REGULATIONS ON OCCUPATIONAL SAFETY AND HEALTH IN MINING AND QUARRYING

MINISTRY OF PUBLIC SERVICE AND LABOUR

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The Minister of Public Service and Labour;

Pursuant to Law N0. 66/2018 of 30/08/2018 regulating Labour in Rwanda, especially in its Article 78;

Pursuant to Law N0.86/2013 of 11/09/2013 establishing the General Statute for Public Service, especially in its Article 68;

Having realized that there is a need to have specific sectorial Regulations to ensure Occupational Safety and Health;

Regulates the following:

CHAPTER ONE: GENERAL PROVISIONS

Article One: Definition of terms

These terms shall have the following meaning:

1. **Mine**: area where mining operations are carried on, continuously or from time to time; it includes buildings for administration, accommodation and associated facilities. It also refers to an underground excavation for the extraction of mineral deposits, in contrast to surficial excavations such as quarries. It is also applied to various types of open-pit workings;
2. **Operations**: are activities carried out in connection with extracting, loading, transporting, crushing, concentrating, storing, leaching and processing of minerals or hard rock and disposing of mineral or waste products and selling;
3. **Quarry:** area where building stones or other valuable non-metallic constituents from a surficial mine are extracted. It is also technically referred to as an opencast or an open cut mining which is a superficial mining, in which the valuable rock is exposed by removal of overburden;
4. **Occupational injury:** any personal injury, disease or death resulting from an occupational accident;
5. **Occupational disease**: a disease contracted as a result of an exposure over a period of time to risk factors arising from work activity;
6. **Occupational accident**: An unexpected occurrence, arising out of or in the course of work which results in a fatal or non-fatal occupational injury;
7. **Occupational disease**: Disease known, under prescribed conditions, to arise out of exposure to substances or dangerous conditions in processes, trades or occupations;
8. **Serious accident:** An accident at a mine or quarrying that causes the death of a person; or a person to be admitted to a hospital as an in-patient for treatment for the injury;

9. **High potential incident:** An event or a series of events that causes or has the potential to cause a significant adverse effect on the safety or health of a person;
10. **Risk:** probability of undesirable consequences arising from possible event e.g the risk of injury or illness to a person arising out of a hazard and is measured in terms of consequences and likelihood;
11. **Hazard:** a person licensed or legally authorized to carry out mining and quarries activities;
12. **Concentrate:** clean or final ore product recovered after separation during mineral processing;
13. **Deposit:** mineral deposit or ore deposit used to designate a natural occurrence of a useful mineral, or an ore, in sufficient extent and degree of concentration to invite exploitation;
14. **Open pit mining**: tunneling into the earth and these methods are used when deposits are found near the surface, where the overburden is relatively thin or the material of interest is structurally unsuitable for tunneling;
15. **Ore:** naturally occurring material from which minerals of economic value can be extracted;
16. **Overburden:** materials overlying the ore deposit, including soil, glacial deposits, sand, and sediment;
17. **Slurry:** a fluid mixture of water and finely divided materials such as a naturally occurring muddy lake-bottom deposit;
18. **Tailings:** waste material and water mixture that is left over after the mill removes the valuable rocks portions of washed or milled ore that are regarded as too poor to be treated further, as distinguished from the concentrate or material of value;
19. **Trench:** a long, narrow excavation used in mineral exploration, artificially dug through overburden, or blasted out of rock, to expose a vein or ore structure;
20. **Open cast mine**: means that a mineral that occurs fairly close to the surface and can be extracted by open pit system contrasting with underground method;
21. **Underground mine:** means that the mining activities are carried out under the ground. This term implies such activities as planning and designing of mines taking into account economic, technical and geologic factors, supervision of extraction, haulage and safety of the underground staff and sometimes the preliminary refinement of the raw material;
22. **Traceability:** concept that the systematic ability to access to data for each stage in the supply chain of minerals from the source to consumers;
23. **Subcontractor:** head of artisanal mining group supervising artisanal mining activities, communicating with company staff, and organizing payment of individual artisanal miners (on behalf of the company) within a given group of miners;
24. **Artisanal miner**: person who is working on the concession area of a given company (producer) and, indirectly, provides services to and receives payment from the company through the artisanal mining group leader (the sub-contractor).

Article 2: **Scope**

These regulations establish a best practice guide for facilitating and encouraging continual improvement in the management of health and safety of employees in mining facilities throughout the mine and quarry life cycle in Rwanda.

CHAPTER II: GENERAL REQUIREMENTS

The principal objective of health and safety in employment is to prevent harm to employees at work. The owners and managers of mines and quarries shall set up good programs for health and safety management for their workers.

Article 3: **Employers responsibilities**

An employer shall have a general duty to take all practicable steps to ensure the health and safety of workers while at work. In particular, employers shall be required called upon to:

1. provide and maintain a safe working environment;
2. provide and maintain facilities for the health and safety of workers at the site;
3. ensure that machinery and equipment in the place of work is designed, made, set up, and maintained to be safe for employees;
4. ensure that there are control measures set up for workers exposed to hazards in their daily work;
5. ensure that all the workers are covered by a National insurance institution for occupational risks;
6. develop procedures for dealing with emergencies that may arise while employees are at work;
7. ensure that all workers are either initially trained / competent to operate plant and equipment or are clearly supervised by someone who is competent;
8. post procedures / working instructions in public places for easy accessibility to the public.

Article 4: **Hazard Prevention**

Hazard prevention starts at the planning stage of a mining project and continues during operation, mine closure and after-care. Therefore effective public mechanisms shall be in place which covers permitting and controlling, where the permitting process covers the entire lifecycle of a mining operation including the after-use.

Article 5: **Hazard Management**

Employers shall identify hazards in the place of work (previously existing, new and potential) and regularly review these to see whether these hazards have changed and are significant and require further action. Where an accident results in harm to a person, an employer shall record it in a register of the prescribed form. The employer shall also investigate whether it was caused by a significant hazard.

This does not preclude responsibility on workers to participate in the hazard management process.

