



# Guidelines

Occupational Health & Safety in the Mining Sector

*Sustainable Development of the Mining Sector in Rwanda*



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# ABBREVIATIONS AND ACRONYMS

- ASM:** Artisanal and Small-scale Mining
- CO:** Carbon Monoxide
- CO<sub>2</sub>:** Carbon Dioxide
- CSR:** Corporate Social Responsibility
- dB:** Decibels
- ERP:** Emergency Response Plan
- ESIA:** Environmental and Social Impact Assessment
- GBV:** Gender-based Violence
- H<sub>2</sub>S:** Hydrogen Sulfide
- HIRA:** Hazard Identification and Risk Assessment
- HSE:** Health, Safety & Environment
- ILO:** International Labor Organization
- ISO:** International Organization for Standards
- KPI:** Key Performance Indicators
- M&E:** Monitoring & Evaluation
- NISR:** National Institute of Statistics of Rwanda
- NO<sub>x</sub>:** Nitrogen Oxide
- NST2:** National Strategy for Transformation II
- OHS:** Occupational Health and Safety
- PDCA:** Plan-Do-Check-Act
- PPE:** Personal Protective Equipment
- PPV:** Peak Particle Velocity
- RMB:** Rwanda Mines, Petroleum and Gas Board
- RS:** Rwanda Standards
- RSB:** Rwanda Standards Board
- SDGs:** Sustainable Development Goals
- SMART:** Specific, Measurable, Achievable, Realistic, Time bound
- VWF:** Vibration White Finger

# 1. INTRODUCTION

Within Rwanda's Second National Strategy for Transformation (NST2), mining has been classified among the key sectors with great potential for growth and employment. A 5-year Government Program 2024 – 2029 has been elaborated accordingly, working towards the realization of Rwanda's Vision 2050 and the UN Sustainable Development Goals (SDGs). NST2 states that the growth in the mining sector will be led by a combination of mineral exploration, professionalization of artisanal miners, adoption of environmentally friendly mining practices, as well as enhanced processing and value addition of key minerals.

Rwanda Mining and quarrying sector employs over 92,000 workers as per the Labour Force Survey (LFS) released by the National Institute of Statistics of Rwanda (NISR) for the third quarter of 2025. The report shows that the number of people employed in mining and quarrying rose from 81,000 in August 2024 to over 92,000 in August 2025, representing a 14.5 percent increase. The report does not show gender dimensions but still shows the sector is highly male-dominated. Despite sector's potential, challenges remain in aligning mining practices with international and national standards for gender inclusion, occupational health and safety (OHS), environmental and social protection.

To evaluate the extent to which these standards are being implemented within Rwanda's mining sector, a gap analysis was conducted to serve as the foundation for the guidelines at hand. The gap analysis focused on:

- Identifying relevant international standards and evaluating their integration into Rwanda's regulatory framework
- Assessing practical implementation gaps within mining operations
- Highlighting priority areas for intervention to ensure safer, more sustainable, and gender-inclusive mining practices

Findings from this analysis revealed critical gaps and opportunities in the domestication and implementation of standards in the mining sector. For example, the study identified the need for improved OHS management systems, hazard identification and risk assessment. The study also emphasized the need for mine owners to understand and implement the correct preventative measures to mitigate accidents. Gender inclusion remains under-addressed, with recommendations focusing on eliminating gender-based violence (GBV), promoting women's leadership, and ensuring gender-sensitive grievance mechanisms are effectively implemented in the Rwandan mining sector.

Overall, the findings underscore the necessity of regulatory enforcement, the adoption of modern technologies, and continuous engagement with communities and stakeholders to foster a safer, more sustainable, and inclusive mining industry.

## 1.1. PURPOSE OF THE OHS GUIDELINES

The primary purpose of these guidelines is to provide mining companies, supervisors, and mine workers with clear and actionable steps for aligning their operations with both national and international best practices. By addressing critical operational gaps, the guidelines aim to foster a more responsible, sustainable, and compliant mining sector that benefits all stakeholders, including workers, communities, and the environment.

## 1.2. SCOPE & TARGET AUDIENCE

These guidelines offer clear and step-by-step instructions designed to be accessible for mine owners, supervisors and mineworkers, ensuring that complex regulatory requirements are simplified, making it easier to follow and implement them in daily mining operations. The document is structured into five chapters:

- 1) **OHS Management Systems:** This chapter provides an introduction to Occupational Health and Safety (OHS) management systems, highlighting their purpose, core principles, and essential components. It explores how these systems promote workplace safety and operational efficiency by addressing hazards, implementing controls, and fostering a safety-first culture. Key elements such as policy development, planning, training, monitoring, and continual improvement are discussed, demonstrating how an effective OHS management system aligns organizational goals with legal compliance and best practices.
- 2) **Hazard Identification and Risk Assessment:** This chapter delves into the specific processes of hazard identification and risk assessment within the mining sector, emphasizing their importance in managing safety risks. It outlines systematic steps, from preparation and hazard identification to risk analysis, evaluation, control, and continuous improvement. Common hazards unique to mining—physical, chemical, ergonomic, biological, psychosocial, and gender-specific—are explored, alongside practical tools such as risk matrices. The chapter aims to equip mining professionals with the knowledge to identify risks effectively and implement robust measures to mitigate them, enhancing both safety and productivity.
- 3) **Risk control:** This chapter focuses on the development and implementation of proactive strategies to minimize risks and prevent incidents in the workplace, particularly within the mining sector. It explores preventive measures across various hazard categories, emphasizing the importance of addressing risks at their source through a hierarchy of controls. Key topics include the design and enforcement of safety protocols, engineering and administrative controls, personal protective equipment (PPE), and regular training programs. The chapter also highlights the role of continuous monitoring, worker engagement, and fostering a culture of safety to ensure the effectiveness of these measures. By prioritizing prevention, organizations can reduce accidents, improve operational efficiency, and promote long-term sustainability in mining operations.
- 4) **Emergency Response Planning:** This chapter provides a comprehensive guide to developing and implementing an effective Emergency Response Plan (ERP) tailored to the unique risks of the mining sector. It emphasizes the importance of preparedness in minimizing the impact of emergencies such as accidents, fires, chemical spills, or natural disasters. Key topics include identifying potential emergency scenarios, assigning roles and responsibilities, ensuring proper communication protocols, and conducting regular drills to maintain readiness. The chapter also discusses integrating first aid, evacuation procedures, and coordination with external emergency services. By having a robust ERP in place, mining organizations can protect workers, reduce downtime, and ensure a rapid and organized response to critical incidents.
- 5) **Monitoring and Evaluation:** The chapter focuses on the importance and benefits of monitoring and evaluation (M&E) in OHS within mining operations. It outlines how continuous improvement can be achieved through goal setting and tracking progress on OHS measures. Regular inspections, including self-assessments, independent audits, and government inspections, are emphasized as essential tools for ensuring compliance and safety. The chapter also highlights the significance of incident reporting and learning, stressing the need for a structured framework to document, investigate, and address accidents, while sharing lessons learned to prevent future occurrences. Finally, it covers the importance of transparent reporting on OHS commitments and measures to maintain accountability and improve safety standards.

Each chapter offers practical guidance on implementing standards to achieve optimal compliance. Additionally, the guidelines include a set of practical tools designed to help miners effectively adhere to OHS requirements.

### 1.3. DEFINITION OF KEY CONCEPTS

**Accident:** Any unplanned event which results in harm (*Rwanda Standards Board RS 117-2: 2024*)

**Corporate social responsibility (CSR):** A way for enterprises to consider the impact of their operations on society (*International Labor Organization*).

**Emergency:** A sudden and usually unforeseen event that calls for immediate measures to minimize its adverse consequences (*ILO Guidelines on Decent Work in public emergency services*).

**Emergency response plan:** A set of immediate and ongoing activities, tasks, programs, and systems designed to manage the effects of an incident that poses a threat to life, property, operations, or the environment (*Science Direct*).

**Gender-based violence (GBV):** Any act that results in bodily, psychological, sexual and economic harm to somebody just because they are female or male. Such acts result in the deprivation of freedom and negative consequences and this violence may be exercised within or outside households (*Law No. 35 of 2008 on Prevention and Punishment of Gender-Based Violence*).

Violence directed against a person because of that person's gender or violence that affects persons of a particular gender disproportionately (*European Commission*).

**Hazard:** Source or a situation with a potential for harm in terms of human injury, ill-health, damage to property, damage to the environment, or a combination of these (*Rwanda Standards Board RS 117-2: 2024*).

**Hazard identification:** The process of recognizing that a hazard exists and defining its characteristics (*Rwanda Standards Board RS 117-2: 2024*).

**Hierarchy of control:** A method of identifying and ranking safeguards to protect workers from hazards (*US Department of Labor*).

**Incident:** An unplanned event which results in damage or production loss but does not result in harm (*Rwanda Standards Board RS 117-2: 2024*).

**OHS management system:** A set of interrelated or interacting elements to establish OHS policy and objectives, and to achieve those objectives (*ILO-OHS 2001*).

