites, drilled holes, charging, completing and checking the initiation circuit, clearing and securing the danger zone, sounding warning and blasting. Thereafter, inspecting blast site after detonation, handling of misfires, taking remedial action with misfires and recovering explosive materials.
Scope	This unit covers the following: <ul style="list-style-type: none"> • Charging blast holes to specifications • Blasting to specifications • Dealing with misfires
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Charge blast holes to specifications	To be competent, the individual must be able to: <p>PC1. examine each blast hole is checked for condition, dimension, angle, inclination and direction, as appropriate, to ensure it is suitable for charging to the blast specification</p> <p>PC2. identify, record and report any variations to the blasting specification and confirm with the appropriate persons</p> <p>PC3. prepare the required quantities of explosives in accordance with the blast specification</p> <p>PC4. examine the explosives to ensure they conform, in quantity and type, to the blasting specification</p> <p>PC5. charge the blast holes in accordance with the blasting specification</p> <p>PC6. place detonators and primers accurately in conformity with the blasting specification</p> <p>PC7. identify and report the variations between the specification and the actual conditions at the time of charging in conformity with operational and organisational rules and procedures</p> <p>PC8. return the explosive materials which are surplus to requirements to store and correctly package and label and maintain the records</p> <p>PC9. interpret and implement the approved procedures and practices for disposal of surplus materials</p>
Blast to specifications	To be competent, the individual must be able to: <p>PC10. connect the ignition system for the explosive accurately in conformity with the blast specification</p> <p>PC11. protect the connections against adverse environmental conditions, premature ignition and mechanical damage</p> <p>PC12. implement operational safety procedures whilst preparing the initiation circuit and connecting the ignition system in conformity with approved procedures and practices</p> <p>PC13. check the ignition system and initiation sequences thoroughly in accordance with operational and organisational rules and procedures and relevant legislation</p>

	<p>PC14. clear and secure the specified danger zone effectively in compliance with operational and organisational rules and procedures and the blast specification</p> <p>PC15. provide clear notification to public of intention to fire the explosive</p> <p>PC16. maintain security of exploder in compliance with relevant explosives regulations, operational and organizational rules and procedures</p> <p>PC17. fire the explosive when all safety precautions have been taken and verified</p> <p>PC18. inspect the blast area (including where applicable, the face, crest and pile) thoroughly in accordance with site rules and operational procedures</p> <p>PC19. provide the all clear on satisfaction that the area is safe and the blasting operation is complete</p> <p>PC20. record the type and quantity of explosive materials and means of initiation in accordance with organisational and operational procedures</p>
<p>Deal with misfires</p>	<p>To be competent, the individual must be able to:</p> <p>PC21. identify and classify misfires correctly and communicate to appropriate person(s)</p> <p>PC22. clearly mark the located misfire in accordance with operational and organisational rules and procedures</p> <p>PC23. secure the exclusion zone in conformity with operational and organisational rules and procedures</p> <p>PC24. record and report the method of dealing with the misfire clearly and accurately in accordance with operational and organisational procedures</p> <p>PC25. secure the area of recovery for unexploded explosive and isolate until recovery has been carried out and the area made safe</p> <p>PC26. ensure that the method of recovery used for unexploded charges minimises the risk of accidental initiation and is in conformity with operational and organisational rules and procedures for misfires</p> <p>PC27. ensure that explosives and detonating devices are recovered and disposed of correctly and safely</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organisational Context (Knowledge of the company/ organisation and its processes)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. relevant standards and procedures followed in the company</p> <p>OK2. different types of electrical requirements at the mine</p> <p>OK3. processes like procurement, store management, inventory management, quality management and key contact points for query resolution</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. responsibilities of a blaster according to Explosives Regulations (833) and (836)</p> <p>TK2. types of initiating systems</p> <p>TK3. types of detonating devices and explosives used</p> <p>TK4. delayed detonators and how the delay is created</p>