Where the hazard is significant, this code of practice sets out the steps an employer shall take.

a) Where practicable, the hazard shall be eliminated;

b) If elimination is not practicable, the hazard shall be mitigated;
In addition, the employer shall, where appropriate:

1. ensure that personal protective equipment is provided, accessible and used properly;
2. monitor employees' exposure to the hazard;
3. regularly review the hazard to identify any changes in status.

Employers shall establish systems for this process of identifying and managing hazards.

Article 6: Information for workers

Employers shall inform their workers and the health and safety representatives of:

1. emergency procedures;
2. hazards the employee may be exposed to while at work (ongoing);
3. hazards the employees may create while at work which could harm themselves and other people;
4. how to minimize the likelihood of these hazards becoming a source of harm to others;
5. the location of safety equipment and how to use and maintain it.

The employer shall inform employees of the results of any monitoring of health and safety exposure in the workplace. In doing so, the privacy of individual employees shall be protected. The employer shall ensure employees are either sufficiently competent to do their work safely or supervised by an experienced and trained person.

In addition, the employee shall be adequately trained in the safe use of equipment in the place of work, including personal protective equipment.

An employer is also responsible for the health and safety of people who are not employees. An employer shall take all practicable steps to ensure that an employee does not harm any other person while at work, including visitors and the population in general.

Article 7: Workers responsibilities

Effective health and safety management shall involve everyone in the place of work.
Key actions in meeting this requirement include:

1. complying with instructions given by an employer;
2. using and maintaining personal protective equipment provided;
3. working in a co-operative manner with an employer in health and safety management;
4. reporting any identified hazard;
5. exercising their right to refuse unsafe work;
6. reporting any accident occurring at the place of work;
7. ensure their own health and safety as well as the health and safety for their colleagues.

Article 8: Accident recording

Understanding the nature and frequency of accidents within the work area assists in the identification of actual or potential hazards in the workplace. The employers shall have responsibility to maintain a register of all accidents occurring at the place of work.

CHAPTER III: MANAGING MAJOR HAZARDS MANAGEMENT IN THE WORKING ENVIRONMENT

Article 9: General provisions

In the working environment of a surface or underground mine airborne contaminants (such as rock dust and fumes), excessive noise, vibration, heat stress and ergonomic problems can create health risks to mineworkers who are subject to frequent and prolonged exposure to them.

Article 10: Dust

Airborne contaminants, such as rock dust, are mainly produced during drilling operations, mineral getting, loading, crushing of rock or ore, and blasting. Persons exposed to excessive dust for prolonged periods may suffer from permanent lung diseases, such as silicosis.

As far as practicable, the escape of dust into the atmosphere shall be prevented, particularly in stagnant zones.

Dust shall be controlled or suppressed by:

1. Using wet drilling techniques.
2. Using water sprays during mineral getting, loading, crushing.

In general, any stone surface being worked shall be kept moist to reduce the escape of dust into the atmosphere.

Where such dust control measures are not provided or have not been developed, mineworkers exposed to excessive dust concentrations in their working environment shall always use personal protective equipment, such as dust masks, to prevent dust from being inhaled.

Article 11: Harmful fumes

Fumes, produced during shot-firing operations contain toxic gases (such as sulphur dioxide, nitrous oxide, nitric oxide, etc.) which, when inhaled, can lead to serious health damage.

Mineworkers shall not approach a working face after shot-firing until the dust and gaseous products of the blast have completely dissipated.

The exhaust from diesel engines also contains harmful fumes, including very fine, respirable particles. Frequent and prolonged exposure to diesel exhaust is a health risk and shall be prevented.

As far as practicable, stationary diesel equipment shall not be operated in stagnant zones or close to workplaces.

Simple dust masks do not protect against toxic gases which are present in after-blast fumes or in diesel exhaust fumes.

Persons shall not work or travel where hazards may be created as a result of impaired visibility due to dust or fumes.

Article 12: Noise

Repeated or prolonged exposure to excessive noise levels will lead to hearing impairment. Potential sources of noise emissions include compressors, drilling machines, pick-hammers or other mechanical equipment used at a mine.

Wherever possible, such noise sources shall be muffled with an effective acoustic absorbing material so as to reduce noise emissions to tolerable levels. Increasing the distance between the noise source and the listener is often a practical method of noise control.

Where such noise control measures are not possible, comfortable and practical personal hearing protection devices, such as approved ear plugs or ear muffs, shall be worn by every person exposed to noise levels exceeding 90 dbA.

Since the sound pressure of pick-hammers or drilling machines normally exceeds acceptable levels, every person working with or in the vicinity of such devices shall always use ear protection.

Article 13: Vibration

Workers operating hand-held machinery, especially pneumatic rock drills and pick-hammers — even for one hour a day — can suffer from the effects of vibration in their hands and arms.

Vibration White Finger or "dead finger" starts when the fingers become numb.

There is no cure for Vibration White Finger.

Article 14: Prevention and control of Vibration White Finger

1. Avoid long periods using equipment. Work in short bursts.
2. Use modern, vibration-dampened equipment.
3. Repair or replace old equipment or fit anti-vibration handles.
4. Grip handles as lightly as possible.
5. Support heavy tools so that a lighter grip can be used.
6. Maintain vibrating tools to minimize vibration levels.

There is no personal protective equipment that has proved to be effective against hand and arm vibration syndrome.

Article 15: Heat stress

Workers shall be informed of the nature of heat stress and its adverse effects, as well as of protective measures. They shall be taught that heat tolerance is very dependent on drinking enough water (not merely satisfying thirst (and eating a balanced diet.

Workers shall also be taught the signs and symptoms of heat disorders (e.g. dizziness, faintness, breathlessness, palpitations, and extreme thirst).

Workers shall have ready access to water or other appropriate drinks which encourage re-hydration. Carbonated drinks and drinks containing caffeine and heavy concentrations of sugar or salt shall not be offered.

Safe, potable water shall be located within close to each worker or brought to the worker every hour.

Clean cups shall be provided and water containers shall be shaded or cooled to 15-20°C.