**OHS policy:** A set of principles stated as commitments in which top management outlines the long-term direction of the organization to support and continually improve its OHS performance (*ISO 45001*). A written occupational health and safety policy helps define and promote an effective OHS program (*Canadian Center for Occupational Health and Safety*).

**Personal Protective Equipment (PPE):** An equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses (*US Department of Labor*).

**Risk:** A combination of the likelihood of an occurrence of a hazardous event and the severity of injury or damage to the health of people caused by this event (*National Occupational Safety and Health Risk Assessment Regulations*).

**Risk assessment:** The process of evaluating the risks to safety and health arising from hazards at work (*National Occupational Safety and Health Risk Assessment Regulations*).

**Vibration white finger (VWF):** A disease that occurs in workers who use vibrating tools (*National Center for Biotechnology Information*).

## 1.4. LEGAL AND REGULATORY FRAMEWORK IN RWANDA

National and international regulatory frameworks are essential for reducing occupational hazards and promoting a culture of safety in the mining sector, ensuring that workers are protected from avoidable harm while maintaining operational efficiency. Below are key national and international regulatory frameworks that govern OHS in the mining sector. When developing the guidelines, the priority was given to referencing national standards. Where the national standards lacked sufficient information, international standards were considered.

### National regulatory framework

The national regulatory framework on OHS in Rwanda is guided by Laws, Ministerial Orders, standards developed by the Rwanda Standards Board (RSB) as well as specific regulations by the regulatory agency namely the Rwanda Mines, Petroleum and Gas Board (RMB). Key frameworks include:

**Law N° 66/2018 of 30/08/2018 Law regulating labor in Rwanda<sup>1</sup>:** This Law regulates labor in Rwanda. Chapter 3 addresses general working conditions, including employee rights, standard working hours, various types of work leave (such as annual, maternity, paternity, and sick leave), and other related aspects. Chapter 5 focuses specifically on occupational health and safety, detailing workplace safety requirements, the provision and proper use of personal protective equipment (PPE), first aid preparedness, accident prevention measures, and the responsibilities of employers to maintain a safe and healthy working environment.

**NOTE: “Law n° 027/2023 of 18/05/2023 amending Law n° 66/2018” outlines the updates and modifications made to Rwanda’s labor law. This law can be consulted for details on the specific amendments introduced.**

**Ministerial Order n° 02/MIFOTRA/23 of 01/08/2023 on OHS<sup>2</sup>:** The Ministerial Order by the Ministry of public services and Labor provides comprehensive provisions on occupational health and safety, focusing on employer obligations to ensure safe work environments and mitigate workplace risks. It specifies general occupational health and safety conditions applicable to both the public and private sectors, outlines the procedures and requirements for registering employee and employer organizations, and defines prohibited types of work for children, among other regulations.

**Regulations on Occupational Health and Safety in Mining and Quarrying<sup>3</sup>:** These regulations by the Ministry of Public Service and Labor establish sector-specific safety guidelines to protect workers in mining and quarrying activities, including the use of protective equipment and safe operational practices.

**Rwanda Standards on Mining and Quarry<sup>4</sup>:** This standard specifies health and safety requirements and a framework for the management of hazards and risks associated with mining/quarrying activities, to enable mining companies to provide safe and healthy workplaces by preventing work-related injuries and ill-health for employees and surrounding communities. Below is a list of the standards that are relevant to the mining sector:

1 Ministry of public services and Labor. (2018). Law N° 66/2018 regulating labor in Rwanda. <https://www.mifotra.gov.rw/publications>.

2 Ministry of Public Services and Labor (2023). *Ministerial Order n° 02/MIFOTRA/23*. <https://www.mifotra.gov.rw/publications>.

3 Ministry of Public Services and Labor (2020). *Regulations on occupational safety and health in mining and quarrying*. <https://www.mifotra.gov.rw/publications>.

4 Rwanda Standards Board (2024). *Mining and Quarrying-Health and safety requirement*. <https://portal.rsb.gov.rw/webstore.php>

**RS 117-2:2024 (Mining and Quarrying – Health and Safety Requirements):** A general framework setting minimum safety and health standards across all mining and quarrying operations.

**RS 117-3:2024 (Mining and Quarrying – Open pit/surface mining):** Part 3 of the General Framework gives specific guidance on the regulation of open pit/surface mining.

**RS 117-4:2024 (Underground Mining):** The standard Specifies health and safety requirements for underground mining, focusing on how to make the working area safe, supporting of mining tunnels, mine ventilation, as well as air compressors and underground lighting.

**RS 117-5:2024 (Blasting in Mining and Quarrying):** The standards regulate blasting operations to ensure controlled use of explosives, minimizing risks to workers and the environment.

## International standards

International standards on OHS provide a global framework for ensuring safe and healthy working conditions in mining operations. These standards establish guidelines for risk management, hazard prevention, and worker well-being. The following standards have been referenced in the development of this guideline:

**International Labor Organization (2001)<sup>5</sup>, Guidelines on Occupational Safety and Health Management Systems:** These guidelines on OHS management systems have been developed by the International Labor Organization (ILO) according to internationally agreed principles defined by the ILO's tripartite constituents. This tripartite approach provides the strength, flexibility and appropriate basis for the development of a sustainable safety culture in the *organization*. The ILO has therefore developed voluntary guidelines on OHS management systems which reflect its values and instruments relevant to the protection of workers' safety and health.

**International Labor Organization (2001)<sup>6</sup>. Safety & health in small-scale surface mines:** The following guidelines apply to any situation or operation that affects the safety and health of those involved in small-scale surface mines. They are for mining operators, supervisors and mineworkers. The guidelines set out the basic requirements for protecting workers' safety and health and contain recommendations on good mining practices to be followed to protect safety and health.

**International Finance Corporation (2007)<sup>7</sup>. Environmental, Health, and Safety Guidelines for mining:** The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice. The EHS Guidelines for Mining are applicable to underground and open-pit mining, alluvial mining, solution mining, and marine dredging. Extraction of raw materials for construction products are addressed in the EHS Guidelines for Construction Materials Extraction.

**U.S. Department of Labor – Occupational Safety and Health Administration (2002)<sup>8</sup>. Job Hazard Analysis:** This booklet is for employers, foremen, and supervisors. It explains what a job hazard analysis is and offers guidelines to help you conduct your own step-by-step analysis.

**ISO 45001<sup>9</sup> : Occupational Health and Safety Management – Requirements:** The standard establishes criteria for an OHS policy, objectives, planning, implementation, operation, auditing and review. Key elements include leadership commitment, worker participation, hazard identification and risk

5 **International Labor Organization (2001).** *Guidelines on occupational safety and health management systems.* <https://www.ilo.org/research-and-publications>

6 **International Labor Organization (2001).** *Safety & health in small-scale surface mines.* <https://www.ilo.org/research-and-publications>

7 International Finance Corporation (2007). *Environmental, Health, and Safety Guidelines for mining* <https://www.ifc.org>

8 U.S. Department of Labor - Occupational Safety and Health Administration (2002). *Job Hazard Analysis* <https://www.OHSa.gov/sites/default/files/publications>

9 ISO 45001 *Occupational Health and Safety Management Requirements.* <https://www.iso.org/store.html>

assessment, legal and regulatory compliance, emergency planning, incident investigation and continual improvement.

**ISO 31000<sup>10</sup> : Risk Management:** ISO 31000 is an international standard that provides principles and guidelines for risk management. It outlines a comprehensive approach to identifying, analyzing, evaluating, treating, monitoring and communicating risks across an organization.

**ISO 23875<sup>11</sup> :Mining Operator enclosures Air quality Control Systems and Air quality testing. Overall Health and Safety of Mining Equipment Operators:** This document specifies performance and design requirements for air quality control systems for operator enclosures and their monitoring devices. The design specifications are universal in their application and do not contemplate specific mining environments. They are intended to meet identified parameters of both pressurization and respirable particulate and carbon dioxide concentrations. This document also specifies test methods to assess such parameters and provides operational and maintenance instructions. Recommendations are made for operational integration of the air quality control system.

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10 ISO 31000 *Risk Management*. <https://www.iso.org/store.html>

11 ISO 23875 *Mining Operator enclosures Air quality Control Systems and Air quality testing. Overall Health and Safety of Mining Equipment Operators*. <https://www.iso.org/store.html>

## 2. OHS MANAGEMENT SYSTEMS

According to ISO 45001, the adoption of an OHS management system is intended to enable an organization to provide safe and healthy workplaces, prevent work-related injury and ill health, and continually improve its OHS.

The purpose of an OHS management system is to provide a framework for managing risks and opportunities. The aim and intended outcomes of the OHS management system are to prevent work-related injury and ill health to workers and to provide safe and healthy workplaces; consequently, it is critically important for the organization to eliminate hazards and minimize OHS risks by taking effective preventive and protective measures.