	<p>TK5. how to identify and deal with faults that cannot be rectified</p> <p>TK6. types of approved circuit testers</p> <p>TK7. initiation sequences for blasting patterns and the possible effects on the time delay period between individual charges</p> <p>TK8. blast patterns</p> <p>TK9. circuit testing for electrical initiation</p> <p>TK10.types of initiation and premature ignitions</p> <p>TK11.types and uses of blasting/ shot-firing equipment</p> <p>TK12.causes of and dangers from fly-rock</p> <p>TK13.warning systems deployed at the blast site (e.g. site radio; siren; flags; hand signals and warning signs)</p> <p>TK14.the issues likely to arise from the blast operation</p> <p>TK15.recognition of various types and causes of misfires, their avoidance and any other relevant action to be taken</p> <p>TK16.hazards associated with misfires and unexploded charges</p> <p>TK17.reasons for post blast slippage of ground and its effects</p> <p>TK18.dangerous effects of fumes created by blasting</p> <p>TK19.acceptable conditions for the post blast area (including when to access the face, crest or pile areas)</p> <p>TK20.understand the monitoring process for recordings of ground vibration/air over pressure</p> <p>TK21.systematic testing to reveal location of faults in a circuit</p> <p>TK22.recognition of undisturbed ground and indications of unfired charges after blasting</p> <p>TK23.calibration requirements for exploders</p> <p>TK24.marking of misfires</p> <p>TK25.safe methods of handling and disposal of explosive materials recovered from the site</p> <p>TK26.desensitisation of bulk/ loose grain explosives</p> <p>TK27.the approved procedures and practices in the context of the operations, the work activity and the workplace environment to include organisational; environmental; regulatory; emergency and operational)</p> <p>TK28.the responsibilities of blaster and others under the health and safety statutory requirements</p> <p>TK29.the relevant legislation associated to the handling and movement of explosives</p> <p>TK30.how to recognise detonator types and delays</p> <p>TK31.the operational and organisational procedures and practices for handling and transport of explosives</p> <p>TK32.the requirements for checking explosives type and condition</p> <p>TK33.the dangers of induced currents from external sources</p> <p>TK34. precautions for blasting as per weather conditions, for opencast mining</p> <p>TK35. various types of blasting hazards</p> <p>TK36. free face and its importance</p> <p>TK37. environmental effects of blasting; ground vibration, noise, dust, fumes and flying fragments, including the need to control the effects and precautions to be taken</p> <p>TK38. carrying out muffle blasting</p> <p>TK39. misfire sockets and blown-outs</p>
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	<p>TK40. checking and clearing of choked holes before charging/loading</p> <p>TK41. use of bulk industrial explosives by bulk loading systems</p> <p>TK42. charging of holes in watery strata, hot strata and in bad weather</p> <p>TK43. blasting schedule/times.</p> <p>TK44. Primary & Secondary Blasting (Exp. Regs. 831, 832), Blasting Schedule (Min. Reg. 926) (833 & 836)</p>
<p>C. Regulatory context (Knowledge of Mines Safety Department Rules and Regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Critical regulations regarding explosives that guide on use, possession, storage, and destruction of explosives as guided by the explosives regulations of Zambia.</p> <p>RK2. mine organisation, time keeping, need for discipline and punctuality</p> <p>RK3. benching in quarries/ open cast mines, dressing of overhangs, undercuts, fencing, first aid and hygiene</p> <p>RK4. standing orders in force at the mine, safety in the vicinity of machinery</p> <p>RK5. shot-firing and safety regulations, how and where to take shelter</p> <p>RK6. duties of workmen/ helpers</p> <p>RK7. provision of wages, working hours and accident compensation as per Mines and Minerals Act and Workers' Compensation Act</p> <p>RK8. mining safety procedures</p> <p>RK9. impact of violating safety procedures</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The individual on the job must be able to:</p> <p>CS1. note down observations (if any)</p> <p>CS2. prepare information (in Official Language) documents or enter the information in online enterprise resource planning systems under guidance of the supervisor</p> <p>Reading Skills</p> <p>The individual on the job must be able to:</p> <p>CS3. read and interpret symbols and measurements</p> <p>CS4. read and comprehend information documents</p> <p>CS5. read and analyse the available data about the site</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The individual on the job must be able to:</p> <p>CS6. discuss task lists, schedules and activities with the supervisor and co-workers</p> <p>CS7. effectively communicate with the supervisor and other team members</p> <p>CS8. listen attentively and comprehend the information given by various sources about the site</p>