Modified work practices can reduce the likelihood of heat stress — e.g. by reducing individual workload through the provision of tools or task-sharing, or by scheduling appropriate breaks.

Article 16: Ergonomics

Many aspects of mining work carry risk of injury to the upper and lower limbs or spine, either because of the manual handling tasks involved or because of awkward postures.

Basic ergonomic requirements shall be considered, including workplace layout, design of equipment and tools, working techniques, working time and rest patterns.

Article 17: Patterns of movement

1. Avoid crooked or twisted positions.
2. Aim for rhythmical movements but avoid monotonous ones.
3. Horizontal movements are easier to control than vertical ones.
4. Avoid reaching out any further than necessary.
5. Try to keep movements symmetrical when working with both hands.

Article 18: Using strength

1. Dynamic actions are preferable to static ones.
2. Find a movement in which there is sufficient strength to carry out a task, or redesign the task.
3. For each system of joints, bones, muscles and tendons, there is a range of movements which can be carried out most efficiently. Tasks shall use this range of movements.
4. The heavier the load that is carried in front of the body, the closer it shall be to the body.

The main causes of injury are heavy loads, awkward working positions, repetition, working under pressure.

CHAPTER IV: HEALTH, WELFARE AND HYGIENE OF MINEWORKERS

Article 19: Changing and bathing facilities

Where possible, the mine owner shall provide adequate facilities at the mine site for the changing, storage and washing of clothes and for bathing by mineworkers. Water supplied for washing and bathing shall be of sufficient purity and must not come from a sump that is part of the works, unless it has been suitably treated. Waste water shall pass straight to a drainage system.

Article 20: Sanitary facilities

The mine owner shall ensure that surface mine works are equipped with latrines and urinals that are located and fitted out in such a way as not to spread odours.

They shall be installed so that they do not pollute the working environment such as in inactive workings.

Latrines and urinals shall always be kept clean and disinfected. Other places than the latrines shall not be used for such purposes.

Article 21: Drinking water

A mineworker shall never drink mine water.

An adequate supply of potable drinking water shall be provided at all main work sites during working hours.

If it is safe to drink from wells on site, they shall be located so that they will not be contaminated by waste water from the mine (e.g. outside the mining area, higher than the mine drainage level).

Drinking containers shall be dust proof and kept closed when not in use. Drinking water shall not be contaminated in any way.

Article 22: Areas for food

Food shall not be stored or consumed in any area that is exposed to hazardous material, vapour or dust.

Food shall be stored and consumed in clean, sheltered places. Rest stations may be established for that purpose.

Article 23: Intoxicating beverages and narcotics

Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Persons appearing to be under the influence of alcohol or narcotics shall not be allowed to work.

Article 24: Health care

A suitable health examination shall be undertaken prior to commencement of employment. This shall be based on specific work to be done as well as the hazards the worker may be exposed to, and which can be harmful to his life. The examination shall be carried out by a medical practitioner or occupational health nurse.
Ongoing monitoring to ensure fitness for work shall be maintained and carried out at intervals reflecting the impact of the hazard.
A mineworker who is ill or in any way incapable of normal activity shall not be allowed to work.

CHAPTER V: EMERGENCIES

Article 25: General provisions

A system that deals with emergencies shall be in place and have been communicated to everyone on the site.

Employees shall be given opportunity to participate in the development of this system.

This system shall clearly state the methods and process to be used in the tasks of the emergency. It shall cover but not be limited to the following:

1. emergencies that may be encountered at the site
2. general emergency procedures including evacuation to assembly areas
3. provision for the transport of sick or injured persons
4. isolation and control of access to the incident area
5. appointment of duties to be carried out by designated individuals
6. the supply and maintenance and training in the use of emergency equipment
7. provision and supply of water storage and reticulation for firefighting
8. reporting and replacement of damaged equipment
9. liaison and working with Emergency Services, including guidance to the site, as appropriate
10. methods of communication between all parties involved in an emergency
11. the emergency response system for permanent sites shall be tested and reviewed in a live simulation at least once per year.

Article 26: Duty to take general fire precautions

In accordance with national standards, the employer must:

1. take such general fire precautions as will ensure, so far as is reasonably practicable, the safety of any of his employees; and
2. in relation to relevant persons who are not his employees, take such general fire precautions as may reasonably be required in the circumstances of the case to ensure that the premises are safe.

CHAPTER VI: FIRST AID

Article 27: General provisions

Workers and supervisors shall be able to respond quickly to incidents and accidents and provide basic first aid and treatment to injured persons.

Rapid first-aid treatment can prevent further serious health damage or even loss of life to injured persons.

The mining operator shall ensure that suitable, regularly replenished and properly maintained first-aid kit is provided at a strategic location where mining operations are performed. The first-aid kit shall be easily accessible and ready for use at any time while any person is at work.

The minimum equipment required to ensure adequate first-aid treatment shall include:

1. a stretcher for transporting persons unable to walk;
2. a blanket for persons in shock;
3. sufficient bandages and sterile dressings for open wounds on limbs, body and head;
4. splints for fractures of limbs;
5. disinfectants;
6. any other first-aid material that may be required due to the nature of work and recommended by a competent physician.

Every effort shall be made to ensure that at least one employee is trained in first-aid applications (the mining authority shall provide first-aid training) who shall be on site while mining activity is carried out.

Article 28: Action following a mining accident

At any mine where there has been an accident, the necessary measures shall be immediately taken to:

1. Remove injured mineworkers to a safe place for first-aid treatment.
2. Eliminate further danger arising from the event.

Any worker involved in rescue operations shall take reasonable care for the safety and health of him or herself and not endanger themselves by rash action where there are unknown risks.

No person shall be allowed to enter the area where there has been an accident, except when it has been made safe and express permission is given by a competent person.

Every injury to a mineworker, however small, shall be reported to the person in charge of first aid at the mine for checking up and treatment before the injured person returns to work or leaves the mine.

Arrangements shall be made for transporting injured or sick persons to a hospital or other suitable medical facility, for example through cooperation between mine sites in close proximity.