**REQUIREMENT: The mine owner shall establish an occupational health and safety management system based on RS ISO 45001 (Source: Rwanda Standard Board 117-2 Mining and quarrying — Health and safety, page 11).**

### 2.1. CORE PRINCIPLES OF OHS MANAGEMENT SYSTEMS

The ILO OHS Management System 2001 and ISO 4500 are founded on the principles of “Plan-Do-Check-Act” (PDCA). The PDCA principle is an iterative process used by organizations to achieve continual improvement. It can be applied to a management system and to each of its individual elements, as follows:

**Plan:** Determine and assess OHS risks, OHS opportunities and other risks and other opportunities, establish OHS objectives and processes necessary to deliver results in accordance with the organization’s OHS policy

**Do:** Implement the processes as planned

**Check:** Monitor and measure activities and processes with regard to the OHS policy and OHS objectives, and report the results

**Act:** Take actions to continually improve the OHS performance to achieve the intended outcomes.

### 2.2. DEVELOPMENT AND IMPLEMENTATION OF OHS MANAGEMENT SYSTEMS

According to ILO OHS 2001, an OHS management system should contain the main elements of policy, organizing, planning and implementation, evaluation and action for improvement.

#### **Crafting an OHS Policy statement<sup>12</sup>**

The OHS policy is a set of principles stated as commitments in which top management outlines the long-term direction of the organization to support and continually improve its OHS performance. The OHS policy provides an overall sense of direction, as well as a framework for the organization to set its objectives and take actions to achieve the intended outcomes of the OHS management system.

<sup>12</sup> International Labor Organization (2001). *Guidelines on occupational safety and health management systems* P.27. <https://www.ilo.org/research-and-publications>

### TIP: Crafting a clear OHS policy statement<sup>13</sup>

In accordance with ISO 45001, the OHS policy shall:

- Provide a framework for setting the OHS objectives
- Include a commitment to provide safe and healthy working conditions for the prevention of work-related injury and ill health
- Include a commitment to fulfill legal requirements and other requirements
- Include a commitment to eliminate hazards and reduce OHS risks
- Include a commitment to continual improvement of the OHS management system
- Include a commitment to consultation and participation of workers
  
- Be available as documented information
  
- Be communicated within the organization
  
- Be available to interested parties, as appropriate
  
- Be relevant and appropriate

### Aligning OHS policy with legal requirements

According to the ILO, the OHS policy should comply with relevant OHS national laws and regulations, voluntary programs, collective agreements on OHS and other requirements to which the organization subscribes.

**REQUIREMENT:** An operating mine shall develop a policy on Environmental Management and Occupational Health and Safety (Source: *Rwanda Standard Board 117-2 Mining and quarrying — Health and safety*).

### Communicating OHS policy to stakeholders

According to ISO 45001, the organization shall establish, implement and maintain the process needed for the internal and external communications relevant to the OHS management system, including what will be communicate, when to communicate and with whom to communicate.

<sup>13</sup> ISO 45001 *Occupational Health and Safety Management Requirements P.10*. <https://www.iso.org/store.html>

### **TIP: How to communicate efficiently**

The organization shall take into account diversity aspects (e.g. gender, language, culture, literacy, disability) when considering its communication needs.

The organization shall ensure that the views of external interested parties are considered in establishing its communication process<sup>14</sup>.

When establishing its communication process, the organization shall:

- Take into account legal requirements and other requirements
- Ensure that OHS information to be communicated is consistent with information generated within the OHS management system, and is reliable
- The organization shall respond to relevant communications on its OHS management system
- The organization shall retain documented information as evidence of its communications, as appropriate

## **Hazard and Risk Assessment Overview**

Hazard and risk assessments are essential for mitigating risks that may result in accidents, injuries, or health complications. The responsibility for conducting these assessments lies with key personnel, such as mining engineers, Health, Safety & Environment officers, and other senior staff members in a mine.

**REQUIREMENT: The Rwanda Standards Board stipulates that hazards and risks management shall be performed in accordance with Clause 9 of RS 1171-1 ([Link in reference list](#)).**

## **Processes for identifying hazards and assessing risks**

Identifying hazards and assessing risks are essential steps in ensuring workplace safety. This process begins by defining the scope of assessment, considering the workplace environment, activities, and those affected. Hazards are identified through inspections, employee consultations, incident reviews, and task analyses. Risks are then assessed by evaluating the likelihood and severity of potential harm, prioritizing them based on urgency. Control measures are implemented using a hierarchy, starting with eliminating hazards and progressing to engineering controls, administrative measures, and personal protective equipment. Documentation is maintained for accountability, and regular reviews ensure the process remains effective and adapts to changes in the workplace.

## **Tools and techniques for evaluating risk levels**

A risk matrix is a widely used tool for assessing and categorizing risks based on two key factors: the likelihood of an event occurring and the severity of its potential consequences. The matrix is typically presented as a grid, with likelihood on one axis and severity on the other. Risks are plotted within the matrix to determine their priority, with categories such as low, medium, high, or critical risk. High-priority risks (e.g., those with high likelihood and severe consequences) require immediate attention and control measures, while lower-priority risks may warrant periodic monitoring. The risk matrix simplifies complex evaluations, providing a clear visual representation that helps organizations focus their resources on the most pressing safety concerns.

<sup>14</sup> ISO 45001 Occupational Health and Safety Management Requirements P.16. <https://www.iso.org/store.html>

## Prioritizing risk mitigation measures

Prioritizing risk mitigation measures is essential to address workplace hazards effectively and allocate resources efficiently. This process focuses on controlling risks based on their potential impact and likelihood, ensuring the most significant threats are addressed first. The hierarchy of controls serves as a structured framework for prioritizing mitigation measures.

**NOTE: Detailed information on hazard and risk assessment can be found in Chapter 3 of these guidelines.**

## 2.3. ORGANIZING OHS MANAGEMENT SYSTEMS

In the context of OHS management systems, “organizing” refers to the process of structuring and arranging resources, responsibilities, and activities to effectively manage safety and health in the workplace. This involves:

### Responsibility and accountability

According to ILO, the employer should have overall responsibility for the protection of workers’ safety and health, and provide leadership for OHS activities in the organization. The employer and senior management should allocate responsibility, accountability and authority for the development, implementation and performance of the OHS management system and the achievement of the relevant OHS objectives.

**NOTE:** While responsibility and authority can be assigned, ultimately top management is still accountable for the functioning of the OHS management system. (Source: ISO 45001:2028)

### Competence and training

The necessary OHS competence requirements should be defined by the employer, and arrangements established and maintained to ensure that all persons are competent to carry out the safety and health aspects of their duties and responsibilities.

The employer should have, or should have access to, sufficient OHS competence to identify and eliminate or control work-related hazards and risks, and to implement the OHS management system.

Training programs should:

- Cover all members of the organization, as appropriate
- Be conducted by competent persons
- Provide effective and timely initial and refresher training at appropriate intervals
- Include participants’ evaluation of their comprehension and retention of the training
- Be reviewed periodically. The review should include the safety and health committee, where it exists, and the training programs, modified as necessary to ensure their relevance and effectiveness
- Be documented, as appropriate and according to the size and nature of activity of the organization

**NOTE: Training should be provided to all participants at no cost and should take place during working hours, if possible.**

## OHS management system documentation

According to the size and nature of activity of the organization, OHS management system documentation should be established and maintained. OHS records should be established, managed and maintained locally and according to the needs of the organization. They should be identifiable and traceable, and their retention times should be specified. Workers should have the right to access records relevant to their working environment and health, while respecting the need for confidentiality.

### EXAMPLE: What is included in an OHS record?

- Records arising from the implementation of the OHS management system
- Records of work-related injuries, ill health, diseases and incidents
- Records arising from national laws or regulations dealing with OHS
- Records of workers' exposures, surveillance of the working environment and workers' health
- The results of both active and reactive monitoring

## 2.4. PLANNING AND IMPLEMENTATION<sup>15</sup>

### Initial review

The organization's existing OHS management system and relevant arrangements should be evaluated by an initial review, as appropriate. In the case where no OHS management system exists, or if the organization is newly established, the initial review should serve as a basis for establishing an OHS management system. It should be carried out in consultation with workers and/or their representatives, and respect the following:

- Identify the current applicable national laws, regulations and guidelines, voluntary programs and other requirements to which the organization subscribes
- Identify, anticipate and assess OHS hazards and risks arising from the existing or proposed work environment and work organization
- Determine whether planned or existing controls are adequate to eliminate hazards or control risks
- Analyze the data provided by workers' health surveillance, if applicable

The results of the initial review should be well documented, as they will become the basis for decision-making regarding the implementation of the OHS management system. As such, the initial review will provide a baseline from which continual improvement of the organization's OHS management system can be measured.

15 **International Labor Organization (2001).** *Guidelines on occupational safety and health management systems P.10.* <https://www.ilo.org/research-and-publications>

## Planning, development and implementation

According to the ILO, arrangements should be made for adequate and appropriate OHS planning, based on the results of the initial review, subsequent reviews or other available data. These planning arrangements should contribute to the protection of safety and health at work, and should include:

- A clear definition, priority setting and quantification, where appropriate, of the organization's OHS objectives
- The preparation of a plan for achieving each objective, with defined responsibility and clear performance criteria indicating what is to be done by whom and when
- The selection of measurement criteria for confirming that the objectives are achieved
- The provision of adequate resources, including human and financial resources and technical support, as appropriate

## Setting objectives

The ILO stipulates that organizations are required to establish applicable OHS objectives.