B. Professional Skills	Plan and Organise
	The individual on the job must be able to: PS1. plan and organise the work order received and jobs received from supervisor/ internal teams PS2. organise all process manuals so that sorting out/ accessing information is easy PS3. support the supervisor in scheduling tasks for helpers
	Judgment and Critical Thinking
	The individual on the job must be able to: PS4. use common sense and make judgments on day to day basis PS5. use reasoning skills to identify and resolve basic problems PS6. use intuition to detect any potential problems which could arise during operations
	Desire to Learn and Take Initiatives
The individual on the job must be able to: PS7. follow instructions and work on areas of improvement identified PS8. complete the assigned tasks with minimum supervision PS9. complete the job defined by the supervisor within the agreed timelines and quality norms	
Problem Solving and Decision Making	
The individual on the job must be able to: PS10. detect problems in day to day tasks PS11. discuss possible solutions to address problems, with the supervisor PS12. make decisions in emergency conditions in the absence of the supervisor (as per the authority matrix defined by the organisation)	

UNIT 3 [This unit is about maintaining health and safety measures critical in mines].

Unit No.	03
Unit Title	Maintain health and safety
Description	This unit is about maintaining health and safety measures critical in mines
Scope	This unit covers the following: <ul style="list-style-type: none"> • Maintain health and safety measures critical in mines
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Maintain health and safety measures critical in mines	To be competent, the individual must be able to: PC1. comply with occupational health and safety regulations adopted by the employer PC2. adhere to mining operation procedures with respect to workplace health and safety PC3. follow the correct safety steps in case of accidents or major failure PC4. comply with safety regulations and procedures in case of fire hazards PC5. operate various types of fire extinguishers PC6. work responsibly and as safely and carefully as possible so as not to put the health and safety of self or others at risk, including members of the public and Equipment. PC7. perform storage and transportation of hazardous materials compliant with safety guidelines prescribed by The guide to Explosives Regulations PC8. deal with misfires as per statutory requirements PC9. identify characteristics of post-blast fumes and take necessary precautions PC10. wear safety gear such as hardhat, respiratory protection, eye protection, ear protection PC11. adhere to manufacturer’s instructions for care and safe operation of the equipment
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. relevant standards and procedures followed in the company OK2. different types of safety requirement at the mine OK3. processes like procurement, store management, inventory management, quality management and key contact points for query resolution
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. mine regulations regarding safety health and environment such as explosives regulation 833(b) TK2. mine safety standards including noise levels, pollutants, etc.

	TK3. safety attire and equipment such as safety shoes, tight fit clothing, safety belt, hand gloves, safety goggles, gas detector, safety lamp, self-contained breathing apparatus, gum boots, ear muffs, face mask, etc.
C. Regulatory context (Knowledge of Mines Safety Department Rules and Regulations)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> RK1. regulations regarding environmental protection, health and safety RK2. Explosives regulations that guide on manufacturing, use, possession, storage, importation, exportation, transportation and destruction of explosives as guided by the explosives regulations of Zambia RK3. first aid and hygiene RK4. code of traffic in specific areas of the mine and significance of fences RK5. standing orders in force at the mine and safety in the vicinity of machinery RK6. shot-firing and safety regulations and how and where to take shelter RK7. mining safety procedures RK8. consequences of violating safety procedures RK9. locally prepared emergency preparedness/disaster management plan RK10. environmental impact of mining RK11. sources of (i) mine heat load, fires and gases; (ii)dust, noise and vibration and measures to minimise them RK12. hazardous material safety and security rules and regulations as prescribed by the Mines Safety Department RK13. code of practice for safe handling and transportation of dangerous material and heavy equipment
Skills (S)	
A. Core Skills/ Generic Skills	Reading Skills
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS1. read and interpret symbols and measurements CS2. read information documents CS3. understand and analyse the available data about the site
	Writing Skills
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS4. note down observations (if any) CS5. fill in documentation (in official language) or enter information in online systems under the guidance of the supervisor
Oral Communication (Listening and Speaking skills)	
<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS6. discuss task lists, schedules and activities CS7. effectively communicate with superiors, colleagues and regulators CS8. listen attentively and comprehend the information given by various sources about the site 	