CHAPTER VII: PERSONAL PROTECTIVE EQUIPMENT

Article 29: General provisions

The provision of personal protective safety equipment shall be the responsibility of the employer. They shall ensure that all people who are required to wear such equipment are trained in its correct use and maintenance.

Replacement cycles shall be identified for all personal protective equipment. These shall reflect the manufacturers/suppliers guidelines and the environment in which the equipment is used.

Article 30: Types of protection

Personal Protective Equipment (PPE) shall be available for almost every part of the body and the type of equipment purchased shall depend on the protection that is required.

Article 31: Head protection
Miners shall be provided with, and shall wear, safety caps (helmets) which are approved in the jurisdiction in which the mine operates.

The cap (helmets) shall be equipped with a lamp bracket and cord holder to permit mounting of a miner's cap lamp. In areas of the mine where permanent lighting is not installed, the miner's cap lamp is essential to permit the miner to move and work effectively and safely. The key requirements for a cap lamp are that it be rugged, easy to operate with gloved hands, provide sufficient light output for the full duration of a work shift (to illumination levels required by local regulation) and that it be as light as possible without sacrificing any of the above performance parameters.

Article 32: Foot protection
The mining work boots shall be of either leather or rubber construction, depending on whether the mine is dry or wet. Minimum protective requirements for the boots include a full puncture-proof sole with a composite outer layer to prevent slipping.

Article 33: Eye and face protection
Mining operations require the miner to wear safety spectacles, goggles, face shields or a full face piece respirator, depending on the operations being performed and the combination of hazards to which the miner is exposed.

Goggles are not worn frequently below ground unless the particular operation poses a danger of chemical splash.

A face shield may be worn where the miner requires full-face protection from weld spatter, grinding residues or other large flying particles which could be produced by cutting, chipping or scaling.

A full face piece respirator may be worn for face protection when there is also a requirement for respiratory protection against a substance which is irritating to the eyes.
Such operations are more often encountered in the above ground mine processing than in the below ground mining operation itself.

Article 34: Respiratory protection
The respiratory protection needed in mining operations shall be dust protection. The equipment shall include: face masks, half face respirators, air filter units.

Article 35: Hearing protection
Underground vehicles, machinery and power tools generate high ambient noise levels which can create long-term damage to human hearing. Protection is normally provided by ear muff type protectors which are slot-mounted on the miner's cap. Supplementary protection can be provided by wearing closed cell foam ear plugs in conjunction with the ear muffs. Ear plugs, either of the disposable foam cell variety or the reusable elastomeric variety, may be used on their own, either because of preference or because the accessory slot is being used to carry a face shield or other accessory.

Article 36: Skin protection
Certain mining operations may cause skin irritation. Work gloves shall be worn whenever possible in such operations.

Article 37: Clothing
Ordinary cotton coveralls or treated flame-resistant cotton coveralls shall be the normal work wear in mines. Strips of reflective material shall be added to make the miner more visible to drivers of moving underground vehicles. Miners working with heavy equipment may also wear rain suits over their coveralls to protect against cutting fluid, hydraulic oil and lubricating oils, which can spray or leak from the equipment.

Article 38: Protection from heat and cold
In open-pit mines in cold climates, miners shall have winter clothing including thermal socks, underwear and gloves, wind resistant pants or over-pants, a lined parka with hood and a winter liner to wear with the safety cap.

In underground mines, heat is more of a problem than cold. Ambient temperatures may be high because of the depth of the mine below ground or because it is located in a hot climate. Protection from heat stress and potential heat stroke can be provided by special garments or undergarments which can accommodate frozen gel packs or which are constructed with a network of cooling tubes to circulate cooling fluids over the surface of the body and then through an external heat exchanger. In situations where the rock itself is hot, heat resistant gloves, socks and boots are worn. Drinking water or, preferably, drinking water with added electrolytes must be available and must be consumed to replace lost body fluids.

Article 39: Belts and Harnesses
The belt and harnesses shall be worn for protecting miners against falls.

Article 40: Other Protective Equipment
Depending on local regulations and the type of mine, miners may be required to carry a self-rescue device. This is a respiratory protection device which will help the miner to escape from the mine in the event of a mine fire or explosion that renders the atmosphere unbreathable because of carbon monoxide, smoke and other toxic contaminants. The self-rescuer may be a filtration type device with a catalyst for carbon monoxide conversion or it may be a self-contained self-rescuer, i.e., a closed-cycle breathing apparatus which chemically regenerates oxygen from exhaled breath.

Additional protective equipment shall be used as required.

This minimum standard protection shall be worn at all times in and around the mine.

CHAPTER VIII: SAFETY WHEN MINING

Article 41: Posting warning signs and barriers
A surface mine often consists of deep trenches or large holes. There is a high risk that a mineworker or member of the public could fall in. Such workings shall be surrounded by a

secure fence or otherwise securely barricaded. Suitable warning signs to forbid unauthorized entry and subsequent fall of any person shall be posted.

G round conditions or any other dangerous condition in the mine that creates a hazard to persons shall be corrected before other work or travel is permitted in the affected area. Until corrective work is completed a warning sign against entry shall be posted. When left unattended, a barrier shall be installed to prevent unauthorized entry.

Article 42: Travel ways and safe means of access

Mineworkers often have to use difficult terrain to travel to and from their work places within the mine (e.g. climbing or walking along steep pit walls and excavations where there may be a danger of slipping or falling,
a slide of material, rock fall, etc.).

To reduce these hazards, the stability of any pit wall, bench or slope where persons normally travel to and from their assigned work places shall be regularly examined and properly maintained.

Each place in the mine where any person normally works shall be provided with appropriate travel ways.

Any access exceeding an inclination of 50 degrees from the horizontal shall be provided with fixed stairs or a ladder.

Article 43: Stripping of overburden

Surface mining activities generally start with the removal of overburden, typically loose ground or decomposed rock. This material is potentially unstable and could easily collapse or slide, especially when wet.

Any excavation of loose ground shall therefore not be done by undercutting or by forming steep slopes. The slope of loose ground or decomposed rock shall be kept at an angle (not more than 45 degrees) that ensures stability.