### EXAMPLE: Good practices for setting OHS objectives

- Objectives should be specific to the organization, and appropriate to and according to its size and nature of activity
- Objectives should be consistent with the relevant and applicable national laws and regulations, and the technical and business obligations of the organization with regard to OHS
- Objectives should be focused towards continually improving workers' OHS protection to achieve the best OHS performance
- Objectives should be realistic and achievable
- Objectives should be documented, and communicated to all relevant functions and levels of the organization
- Objectives should be periodically evaluated and if necessary updated

*(Source: ILO, Guidelines on occupational safety and health management systems)*

## 2.5. MONITORING AND EVALUATION

Procedures to monitor, measure and record OHS performance on a regular basis should be developed, established and periodically reviewed. Responsibility, accountability and authority for monitoring at different levels in the management structure should be allocated<sup>16</sup>.

### Establishing key performance indicators (KPIs) for safety

KPIs provide measurable benchmarks for assessing safety performance, such as incident rates, near-miss reporting, and training completion. These indicators help track progress, identify trends, and set goals for improvement.

<sup>16</sup> International Labor Organization (2001). *Guidelines on occupational safety and health management systems P.1*. <https://www.ilo.org/research-and-publications>

## Conducting regular site inspections and audits

Routine inspections and audits ensure compliance with safety standards and identify potential hazards. Audits evaluate the effectiveness of implemented controls and uncover gaps in the system that require corrective actions.

## Using incident data to evaluate OHS performance

Analyzing data from incidents, near-misses, and unsafe conditions provides insights into recurring patterns and root causes. This information is vital for refining safety measures, preventing future occurrences, and improving overall system effectiveness.

## Incident management

Incident management is a critical component of an OHS management system, focusing on responding to, learning from, and preventing workplace incidents.

**REQUIREMENT:** The mine manager must maintain a register of any accident, dangerous occurrences (incidents) and diseases. The register shall be available to the inspector of the governing organ in charge, and its extracts shall form a report to the governing institution in charge of mines (RMB). Incidents and accidents shall be classified in accordance with ISO 19434. (*Link in reference list*)

**Incident reporting**<sup>17</sup>: Any incident no matter how slight, shall be documented and kept at mine site. Moderate, major and catastrophic incidents shall be reported to the governing institution in charge of mines (RMB). For incidents where personnel need to be taken to a health clinic, an incident report form shall be completed and taken, with the injured personnel to the nearest health center/clinic/hospital and a copy of incident report shall be documented at mine site. (*Refer to chapter 7 for the incident report template*).

**Investigating root causes and implementing corrective actions:** A thorough investigation identifies the underlying causes of incidents, going beyond surface-level factors to address systemic issues. Corrective actions, such as updating procedures, improving training, or modifying equipment, are implemented to prevent recurrence.

**Sharing lessons learned to prevent recurrence:** Disseminating findings from incident investigations across the organization helps raise awareness and reinforce a proactive safety culture. Sharing lessons learned promotes continuous improvement and empowers employees to identify and mitigate similar risks in the future.

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<sup>17</sup> Rwanda Standards Board. (2024). RS 117-2 Mining and Quarrying-Health and safety requirement\_General. <https://portal.rsb.gov.rw/webstore.php>

# 3. HAZARD IDENTIFICATION AND RISK ASSESSMENT

Hazard identification and risk assessment are essential processes in ensuring occupational health and safety in mining operations. These processes help recognize potential threats to workers' health and safety and determine effective measures to mitigate risks. This chapter outlines practical steps for mining operators to identify, evaluate, and manage hazards within their operations. Additionally, it emphasizes the importance of a proactive approach to reducing workplace accidents and health issues.

The following positions are critical for conducting hazard & risk assessments in a mine:

*Table 1: Responsibilities for conducting hazard & risk assessments in a mine*

Position	Responsibilities
<b>Mining engineer</b>	<ul style="list-style-type: none"> <li>- To ascertain extraction risks</li> <li>- ensure that operations comply with health and safety requirements of national and international Standard.</li> <li>- To ensure that the equipment used are safe</li> <li>- To ensure compliance with engineering safety standards during planning and execution</li> </ul>
<b>HSE officer/manager</b>	<ul style="list-style-type: none"> <li>- Conduct regular workplace inspections to identify safety and health hazards</li> <li>- Evaluate risks associated with processes, equipment, and worker activities</li> <li>- Recommend corrective actions, develop safety protocols, and monitor compliance</li> </ul>
<b>Environmentalist</b>	<ul style="list-style-type: none"> <li>- ensure that a mining/quarry company is in compliance with environmental regulations and standards related to pollution and waste management</li> <li>- assess and manage the impact of mining operations on the natural environment and surrounding communities</li> <li>- Implement environmental management plan referring to environmental and social impact assessment conducted</li> </ul>
<b>Mine manager</b>	<ul style="list-style-type: none"> <li>- Enforce the requirements of regulatory requirements and other national standards related to mining and quarries.</li> <li>- Take all necessary measures to provide for the safety and proper discipline of persons employed at the mine</li> <li>- Submit quarterly report indicating the activities conducted and the plan of activities to be conducted considering the mine plan and provisions of the booklet of mining safety standards</li> </ul>

Source: Rwanda Standards 117-2 2024

## 3.1. COMMON HAZARDS IN THE MINING SECTOR OF RWANDA<sup>18</sup>

The mining sector in Rwanda, faces several challenges related to health and safety. These challenges arise from the unique nature of mining operations, including the physical demands, environmental factors, and the diversity of the workforce. Below are some of the common hazards present in the

<sup>18</sup> Rwanda Standards Board. (2024). RS 117-2 Mining and Quarrying-Health and safety requirement\_General. <https://portal.rsb.gov.rw/webstore.php>

Rwandan mining sector as seen in RS 117-2 and findings of the gap analysis in mining conducted in 2024.

## Physical Hazards

**Falling rocks and debris:** In underground mining, loose rocks or debris can fall unexpectedly, posing a serious risk of injury or death to workers.

**Cave-ins and collapses:** The structural integrity of tunnels and shafts in underground mines can be compromised, leading to collapses or cave-ins that can trap or harm miners.

**Heavy equipment accidents:** The operation of heavy machinery, such as trucks, loaders, and drills, presents a risk of accidents, including collisions, rollovers, and being caught in machinery.

**Explosions:** The use of explosives in mining operations, particularly for blasting, can lead to unintentional explosions, posing a risk of serious injury or death.

**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<sup>19</sup>.

**Vibration:** Prolonged exposure to vibrations from machinery and tools can lead to musculoskeletal disorders, such as Vibration White Finger (VWF). Employees shall not be exposed to vibrations exceeding the tolerance limits specified in RS 237<sup>20</sup>.

**Heat exhaustion<sup>21</sup>:** The symptoms of heat exhaustion are headaches, dizziness, light headedness, weakness, mood changes, (that is, feeling irritable or confused), vomiting, decreased and dark colored urine, fainting and pale clammy skin.

**Dust<sup>22</sup>:** 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.

## Chemical Hazards

**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.

**Chemicals in processing and refining:** Chemicals used in the extraction and refining processes, such as sulfuric acid, hydrochloric acid, and various solvents, can pose significant health risks. Exposure can cause burns, eye damage, and long-term organ damage.

**Chemical spills and leaks:** Accidental spills or leaks of chemicals used in mining processes can contaminate the environment, exposing workers to harmful substances that can cause burns, respiratory issues, or long-term health effects.

19 Ministry of public services and Labor. (2020). *Regulations on occupational safety and health in mining and quarrying P9*. <https://www.mifotra.gov.rw/publications>.

20 Rwanda Standards Board. (2021). *RS 237: Vibration Tolerance limits*. <https://portal.rsb.gov.rw/webstore.php>

21 Rwanda Standards Board. (2024). *RS 117-2: Mining and Quarrying-Health and safety requirement*. <https://portal.rsb.gov.rw/webstore.php>

22 Ministry of public services and Labor. (2020). *Regulations on occupational safety and health in mining and quarrying P9*. <https://www.mifotra.gov.rw/publications>.

## Social Hazards

**Child labor:** In some mining communities, children may be involved in hazardous work, which exposes them to physical, chemical, and psychological dangers, impeding their education and future opportunities.

**Violence and crime:** Mining areas can sometimes be prone to violence and crime, including theft, conflicts over resources, and, in some cases, organized crime. This can lead to safety risks for workers and the surrounding community, exacerbating existing social tensions.

## Ergonomic Hazards<sup>23</sup>

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.

## Biological Hazards

**Waterborne diseases:** In some mining operations, particularly in informal or artisanal mining sites, improper waste disposal can lead to contamination of nearby water sources. Drinking or coming into contact with contaminated water can result in waterborne diseases like cholera, dysentery, or typhoid fever.

**Contaminated soil and dust:** Mining operations can stir up contaminated soil, which may contain biological agents such as bacteria, parasites, or viruses. Workers exposed to contaminated soil or airborne particles can contract diseases that affect the skin, respiratory system, or gastrointestinal tract.