B. Professional Skills	Plan and Organise
	The individual on the job must be able to: PS1. plan and organise the work order and jobs PS2. organise all process manuals so that sorting out/accessing information is easy
	Judgment and Critical Thinking
	The individual on the job must be able to: PS3. use common sense and make judgments in day to day activities PS4. use reasoning skills to identify and resolve basic problems PS5. use intuition to detect any potential problems which could arise
	Desire to Learn and Take Initiatives
The individual on the job must be able to: PS6. follow instructions and work on areas of improvement identified PS7. complete the assigned tasks with minimum supervision PS8. complete the job within the agreed timelines and quality norms	
Problem Solving and Decision Making	
The individual on the job must be able to: PS9. detect problems in day to day tasks PS10. discuss possible solutions to address problems, with the supervisor PS11. make decisions in emergency situations in the absence of the supervisor (as per the authority matrix defined by the organisation)	

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

These include, but not limited to; personal protective equipment, explosives, detonators, starters, charging sticks, match sticks/lighters, fully equipped first aid box, climbing ladder, scaffolds, lighting equipment e.g. head lamp, warning signs/barricades, warning whistle, stretcher, etc.

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Dilemmas associated with the job of Mining Blaster include: high risks to self and others – associated with the handling of explosive materials, exposure to mining physical, chemical, and biological hazards, working in dangerous areas e.g. underground mines, long working hours, pressure from supervisors and colleagues, pressure from government regulators, working in extreme weather such as hot and cold conditions, etc.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to dilemmas include: wearing protective clothing and willingness to adhere to safety requirements, exercising regularly to maintain physical fitness, planning and prioritising work to minimise pileups, requesting for additional labour if need be, participating in workplace safety sensitisation and awareness meetings/training sessions, adhering to company's safety and standard operating procedures at all times, consulting extensively within and outside one's department/team on work related issues, etc.

7. WORKING CONDITIONS/ENVIRONMENT

Working conditions include: underground and open cast mines, confined spaces, working at heights, lifting relatively heavy materials/equipment, wet, cold and hot conditions, working in shifts, working in areas that are noisy and dusty, in areas with limited lighting and ventilation, need to wear protective clothing such as hard hats, safety boots and other safety equipment, etc.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal/Within the Organisation

Supervisors, drill and blast Engineer, trainers, safety team/section members, other colleagues, etc.

8.2 External/Outside the Organisation

Government regulators, trainers, suppliers of equipment/tools/consumables, Mining Blasters from other companies, labour unions/occupational health and safety associations, etc.

9. PHYSICAL DEMANDS ON THE BODY

- Physique to withstand strenuous conditions;
- Be able to sit, stand and walk for long periods of time;
- Bend, stretch, twist, or reach out;
- Be able to use fingers and hands with ease to complete the assigned task (dexterity);
- Have no medical impairment such as colour blindness, deafness or epilepsy;
- Be able to lift relatively heavy materials/equipment;
- Etc.

ANNEX A

Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programmes developers. Each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programmes developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated the 'Total Mark', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

A.1.2 Individual awarding/assessment bodies or institutions and other users of the NOS will create unique question papers for the theory part and evaluations for skill practical part for their respective candidates.

ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	NOS.MB.01		
ZQF Level	3	Version Number	01
Sector	Mining	Date of Approval	7 th May, 2021
Sub Sector	Underground and Opencast Mines	Date of Last Review	N/A
Occupation	Mining Operations	Date of Next Review	May, 2026