Vegetation, such as large bushes and trees, shall be removed from the overburden before stripping reaches the roots to prevent hazards due to falling trees.

To prevent loose soil from sliding back into the mine:

1. pit or wall perimeters consisting of soil or unconsolidated material which could create a fall-of-material hazard, shall be stripped back for at least 3 metres from the top of the pit or quarry wall; and
2. all material from the stripping of overburden shall be removed to a safe distance from the working edge of the mine excavation and be shaped to a safe angle of repose (30 - 40 degrees from the horizontal).

Article 44: Working on walls and benches

Falls of rock at the working face, the collapse of the working face and landslides are major risks in the production areas of surface mines. They are often the cause of serious mining accidents.

The design and layout of the working faces shall therefore be such that the danger of material fall is minimized.

This can be done by applying a benching (terraced) system instead of having a steep pit wall.

Any wall, slope or bench, where work is to be performed shall be regularly examined for cracks or other signs of stress or weakness, in particular:

1. prior to commencing any work;
2. after blasting;
3. after heavy rainfall; and
4. as ground conditions warrant.

Under no circumstances shall any face, side or bench be worked in a way that causes unsupported overhanging or undercutting.

Where the undercutting of a working face is essential, a sufficient means of support (e.g. sturdy wooden props) shall be properly installed to prevent overhanging material from collapsing

In any alluvial layer, consisting of sand, clay, pebbles or similar loose material, a single bench for manual working shall normally not exceed 2.5 meters in height. Also the maximum slope shall be less than 45 degrees.
When working in solid material or hard, rock the height of a single bench shall not exceed 6 meters for manual working. Also, the slope angle shall be less than 60 degrees from the horizontal.

Each terrace floor of a multi-bench system shall be wide enough to allow persons to work and travel freely and safely. A bench width of at least 3 meters is recommended; this also provides some protection against rock fall.

Article 45: Scaling
Wherever loose rock or soil at any working face could create danger to persons. It shall be scaled down or supported in a safe manner before other work or travel is permitted in the affected area.

If possible, scaling shall be done from the top of the working face downward. All persons shall be removed from below the scaling area.

Scaling shall be carried out from a location which will not expose persons to injury from falling material.
If scaling is performed from below the face, the scaling bar shall be of a length and design that will allow the removal of loose material without exposing the person performing this work to injury.

Article 46: Other work

When digging pits, trenches or other such works, any face or side wall over 1.5 meters high shall be securely supported (e.g. by installing struts) to prevent any falls or slips of the wall material back into the excavation.

When using water monitors to dislodge rock or earth from a vertical wall, make sure the hose and nozzle are firmly fixed. Stand well back from the wall and well clear of the debris as it falls and washes away to the pump or sump.

If any work has to be done manually on a face that is more than 2.5 meters above the ground, the workers shall wear a safety harness or rope that is fastened to a secure anchor well clear of the top of the face.

Any tunnel or adit being driven into the face for exploration, drainage or any other purpose shall be securely supported as ground conditions warrant.

Where such underground adits exceed a length of 6 meters, arrangements shall be made to ensure an adequate supply of fresh air, either by artificial or natural ventilation.

Inadequate ventilation in underground workings may result in a lack of oxygen and high levels of carbon dioxide. Thus the atmosphere therein shall be regularly checked for O2 and CO2 concentrations. The level of
O2 shall not fall below 19.5%; the level of CO2 shall not exceed 0.5%.

Unventilated areas underground shall be barricaded and signs posted to prevent entry.

Article 47: Mine drainage

Most small mines do not encounter strong groundwater inflow, unless they are close to and below the level of a river. But they often have problems in dealing with surface water during and after heavy rainfall. Such surface water can adversely affect the stability of the pit strata, wash out slopes and terraces, and even flood the mine. Heavy mudflow and slope failure are often consequences of surface water entering the mine.

Whenever possible, surface water shall be prevented from entering mine workings by digging ditches to trap the water and conduct it away from the pit.

Drainage channels shall be well away from the edge of the excavation and constructed as to minimize storm runoff entering the pit.
As far as possible mine workings shall be arranged so that water is discharged naturally (e.g. into lower abandoned workings).

Channeling incoming water down the slopes to collection points could also be an effective way to protect the slopes of surface mines. Where necessary, water pumps shall be installed at such collection points.

CHAPTER IX: EQUIPMENT AND MACHINERY

Article 48: General provisions

All machinery and apparatus that is used in surface mines shall be robust, fitted with appropriate protective safety devices and maintained in good condition.

Where the location of a mine site makes it difficult to get spare parts, it is even more important to keep machinery in good working order by regular servicing and maintenance. Servicing and maintenance shall be carried out according to a scheme prepared by the mine operator, or to the manufacturer's specifications.

As a safety measure, any power tool for hand-held use shall be failsafe, i.e. operated with controls that re quire constant hand or finger pressure.

Only a competent person shall undertake any work on machinery where technical knowledge or experience is required.

Article 49: Operation of pneumatic pick-hammers

Any mechanical part affecting the safe operation of pneumatic pick-hammers, such as hose connections pick retainer and the state of pick, shall be checked for any defect by the equipment operator before being put into operation. The same applies to pneumatic drills.

Extraction operations by pick-hammer shall be performed from a position which will not expose the operator to injury from falling material.

Lubricating oil shall be used before a pick-hammer is started and at intervals as required during operation.
Material that is to be broken by pick-hammers (secondary breakage) shall be positioned or blocked to prevent any movement which could endanger persons in the work area.

Before pneumatic pick-hammers are moved from one working place to another, the air compressor shall be turned off and air bled from the hose.

Pick-hammers shall not be used for breaking material that could contain misfired explosives or detonators.

Article 50: Drilling operations

Drilling equipment shall be inspected and any defects corrected before it is used.

The drilling area shall be inspected for hazards before starting drilling operations.

Drill crews and others shall stay well clear of rotating augers or drill stems. Persons shall not pass under or step over a rotating drill stem or auger.

Drills shall be attended at all times while they are in operation.