## Psychosocial Hazards

**Stress and mental health issues:** The demanding work environment in mining, including long hours, hazardous conditions, and job insecurity, can lead to high levels of stress. Prolonged stress can contribute to mental health problems like anxiety, depression, and burnout among workers.

**Fatigue:** Long working hours and physically demanding tasks often lead to worker fatigue. Chronic fatigue can impair judgment, increase the risk of accidents, and contribute to long-term health problems, such as cardiovascular issues or sleep disorders.

## Gender-Specific Hazards

**Sexual harassment and Gender-Based Violence (GBV):** Women in mining face a higher risk of sexual harassment and gender-based violence, both within the workplace and in surrounding communities. This includes unwanted sexual advances, verbal abuse, and physical violence, which can have severe physical, emotional, and psychological effects.

## 3.2. STEPS FOR HAZARD IDENTIFICATION AND RISK ASSESSMENT<sup>24</sup>

Hazard identification and risk assessment are crucial processes in mining operations to ensure the safety and well-being of workers, as well as the protection of the environment and assets. The steps highlighted below involve systematically identifying potential hazards, analyzing associated risks, and implementing control measures to mitigate those risks. The goal is to create a safe working environment

23 Ministry of public services and Labor. (2020). *Regulations on occupational safety and health in mining and quarrying P9*. <https://www.mifotra.gov.rw/publications>.

24 Ministry of public services and Labor. (2019). *Regulations on occupational safety and health Risk assessment*. <https://www.mifotra.gov.rw/publications>.

by proactively addressing hazards before they lead to accidents or health issues.



**Figure 1: Steps for Hazard Identification and Risk Assessment**

## Planning

Before starting the hazard identification and risk assessment process, it is important to prepare adequately. This involves gathering relevant information, such as historical data on previous incidents, worker feedback, regulatory guidelines, and operational details. It also includes assembling a team of experts and stakeholders from various departments, such as safety, operations, and management, to ensure a comprehensive approach to the assessment. Preparation also involves setting clear objectives and determining the scope of the risk assessment, ensuring that all relevant hazards and risks are covered.

It is recommended that a team carries out the assessment. So far as is reasonably practicable, the team should consist of both employees' and employer's representatives. It should normally include safety and health personnel where possible, safety and health representatives, representative of the maintenance team where possible and where necessary specialists in specific fields.

## Hazard Identification

According to ISO 45001, the organization has the duty to implement and maintain a process for hazard identification that is ongoing and proactive<sup>25</sup>.

**REQUIREMENT: A checklist on the prevailing environment of the mine site shall be conducted in the area to ensure suitable condition for employees to see and/or hear signs of failing ground. The checklist shall also include: a) noise levels; b) ventilation of site; c) levels of dust; d) adequate water supply; e) availability of power supply; and f) visibility.**

**(Source: Rwanda Standards Board 117-2 Mining and quarrying — Health and safety, page 11)**

## Examination of open pit mining areas

Examination of over ground mining areas involves systematic inspections to ensure safety and operational efficiency. These inspections assess the condition of mining machinery, equipment, and surrounding infrastructure, as well as environmental factors that could impact operations. Regular evaluations help identify hazards such as ground instability, equipment malfunctions, and potential environmental risks. The template for Daily logbook for examinations to be carried out in surface mine working areas is attached in the practical tools chapter of this document.

## Examination of underground mining areas

According to Rwanda Standards 117-4:2024, mine operators are required to conduct daily examinations of underground mining areas before access is allowed. These inspections should evaluate the condition of all access and egress points, ensuring that employees are wearing the necessary personal protective equipment (PPE). The assessment must confirm that there are no unstable hanging walls and that gravitational sources—such as roofs, backs, sides, floors, and walls—are well-maintained. Additionally, it should verify that ventilation units are functioning properly to provide sufficient oxygen levels without

25 ISO 45001 Occupational Health and Safety Management Requirements <https://www.iso.org/store.html>

dust accumulation. The lighting and electrical systems must be in optimal condition, and the installed underground support systems should be secure. Furthermore, the presence of gases, including H<sub>2</sub>S, CO, CO<sub>2</sub>, and NO<sub>x</sub>, must be monitored, ensuring that all equipment and tools in use are in good working order. (See *practical tools chapter for template*)

## Incident management

Incident recording is a crucial aspect of OHS management systems, focusing on responding to, learning from, and preventing workplace incidents. Effective processes for timely reporting and accurate documentation ensure that all incidents and near misses are captured, providing valuable data to identify trends, analyze risks, and demonstrate compliance with regulatory requirements.

**NOTE:** Templates and questionnaires for examining mining areas and incident management based on requirements established by the Rwanda Standards Board are provided in the practical tool chapter of this document.

## Risk Evaluation

During risk evaluation, the likelihood of a hazard and its consequences are compared to determine the severity of the risk as shown in the risk matrix below<sup>26</sup>:

**Table 2: Risk Matrix table**

		Likelihood			
		Likely (3)	Possible (2)	Unlikely (1)	
Consequence	Fatal Injury (4)	High (16)	High (12)	High (8)	Medium (4)
	Serious Injury (3)	High (12)	High (9)	Medium (6)	Medium (3)
	Significant Injury (2)	High (8)	Medium (6)	Medium (6)	Low (2)
	Minor Injury (1)	Medium (4)	Medium (3)	Low (2)	Low (1)

## Noise evaluation and monitoring

Effective noise management begins with thorough monitoring and assessment, allowing for the identification of high-noise areas and specific sources that require intervention. To accurately measure noise, a sound level meter is utilized to obtain decibel readings in designated areas to identify employees at risk, as well as machinery and equipment that contribute to elevated noise levels. These measurements are then compared against established noise standards, set by Rwanda Standards 117-2 2024, to assess compliance and identify necessary protective measures. Based on the results, employers can implement appropriate strategies to mitigate exposure, ensuring a safer working environment for all employees.

## Dust evaluation and monitoring

In accordance with Rwanda Standards 117-2 2024, mining and quarry companies are required to own a dust monitoring device, as depicted in the provided diagram. This device is used to measure dust particles, particularly during dry seasons when levels are likely to be higher. If dust levels exceed normal standards, dust protection measures must be implemented to mitigate potential health and environmental risks.

<sup>26</sup> Ministry of public services and Labor. (2019). *Regulations on occupational safety and health Risk assessment P8*. <https://www.mifotra.gov.rw/publications>.

**Table 3: Permissible limits of particulate matter**

PM 2.5		PM 10	
Annual average	24-hour average	Annual average	24-hour average
Shall not exceed 5 µg/m <sup>3</sup>	<b>Shall not exceed 15 µg/m<sup>3</sup></b>	<b>Shall not exceed 15 µg/m<sup>3</sup></b>	<b>Shall not exceed 45 µg/m<sup>3</sup></b>

**NOTE 1: Annual average concentration of PM2.5 should not exceed 5 µg/m<sup>3</sup>, while 24-hour average exposures should not exceed 15 µg/m<sup>3</sup> more than 3 - 4 days per year.**

**NOTE 2: PM10 (particulate matter with a diameter of 10 microns or less) concentrations of 15 µg/m<sup>3</sup> annual mean, 45 µg/m<sup>3</sup> 24-hour mean.**

Source: Rwanda Standards 117-2 2024

### Ventilation evaluation and monitoring

According to Rwanda Standard 117-7: 2024, the air quality in underground mines must meet specific conditions to ensure a safe working environment. Minimum oxygen levels of 19.5% and maximum carbon dioxide levels of 0.5% must be maintained, and each mine site must monitor air quality using calibrated equipment. Records of oxygen levels must be documented, and the ventilation system must be able to supply a sufficient amount of oxygen for breathing purposes. Additionally, no mine worker can enter underground areas with poor air circulation unless the air has been checked and deemed safe for breathing, free from hazardous gases.

**Multi-gas detectors** are now widely used as personal protectors and for gas monitoring purposes. For example, the Dräger X-am 2500 multi-gas detectors are used to measure 1 to 4 gas concurrently. The detector reliably detects combustible gases and vapors, as well as O<sub>2</sub>, CO, NO<sub>2</sub>, SO<sub>2</sub> and H<sub>2</sub>S.

### Temperature Monitoring

In accordance with Rwanda Standard 117-2 mine managers are responsible for implementing measures to protect employees from heat exposure at mine sites, ensuring that the occupational health and safety needs of workers are closely monitored, and that temperature-related hazards are identified. Mine operators must appoint trained personnel to measure heat stress levels and monitor workers for heat-related illnesses.

### Risk Control

Based on the risk evaluation, appropriate control measures are developed to reduce or eliminate the risk. Chapter 4 provides details on the main risk control strategies: Elimination, Substitution, Engineer solutions, Administrative solutions, and Personnel Protective Equipment

### Monitoring and Review

The effectiveness of implemented control measures should be regularly monitored to ensure they are working as intended. Monitoring can be done through inspections, audits, incident tracking, and worker feedback. Any gaps in risk control or new hazards that emerge should be identified, and the risk management plan should be revised accordingly. The frequency of risk monitoring and review should

be determined in accordance with the risk rating.