Persons shall not hold the drill steel while collaring holes, nor rest their hands on the chuck while drilling.

Persons shall not drill when their footing is not secure or when standing on staging or equipment that is not suitable for drilling.

Before drills are moved from one place to another the air compressor shall be turned off and air bled from the hose.

Holes shall not be drilled where there is a danger of intersecting a misfired hole or a hole containing explosive material.

Article 51: Compressors and related equipment

Compressed air vessels shall have a safety certificate in accordance with regulations. Normally they shall withstand at least five times the maximum design operating pressure.

All pipe/hose constructions and connections shall be able to withstand the operating air pressure and flow. Suitable locking devices shall be used at connections between machines and high pressure hose lines, particularly where a connection failure could create a hazard to the operator or other persons.

On any compressor or pressure storage vessel, safety equipment shall be installed that is suitable for working constantly under the maximum permissible operating pressure. The equipment shall include:

1. pressure gauge;
2. temperature gauge;
3. Safety valve to release excess pressure.

The temperature inside a compressor shall not exceed 40°C below the flash point of the lubricating oil used (i.e. not more than 160 ° C). Whenever the compressed air temperature exceeds the limit, or some defect is found in the cooler, the compressor shall be stopped.

The compressor lubricating oil shall have a flash point higher than 200°C. Animal or vegetable oil shall not be used for lubrication.

Compressor air intakes shall be as clean and dry as possible. Air filters shall be used to ensure that only uncontaminated air enters the compressor.

The compressed air flow from the compressor to the point of use shall be kept as dry and as cool as possible.

Never direct compressed air towards a person. Take all necessary precautions to protect persons using compressed air tools & equipment from injury.

Article 52: Stationary plant

All exposed and dangerous parts of machinery or plant shall be kept securely fenced or guarded so as to prevent any person from coming into contact with them.

Emergency stop facilities, which enable power to be promptly cut off in the event of imminent danger, shall be provided within reach on all plant or equipment that may pose a danger.

A warning system prior to start-up shall be used in all instances.

All pipes used to carry compressed air, water, gas or other hazardous substances shall be clearly identified and shall be checked at regular intervals along the pipe system.

A system of managing defects that may affect the safety of electrical, hydraulic or mechanical equipment shall be in place and cover:

1. the prevention of use of that plant or equipment
2. the means by which that defect is repaired
3. the recording of the defect and repair

Each site shall have a preventative testing and inspection system for the safety related aspects of equipment and machinery. Records of all such activities shall be kept.

Article 53: Isolation and lockout

Procedures shall be developed, implemented and monitored to ensure that potentially damaging energy is isolated from persons who have to work on electrical, hydraulic or mechanical plant or equipment.

These procedures shall include the requirement that isolations are carried out.

Prior to any work commencing and that those isolations attain a state of zero energy.
Any stored energy is made safe and confirmed as such.

Article 54: Conveyor belt

The area in which the conveyor is used shall be of sufficient width to allow inspection and maintenance. Access ways beneath conveyors shall have adequate overhead protection.

Conveyors shall be kept free of flammable material, rubbish and spillage.
The belt and its load shall also remain clear of any other structures such as cable trays and power lines.

Regular inspections shall be carried out to ensure undue heating of either the belt or spillage does not occur and potentially present a fire risk and that other points referred to in this section are adhered to.

Conveyors, where accessible, shall have an emergency stop device along their entire length. Where appropriate rollback/anti-runaway devices shall be fitted.

Article 55: Crushing & screening unit

Appropriate precautions must be taken to eliminate or minimize exposure to noise and dust. Where exposed suitable protection shall be supplied.
Detailed information may be obtained from the guideline for identifying hazards associated with crushing and screening plants in mines and quarries.

Article 56: General requirements for mobile Plant

Only competent persons authorized by the manager may operate mobile plant.
All vehicles shall be fitted with seatbelts of the appropriate standard for the driver and any passengers. Seatbelts shall be worn at all times when a vehicle is in operation.

Passengers shall only be carried where a seat fitted with seatbelt is provided.

Mobile plant that operates in an environment in which people are working shall be fitted with the following items:

1. adequate lights
2. a suitable fail-to-safe braking system
3. an effective method for ensuring the vehicle is visible under all circumstances. This may include flashing lights, pole flags, running lights.
4. suitable firefighting equipment
5. a reverse warning system
6. Comprehensive vision forward and back
7. a suitable washing and wiping system for operator visibility.

Article 57: Testing of mobile plant

Pre-operational checks shall be carried out and recorded by operators every shift.
Provisions shall be made for the systematic testing and inspection of all mobile plant by a competent person. All inspections and tests shall conform to a schedule of examinations and tests and be documented and records held.

Inspection and testing shall include:

1. the thorough examination and testing of all mobile plant at an interval appropriate to the type of transport and according to the manufacturers' guidelines
2. steering and lighting systems
3. the inspection of all moving parts of mobile plant that are practically accessible to establish that they are moving freely and without obstruction
4. the thorough examination of all parts of the mechanical braking system of the mobile plant, including:
5. braking surfaces (pads, blocks and similar parts) to ensure they are not excessively worn
6. brake actuators to ensure that they are operating satisfactorily
7. the testing of all braking systems of mobile plant shall follow manufacturer's instructions/specifications.

Article 58: Haulage railways

A set of plans showing all parts of the railway system of the mine or quarry operation shall be prepared and held at the site office.

Rules and procedures determining shunting and loading operations shall be documented and communicated to all affected personnel. These shall include responsibilities and authorities.

Article 59: Traffic control and roadway conditions

In relation to all mobile plant, rules shall be documented and communicated to all parties involved. These shall include but not necessarily be limited to the following:

1. the conditions under which mobile plant is used
2. measures taken to keep roadways clear of debris or other materials that may negatively impact on mobile plant

Ensuring the safe operation of the mobile plant by providing for the following:

1. the maximum loads (by reference to weight, dimensions, number or other criteria) that may be carried in or towed by mobile plant
2. the areas in which speed restrictions apply and the nature of the restrictions
3. the conditions under which a person may work on or adjacent to a roadway to be used for mobile plant
4. parking procedures for transport or haulage
5. inter-vehicle communication
6. overhead obstacles
7. traffic flow requirements

All roadways on which mobile plant operates shall be maintained to standards consistent with the safe operation of that mobile plant. In particular:

1. the roadway shall be clearly defined at all times
2. signs indicating speed limits shall be placed in strategic positions
3. the roadway shall be wide enough to accommodate all traffic potentially using.

CHAPTER X: EXPLOSIVES AND BLASTING

Article 60: General provisions

Blasting operations shall not take place without the approval of the mining authority.
Only explosives and detonators approved by the mining authority and provided by the mine operator shall be used at a mine.

Only persons who are trained, certified and experienced in the handling and use of explosive material shall direct blasting operations and related activities.

The operator of every mine at which explosives are used shall provide the equipment and materials necessary to enable blasting operations to be carried out safely.

Article 61: Storage of explosive material

Explosive material shall be stored in magazines which, as far as possible, shall meet the following requirements:

1. be structurally sound;
2. be made of non-combustible material, or the exterior covered with fire-resistant material;
3. be lined with non-sparking material;
4. have ventilation holes at the upper and lower part of the building to control dampness and excessive heating;
5. have appropriate warning signs that indicate the contents;
6. be kept clean and dry inside;
7. be locked when unattended;
8. be used exclusively for the storage of explosive material;

9. be electrically grounded when made of metal.

Areas surrounding storage facilities for explosive material shall be clear of rubbish, brush, dry grass and trees for 10 meters in all directions.
Other combustible material (e.g. gasoline; diesel) shall not be stored or allowed to accumulate within 20 meters of explosive material.

Detonators shall not be stored in the same magazine as other explosives, unless they are kept in a separate compartment.

When stored in the same magazine, blasting agents shall be kept separate from explosives, safety fuses and detonating cords to prevent contamination.

A suitable person shall be appointed by the mine operator to be in charge of explosives at the mine. This person shall be over 21 years of age and competent in the storage, handling and use of explosive material.

Article 62: Conveying explosives
Explosive material shall be transported without undue delay to the blast site.

Closed, non-conductive containers shall be used to carry explosives and detonators to and from blast sites.
Separate containers shall be used for explosives and detonators.

Explosive containers shall be clearly marked, indicating their content.

Article 63: Charging and shot-firing operations
Explosives shall not be taken to the blast site until the blast holes are ready to be charged.

Explosives and blasting agents shall be kept separated from detonators until charging begins.

Explosive material shall be protected from impact and from temperatures in excess of 65°C when taken to the blast site.

No person shall smoke, have a naked light or any other appliance that could generate heat or sparks in the vicinity of holes that are being charged with explosives.

Charges shall be made up only at the time of use and as close to the blast site as conditions allow.
Once charging begins, the only activity permitted within the blast site shall be that which is directly related to the blasting operation.

Before charging, blast holes shall be checked for obstructions which shall, as far as possible, be cleared.
Explosives shall not be forcibly pressed into a blast hole for any reason. Tamping (compressing the explosive in the hole to reduce air spaces) shall only be done with non-sparking equipment, such as bamboo-type charging rods.

After a blast hole has been charged, it shall be stemmed by using fine sand in small paper packets or clay "noodles".

Unused explosive material shall be transferred to a protected location, as soon as practicable after charging is completed.

Once charging is completed and the circuits have been connected, the firing of shot holes shall take place without undue delay.

Before firing a shot hole the responsible person shall:

1. Check the completed circuit to ensure that the components are properly connected.
2. Give ample warning to allow all persons to be evacuated from the blasting area.
3. Guard or barricade all access routes to the blast area to prevent the passage of persons.

No work shall resume in the blast area until it is free of after- blast fumes and a post-blast examination by the person in charge has verified that there are no potential blast-related hazards.

Article 64: Handling of misfires

When a misfire (i.e. a shot or any part of a round of shots fails to explode) is suspected, persons shall not enter the blast area until at least 30 minutes after the time of firing.

Faces and muck piles shall be examined for any misfire.

Only work necessary to remove misfires shall be permitted in the affected area until the misfire is disposed of safely.

CHAPTER XI: CESSATION OF MINING / MINE CLOSURE

Article 65: General provisions

No small-scale surface mine or mine site shall be abandoned without any rehabilitation. Nor shall it be left in a condition that could lead potential hazards to the public or damage to the environment. The mining authority shall ensure that its requirements for abandonment are met.

Every mine operator shall ensure that the necessary steps are taken to meet the requirements of the mining authority to prevent any danger arising from abandoned mine sites, either by progressive rehabilitation during ongoing mining operations or after the completion of mining activities.

Rehabilitation measures shall include, but not be limited to:

1. Removal of any harmful or toxic substances, machinery, mine structure and any other left-over material likely to be harmful to persons or nature.
2. Refilling and leveling of deep excavations or holes that may create a danger of fall to persons. Where this is not possible, such danger areas shall be provided with secure fencing or otherwise barricaded.

3. Re-contouring (e.g. by trimming slopes to a safe angle), stabilizing (e.g. by revegetation) of potentially unstable faces, pit walls, benches or waste dumps to reduce erosion or potential slope failure.

CHAPTER XII: HEALTH AND SAFETY MANAGEMENT SYSTEMS

Article 66: General provisions

Effective management of health and safety relies on the presence of a health and safety management system. The nature and size of the operation will determine the complexity of this system.

The presence of a site or company specific health and safety management system gives a clear indication of the steps to be taken to effectively manage their health and safety issues.

Article 67: Health and safety policy

The mine operator's health and safety policy is a statement of the mine operator's commitment and approach to safety and health at the mine. This will vary considerably between mines but common features of a good health and safety policy include that it is an authoritative statement setting out matters of principle and the actions that are to be taken to support those matters.