**Table 4: Risk ranking table**

Risk Rating	Urgency of action
High (8-16)	Immediate
Medium (3-6)	Within 3 months
Low (1-2)	Keep monitoring at low level

### 3.3. HEALTH ASSESSMENT

As required by RS 117-2, mine owners must ensure that all employees are covered by health and accident insurance before any mining activities begin. This regulation is a critical measure to protect the well-being of workers and promote safety and accountability within the mining sector.

**Employee medical examinations<sup>27</sup>:** These shall be conducted in accordance with the relevant instructions issued by the competent authority. All employees engaged in physically demanding tasks such as digging, underground transportation, blasting, drilling, and mineral processing must present a valid medical certificate of fitness before commencing work. Additional medical tests may be required based on the nature of the operations or as recommended by the competent authority. Regular medical check-ups must be conducted at least once a year or as frequently as deemed necessary by the authority. All medical examinations shall be properly documented and made available to the competent authority upon request.

Medical examinations conducted on all employees:

- Hearing;
- Blood pressure;
- Vision;
- Lung (breathing); and communicable diseases (e.g.: tuberculosis, etc.).

#### Hygienic facilities

Adequate and well-equipped hygienic facilities shall be provided to the mining site and shall take into consideration special needs for males and females.

Hygienic facilities include:

- Toilets (Separate male & female)
- Washrooms (Separate male & female)
- Handwashing facilities
- Changing rooms (Separate male & female)

Hygienic facilities shall be constructed with durable materials. Designated eating areas shall be separate from work areas and are clean and tidy.

#### Sanitary facilities

<sup>27</sup> Rwanda Standards Board. (2024). RS 117-2: Mining and Quarrying-Health and safety requirement\_ General. <https://portal.rsb.gov.rw/webstore.php>

- The mine owner shall ensure that mine works are equipped with latrines and urinals that are located and fitted out in such a way as not to spread odors. They shall be installed so that they do not pollute the working environment.
- Latrines and urinals shall always be kept clean and disinfected. Other places than the latrines shall not be used for such purposes.

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

### **Areas for food**

- Food shall not be stored or consumed in any area that is exposed to hazardous material, vapor or dust.
- Food shall be stored and consumed in clean, sheltered places.

## 4. OHS RISK CONTROL

OHS risk control refers to the systematic approach of mitigating workplace hazards to protect workers from accidents, injuries, and illnesses. In the context of mining operations, OHS risk prevention is crucial due to the inherently hazardous working conditions. Implementing preventive measures enhances worker safety, reduces operational disruptions, and contributes to overall productivity and economic sustainability. Effective risk control minimizes workplace injuries, fosters a safety-oriented culture, and ensures compliance with national and international regulations. By prioritizing risk prevention, mining operations can achieve improved worker well-being, environmental sustainability, and enhanced economic viability.

### 4.1. CORE PRINCIPLES OF OHS RISK CONTROL

The ILO OHS Management system, 2001, provides that hazard prevention and control procedures or arrangements should be established and should be in line with the following principles:

- Be adapted to the hazards and risks encountered by the organization
- Be reviewed and modified, if necessary, on a regular basis
- Comply with national laws and regulations and reflect good practice. More details on National Laws and Regulations can be found in point 1.5
- Consider the current state of knowledge, including information or reports from organizations, such as labour inspectorates, occupational safety and health services, and other services as appropriate.

### 4.2. RISK CONTROL STRATEGIES

Risk control strategies follow **the hierarchy of controls**<sup>28</sup>, a structured approach used to manage and minimize workplace hazards by prioritizing control measures based on their effectiveness. Its purpose is to eliminate or reduce risks to worker safety by implementing controls in a specific order, namely: elimination, substitution, engineering controls, administrative controls, and personal protective equipment (PPE). By following this hierarchy, workplaces can focus on the most effective solutions first, ensuring a safer and healthier environment while minimizing reliance on less effective measures like PPE.

<sup>28</sup> Ministry of public services and Labor. (2020). *Regulations on occupational safety and health risk assessment*. <https://www.mifotra.gov.rw/publications>.

## Elimination

- The most satisfactory method of dealing with hazards is to get rid of them. Once a hazard has been eliminated, the potential for harm has gone.

## Substitution

- This involves substituting a dangerous process or substance with one that is not as dangerous.

## Engineer solutions

- Introduce or substitute an engineered device to eliminate or reduce the risk.

## Administrative solutions

- Administrative solutions usually involve modification of the likelihood of an accident happening. This is done by reducing the number of people exposed to the hazard, and by ensuring that those who shall remain exposed know about the hazard and how best to manage it. Administrative solutions also include danger signs and written systems of work, such as those for working in confined spaces and lock-out procedures.

## PPE

- Provision of personal protective equipment shall only be considered when all other control methods are impractical. They provide a means to increase control and offer a last line of defense when used with another method higher up the hierarchy.

Figure 2: The hierarchy of control

Source: (RSB 117-2: 2024)

Eliminating or substituting harmful practices or substances should always be the first consideration, as these methods address risks at their source. When these options are not feasible, engineering controls and administrative controls help to mitigate exposure and enforce safe work practices. While PPE remains an important safeguard, it should be viewed as the last line of defense when all other strategies are insufficient.

## Elimination

Elimination involves completely removing a hazard from the mining process, ensuring that workers and the environment are no longer exposed to risks. High initial costs may be associated with transitioning to safer alternatives, but the long-term benefits outweigh the risks. However, some hazards are inherent to mining and cannot be completely eliminated, requiring additional risk prevention measures.

## Eliminating risks in mining

**Designing safe open pit mines<sup>29</sup>:** In accordance with RS 117-3, The following shall be observed when designing an open pit mine to eliminate potential risks:

- Where the vertical height of the face exceeds three meters and where explosives are used, bench drilling shall be carried out from the top of the bench
- A face shall not be drilled in a manner which shall create an overhang of the face, and where unconsolidated rock is mined; the face and sides shall be battered (that is, be at an appropriate angle) to prevent a collapse
- All loose material on the surface or on any bench shall be cleared to allow a clearance of at least 2m from the edge
- In excavations mined manually, a face or sidewall shall not exceed a vertical height of 1.5 m unless

29 Rwanda Standards Board. (2024). RS 117-3: Mining and Quarrying-Health and safety requirement\_ open pit. <https://portal.rsb.gov.rw/webstore.php>

the face or sidewall is sloping at an angle sufficient to ensure the safety of persons

**Designing safe underground mines:** Many risks can be eliminated through improved mine design. Requirements for underground mining operations are defined Rwanda Standards 117-4:2024, ensuring safety and structural integrity within mines. Key stipulations include:

- Maintaining the angle of inclined entrances to a maximum of 45 degrees in solid rock areas and 10 degrees in softer regions, with a minimum distance of 20 meters between entrances
- The entrance design must consider the characteristics of the mineral deposit, as well as the hardness of the rock, ensuring locations are free from potential collapses, slippage, or flooding risks
- Each mining site should have established personnel standards based on the size of headings and air requirements
- The minimum dimensions for main tunnels are required to be at least **1.50 by 1.80** meters, while other development drifts should not be less than **1 by 1.6** meters, tailored to the specific needs of the workforce and operation technology
- Access points for personnel and materials must be maintained in safe conditions, with a logbook to document examinations and remedies

**REMINDER: As per Rwanda Standards 117-4:2024, mining operations must not begin until at least one secondary exit has been constructed and connected to the primary underground opening. This secondary access serves a dual function, acting as both a ventilation route and an emergency exit for evacuations. It must be designed to ensure safe evacuations and facilitate air intake and outlet, and it should remain unobstructed and in a safe condition for use. Regular inspections are required to maintain the safety and functionality of this second means of access.**

## Substitution

Substitution involves replacing hazardous materials, processes, or equipment with safer alternatives that reduce risk exposure. Substitution requires thorough risk assessment to ensure that the alternative does not introduce new hazards.

### Substituting risk in mining

**Using Battery-Powered or Electric Equipment Instead of Diesel:** Diesel-powered equipment such as power generators currently dominates the mining sector of Rwanda due to limited access to grid power electricity. Such equipment generates harmful fumes and increases fire risk. Transitioning to electric or battery-powered mining equipment improves air quality underground and reduces the risk of fires and explosions.

**Upgrading machinery:** It is crucial for mining companies to replace old machinery with newer ones that pose less risk. For example, as a crusher ages, the side walls soften which can lead to rock projectiles, putting workers at risk. Hence it is crucial for the mine manager to replace the crusher or fix the side walls.

**Replacing Wooden Support Beams with Steel reinforcement:** Most small-scale mines in Rwanda rely on timber as means of support in the underground. In some cases, these timber supports can rot or fail under pressure. Using steel reinforcements enhances tunnel stability and reduces collapse risks.

## Engineering control

Engineering controls focus on designing safer work environments by implementing physical modifications to mining sites and equipment. These measures aim to prevent accidents and reduce exposure to harmful conditions.