Article 68: Arrangements for managing risk

The mine operator's arrangements for managing risk must include an ongoing process for:

1. Identifying hazards ensuring a competent person conducts and documents risk assessments, as required, that takes into account the nature of the hazard and the likelihood and severity of the risk to health and safety at the mine
2. Applying the hierarchy of controls to select the best controls to manage risks so far as is reasonably practicable
3. Recording the procedures used to implement any administrative control (such as a policy, procedure or training that is used to control a risk)
4. Maintaining and reviewing control mechanisms to ensure they remain effective or are changed.

Article 69: Management structure and organizational chart

The description of the management structure in the mine could also include:

1. Documentation of the structure such as roles, responsibilities and scheduling for actions in relation to implementing and ongoing operation of the Safety Management System
2. How the overall Safety Management System is to be managed to ensure it is functioning and who is responsible for this
3. An assessment of technical requirements of the position in the structure against actual competence to determine training requirements for them and any delegates for that role as well as for succession planning.

Article 70: Contractors and contractor health and safety management plans

The management or coordination of contractors at a mine is a control measure and the safety management system must set out how any contractor's system for working safely will be integrated into the mine's safety management system. This requires the mine operator to have a

process for assessing the contractor's policies, procedures and required competencies and to integrate the contractor's health and safety management plan within with the safety management system. The mine operator shall also describe how to evaluate the contractor's compliance with the mine's safety management system.

It shall be useful to include in the safety management system details of how the mine operator will meet its duty to provide all relevant information to contractors to assist them identify risks. For example, how will the mine operator provide the contractor with:

1. Risk assessment documentation for hazards
2. Details of administrative controls such as procedures
3. The emergency plan.

Article 71: Emergency procedures and plan

Mine operators have duties in relation to emergency planning. An emergency plan must be prepared that provides for emergency procedures, including evacuation procedures, notifying emergency services and otherwise responding to the emergency. Emergency procedures need to make provision for providing medical treatment and assistance.

Emergency procedures must be tested and competent people must be trained and made responsible for the control of emergency situations. Emergency instructions, including the names and control details of key personnel, must be clear and accessible to the personnel who need them.

Article 72: Withdrawal conditions

Withdrawal to a place of safety shall be needed as a precautionary measure if there is an increased risk to health and safety that is not an emergency.

Article 73: Information, training and instruction

The employer must ensure workers are provided with suitable and adequate information, training and instruction in regard to the nature of the work, the risks associated with the work and the control measures implemented. It must be provided in a way that is readily understandable by the workers taking into account factors such as their language, qualifications, experience and literacy skills.

Article 74: Health monitoring

The mine operator must provide health monitoring to workers if there is a significant risk of an adverse effect on the worker's health because of exposure to a hazard associated with mining.

Health monitoring shall be required if workers are exposed to hazards, including:

1. poor air quality
2. excessive noise
3. hazardous chemicals.

Article 75: Consultation and safety role for workers

The mine operator must consult with workers on matters specific to a mine. These include the development, implementation and review of the safety management system, and parts of it, such as risk assessments for certain plans.

The mine operator must also implement a safety role for workers that, drawing on their relevant experience working at the mine, enables them to, contribute to:

1. Identifying hazards;
2. Providing input on the appropriate risk control measures;
3. Providing input in the review of safety management system.

The safety management system shall set out how this safety role for workers will be achieved at the mine in practice. This shall involve the mine operator considering how to give all workers the opportunity to contribute, given factors such as the different types of work undertaken at the mine, how to involve contractors and their workers, etc.

Article 76: Incident and notifiable incident response and investigation

The safety management system shall set out in detail the procedures that will be used in the event of either a notifiable incident or an incident.

Incident and notifiable incident management also involves the reporting and investigation procedures, as well as tracking any remedial actions (e.g. new control measures) to ensure they are implemented.

Article 77: Review of control measures

Control measures must be reviewed in a range of circumstances, including when there is evidence that they are not working as intended. The safety management system must include procedures for the review of control measures to address things including:

1. How a review of controls will be done;
2. How a review will be undertaken and by whom
3. How workers, including supervisors, are to report concerns about controls or evidence of their failure;
4. Any arrangements for prioritizing review of critical controls.

Article 78: Records management

The safety management system shall set out how records, including the mine record, will be kept as well as arrangements for the management of those records and documents to ensure compliance with the various duties under national laws.

This might involve, for example, consideration of whether records are to be stored electronically or in hard copy; what arrangements need to be in place to limit access to personal information such as health records and, conversely, how can access to other documents will be provided.

Article 79: Communication

If the mine employs workers on different shifts, the mine operator shall arrange for the exchange of information between shifts and with other relevant people. This will include how recording or reporting of such information will be documented. For example, in shift reports, log books or other methods. These arrangements must be set out in the safety management system.

In deciding on these arrangements the mine operator shall consider:

1. Any specific controls that apply for example in relation to emergencies, remote or isolated work, and contact with people working underground;
2. Alternative methods of communication in the event of power failure or interruption to communication.

Article 80: Induction

Induction procedures for workers shall ensure that the induction is appropriate to the tasks that the worker will perform. The procedure shall address:

1. How the content of any induction supports the implementation of the safety management system. For example, introduction to safety operating procedures and use of personal protective equipment (PPE);
2. How often workers must be refreshed in any part of the induction. For example, changes have occurred at the mine;
3. Keeping records of induction;
4. Regular review and, if required, the process for revising induction content and procedures.

Article 81: Supervision

Supervision is essential to check that work instructions and procedures are followed and tasks are completed as required. Arrangements may be for direct or indirect supervision or a mix of levels. What is appropriate to the mine and the number of supervisors required will depend on factors such as remote work and level of risk.

CHAPTER XIII: FINAL PROVISIONS

Article 82: Authorities responsible for the implementation of these Regulations

The Minister of Public Service and Labour and the Minister of Health are entrusted with the implementation of these Regulations.

Article 83: Specific guidelines

The Minister having occupational safety and health in his/her responsibilities may issue further specific guidelines on specific occupational safety and health matters.

Article 83: Commencement

This Order shall come into force on the date of its signature.

Kigali, on...../..../2019

RWANYINDO KAYIRANGWA Fanfan
Minister of Public Service and Labour