### Engineering controls in mining

**Ventilation systems in underground mining:** Rwanda Standards Board 117-7:2024 require that ventilation system in mining operations must supply a minimum oxygen concentration of 19.5% and no more than 0.5% carbon dioxide by volume to ensure safe breathing conditions. It should effectively remove heat, maintaining comfortable working conditions, while also diluting and eliminating noxious and flammable gases encountered during mining operations. Additionally, the system must address hazardous airborne pollutants generated by various underground activities, including dust, fumes, aerosols, and vapors. The mine operator is responsible for excavating secondary shafts or egress points specifically for ventilation, ensuring that when multiple secondary shafts are constructed, they are located at different elevations where applicable. Furthermore, no mine worker shall enter any underground workplace, particularly areas with poor air circulation, unless the atmosphere has been tested to confirm it is safe and free from hazardous gas levels. The site operator is tasked with ensuring that adequate and effective ventilation is provided in all areas of the mine where personnel are working or traveling.

#### REQUIREMENTS: Ensuring proper ventilation in underground mining

- The mine operator shall excavate secondary shafts or egress for the purpose of ventilation.
- Where more than one secondary shaft is excavated, they should be located on different elevations where applicable
- No mine worker shall enter any workplace underground, in particular those places with poor air circulation, unless the air has been checked therein to ensure a safe breathable atmosphere free from levels of hazardous gases
- The manager shall ensure that adequate and effective ventilation is supplied to all places in a mine where persons are working or travelling
- The working area shall **contain at least 19.5 % oxygen and not more than 0.5 % carbon dioxide**
- Each mine site shall monitor levels of air quality especially in underground mines using calibrated equipment

*(Source: Rwanda Standards board RS 117-4)*

**Engineering control measures for dust control<sup>30</sup>:** Rwanda Standards Board 117-2:2024 on mining and quarrying stipulates that, to ensure safety, every mining and quarry company must have a dust monitoring device to assess airborne dust levels, particularly during dry seasons. If dust concentrations exceed acceptable standards, especially for particles ranging in size from **0.001 to 0.1 mm (1 to 100 µm)**, measures must be taken to prevent reduced visibility and irritation to the eyes, ears, nose, throat, and skin, as well as damage to lung tissues. Appropriate dust protection measures must be implemented to safeguard the health of workers.

<sup>30</sup> Rwanda Standards Board. (2024). RS 117-2: Mining and Quarrying-Health and safety requirement. General. <https://portal.rsb.gov.rw/webstore.php>

### TIP: Dust control measures

- **Dust suppression techniques:** Employ methods such as wetting down, utilizing all-weather surfaces, and incorporating agglomeration additives to reduce airborne particulate matter
- **Soil stabilization and revegetation:** Promptly revegetate or cover exposed soils and erodible materials to prevent unnecessary dust generation
- **Controlled excavation:** Minimize new area clearing and opening only when essential. When necessary, execute loading, transfer, and discharge of materials at a minimum height of fall, shielded against the wind, and consider incorporating dust suppression spray systems
- **Modified drilling methods:** Use water to suppress dust generation or employ a fine water mist to minimize dust dispersion
- **Proper ventilation:** Ensure the proper ventilation of working places, particularly dead ends, by providing dust-free air to the working face

(Source: Rwanda Standards board RS 117-4)

**Noise control**<sup>31</sup>: Rwanda Standards 117-2:2024 provides comprehensive guidance on noise control within mining operations. It emphasizes the importance of identifying and managing sources of noise, which can include vehicle engines, power generators, excavators, drilling machines, jackhammers, blasting operations, and crushers. To effectively control noise, it is vital to prioritize equipment maintenance. Regular maintenance can greatly reduce machinery and vehicle noise levels by minimizing vibrations and ensuring optimal performance. Additionally, implementing noise barriers or acoustical shields around noisy equipment can help absorb sound and reduce noise propagation in operational areas. These barriers can be constructed from materials specifically designed to dampen sound waves. Finally, strategic site planning plays a significant role in noise control. Designing the mine layout to position noisy operations away from residential areas and sensitive habitats, while also utilizing the natural topography as sound barriers, can further minimize noise impact on the surrounding environment.

**Personal Protective Equipment (PPE):** Providing workers with appropriate noise-canceling or absorbing ear protection, such as earplugs or earmuffs, can protect individuals from excessive noise exposure.

**Support Systems in Mining**<sup>32</sup>: Rwanda Standards 117-4:2024 outlines essential guidelines for timber support in underground mining and quarrying. Timber sets are required to support excavations in poor to very poor ground conditions and can be utilized in various structures such as haulages, material crosscuts, service drifts, and undercuts, provided that the span and height limitations allow for it. The standards specify the use of square timber sets for main drives and three-piece timber sets for smaller drives and undercuts, along with specialized configurations like false caps and pony sets to ensure effective passive support of the hanging and side walls. Long-grained hardwood timber is recommended for mine roof support due to its elasticity and strength, providing a warning of potential falls. Timber sizes should be selected based on rock conditions, the intended lifespan of the opening, and the type of timber used. Additionally, when using blockings, they should be at least 30cm thick and composed of multiple pieces, while footboards should meet specified dimensions when stulls are utilized in loose ground environments.

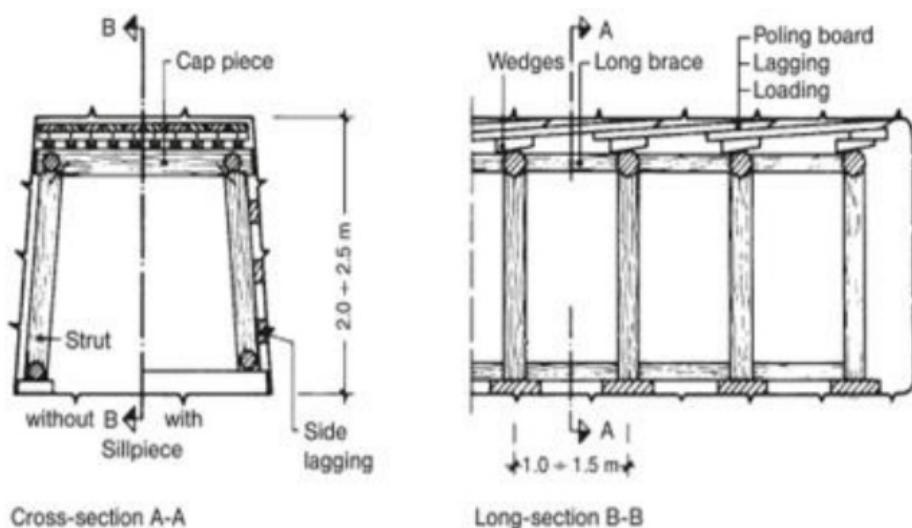
**Support Systems in Pegmatite zones:** Timbering remains a widely used ground support method, especially in small- and medium-scale underground operations due to its affordability and local availability. Timber props are commonly placed vertically under weak roofs (backs), supported by wooden lagging to prevent

31 Rwanda Standards Board. (2024). RS 117-2: Mining and Quarrying-Health and safety requirement\_ General. <https://portal.rsb.gov.rw/webstore.php>

32 Rwanda Standards Board. (2024). RS 117-4: Mining and Quarrying-Health and safety requirement\_ Underground. <https://portal.rsb.gov.rw/webstore.php>

rockfalls from the walls or ceilings. In larger or more unstable openings, square sets interlocking timber frames may be used to provide 3D structural support. Proper installation involves assessing ground conditions, selecting quality seasoned timber (such as eucalyptus or pine), setting props at regular intervals, and adding lagging to distribute pressure. Regular inspection and immediate replacement of damaged or deformed timber are essential to maintain safety.

While timbering is practical for short-term or shallow operations, it has limitations in durability, especially in wet or high-pressure environments. As mining operations deepen or expand, transitioning to more robust alternatives is recommended. These include mechanically anchored or resin-grouted rock bolts, wire mesh with shotcrete, and in more demanding conditions, cable bolts and fiber-reinforced shotcrete. These engineered solutions, though requiring greater initial investment, provide improved long-term stability, enhanced worker safety, and align with Rwanda’s goals of modernizing and formalizing its mining sector.



**Figure 3: Support Systems in Mining**

Source: RSB 117-4: 2024

## Administrative control

Administrative controls involve developing policies, procedures, and work schedules to enhance safety in mining operations. These measures do not remove hazards but instead aim to reduce exposure through structured work practices. Administrative controls are only effective if workers consistently follow safety protocols and procedures. Continuous training and communication are required to maintain safety standards.

### Administrative controls in mining

#### Machinery and electricity risk control:

All exposed and hazardous parts of machinery must be securely fenced or guarded to prevent contact with personnel. Emergency stop facilities should be readily accessible on all equipment and machinery that could pose a danger, allowing for immediate power cutoff in emergencies. Each site must implement a preventative testing and inspection system for safety-related equipment and machinery, with detailed records maintained of all activities. Where electricity is utilized, the mine operator must appoint a qualified individual to oversee all electrical installations and operations, accompanied by clear electrical signage. The mine’s electrical distribution system should be independent and equipped with switch gear to manage circuit interruptions during faults. Moreover, electrical circuits must be

safeguarded against overloads, short circuits, and earth faults, with protective measures in place for overvoltage and lightning strikes, including surge and lightning arrestors.

#### **TIP: Electricity risk control**

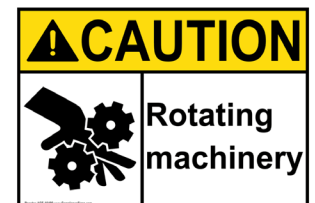
- All electrically operated equipment shall be selected, arranged, installed, protected, maintained and operated in such a manner as to prevent danger
- The mine's electrical distribution system should be independent and have switchgear systems to control circuit interruptions under fault conditions
- The mine's electrical circuits should be protected against overload, short circuit faults, and earth faults
- The protective means for protecting overvoltage and strikes from lightning should be in place. Surge and lightning arrestors should be installed in the mining installation sites
- The electrical operator shall insure that the mine's installation earthing system is installed and maintained at very low impedance to ensure reliable operation of electrical protective systems and devices
- The conductive parts of electrical equipment at the mining site shall be earthed to ensure adequate protection
- The emergency stopping systems and safety alarms shall be installed at the mine site and they shall be effective in case there are electrical faults and failures



*(Source: World Bank, Environmental, Health, and Safety Guidelines Base Metal Smelting and Refining)*

#### **TIP: Machinery operation risk control**

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



*(Source: World Bank, Environmental, Health, and Safety Guidelines Base Metal Smelting and Refining)*

**Mine Security and Access control:** As required by Rwanda Standards 117-2 All visitors and employees at the mine site must be logged upon arrival, and only authorized vehicles are permitted access. Individuals are required to avoid “No-Entry Zones” unless they have received authorization, and the possession or use of alcohol and drugs is strictly prohibited on-site. Additionally, anyone present at the mining site must not be under the influence of drugs or alcohol. An example access logbook is provided in the practical tools section of this document

**Signs in mining:** According to the Rwanda Standards 117-2, The mine owner must ensure that the

machine operating instructions and the danger signs are written in a language that is understandable to the user and displayed near the machine. The mine owner must ensure that smoking prohibition signs at the workplace and in premises where there are combustible or flammable materials are displayed in a visible place.

**Table 5: Types of signs and posters in mining**

Type of signs	Placement	Example
<p>Reminder signs: These signs enhance safety and compliance by reinforcing critical guidelines, hazards, and operational protocols to workers and visitors.</p>	<p>Placed in high-visibility areas such as site entrances, near hazardous zones, along haul roads, at equipment operation points, and in break areas.</p>	
<p>Directional signs: The purpose of directional signs in mining is to guide workers, visitors, and vehicles efficiently and safely to specific locations within the mining site, such as offices, processing plants, emergency exits, or loading zones, minimizing confusion and enhancing site navigation.</p>	<p>Placed at key decision points such as site entrances, intersections, near facilities like offices or workshops, along roads, and at pathways leading to critical areas like emergency assembly points.</p>	
<p>Warning signs: The purpose of warning signs in mining is to alert workers and visitors to potential hazards or dangerous conditions, such as unstable ground, explosives, heavy machinery, or restricted areas, to prevent accidents and ensure safety.</p>	<p>Placed near hazardous areas, such as unstable ground, high-traffic zones, blasting sites, steep inclines, confined spaces, electrical installations, and near heavy machinery or processing plants.</p>	
<p>Prohibiting signs: to clearly indicate actions or behaviors that are not allowed, such as unauthorized entry, smoking prohibition, alcohol consumption prohibition, no trespassing.</p>	<p>Placed at entrances to restricted areas, near hazardous zones like explosive storage or fuel depots, around sensitive equipment, and in areas where specific activities like smoking or unauthorized access are strictly forbidden.</p>	

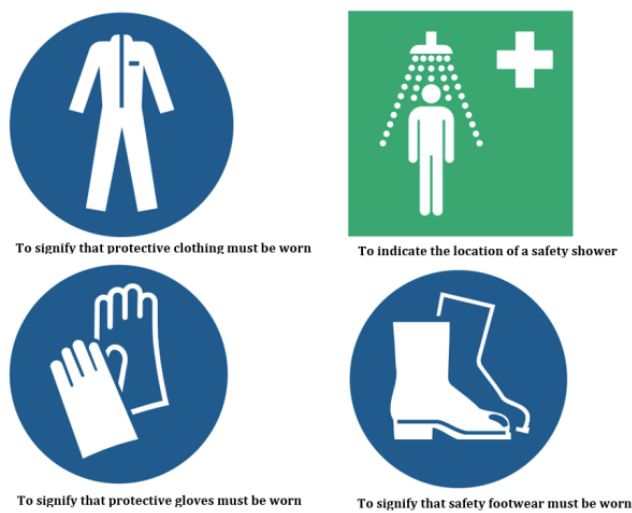
Source: Rwanda Standards Board 117-2:2024

**Keeping mining operational areas secure:** As per Rwanda Standard 117-2, the Mine Manager is responsible for securing operational areas of the mine to prevent unauthorized entry by local residents, ensuring safety through appropriate measures. Warning signs must be prominently displayed to caution individuals, and mine vehicles and equipment should be operated safely to protect nearby residents. Any closed-off sites, such as shafts and tunnels, should be properly barricaded and marked with

“**DANGER, NO ENTRY**” signage. Additionally, excavated materials should be used to create a ridged barrier around any excavation site, minimizing the risk of falls.

**Protection against subsidence and caving:** Rwanda Standard 117-2 required that in areas where mining operations may have caused or could potentially cause cracks, subsidence, or cavities on the surface, those areas must be fenced off and clearly marked with warning signs to alert the public about the risks. The Mine Manager is tasked with implementing safety measures, including the design of safety pillars to protect surface installations and nearby dwellings over mine workings. Additionally, mining operations are prohibited within a 50-meter horizontal distance from any structures, such as buildings, roads, and water bodies, to prevent any potential surface damage. Construction activities of any kind, including buildings and roads, are also disallowed within this 50-meter radius from caving areas.

**Chemical Exposure:** Chemical exposure signage is a vital element of Occupational Health and Safety management in mining operations, where hazardous materials may be present. These signs serve to alert workers to the potential risks associated with specific chemicals, including their toxic properties, required personal protective equipment (PPE), and emergency response procedures in the event of exposure. Color-coded and clearly labeled, these signs should be strategically placed in areas where chemicals are stored, handled, or utilized, ensuring that all personnel can easily identify and understand the hazard.



**Figure 4: Signs to warn against chemical exposure**

Source: RSB 117-2: 2024

**Employee hygiene:** In line with guidelines set by the Rwanda Standards Board, mining sites must provide adequate and well-equipped hygienic facilities, catering to the specific needs of both males and females. These facilities should include separate toilets, washrooms, handwashing stations, and changing rooms, constructed from durable materials. Additionally, designated eating areas must be kept separate from work zones and maintained in a clean and tidy condition.

The mine owner is responsible for ensuring the availability of sanitary facilities, including properly located latrines and urinals that do not emit odors or pollute the working environment. These facilities must be regularly cleaned and disinfected, with strict prohibitions on using non-designated areas for such purposes. Regarding drinking water, workers must not consume mine water; instead, an adequate supply of potable water should be accessible at all main work sites. Drinking containers must be dustproof and kept sealed when not in use to avoid contamination. Furthermore, food storage and consumption should occur only in clean, sheltered areas, away from hazardous materials. Prior to starting work, the mine owner must also ensure that every employee has health and accident insurance.

**REQUIREMENTS:** Employee medical examinations must be conducted in accordance with guidelines set by Rwanda Standards 117-2 2024-Mining and quarrying General (p.17). All employees engaged in physically demanding roles—such as diggings, underground transportation, blasting, drilling, and processing—must provide a medical certificate of fitness before starting work. Additional tests may be required based on specific operations or recommendations from the governing body in charge of mines (RMB). Regular medical check-ups are mandated annually or as deemed necessary by authorities, and records of these examinations must be documented and made available upon request. The medical examinations for all employees include assessments of hearing, blood pressure, vision, lung function (breathing), and screening for communicable diseases, such as tuberculosis.

**Blasting administrative controls:** The mine owner must establish a documented procedure for blasting operations, including a technical design and report that outlines the expected results and impacts. This design must incorporate a pre-blasting survey of neighboring infrastructure within a 1 km radius. Blasting plans, which include pre-blasting technical designs, must be submitted to the governing body in charge of mines (RMB) as required. A pre-blasting survey will be conducted by an inspection team comprising the mine owner, an authorized representative from the governing body in charge of mines (RMB), and local authorities. Blasting operations must be carefully designed to ensure the safety of the neighboring community and to protect both infrastructure and the health of individuals in the vicinity. Additionally, if repetitive blasting operations are to take place in the same area, their cumulative effects must be assessed. Finally, a competent blasting engineer must approve the design of all blasting operations.

**Blasting Vibration and Noise Control:** Mines that use explosives must monitor and record vibrations resulting from blasting activities to ensure compliance with established limits.

**Acceptable Blasting Vibration Limits:** Peak Particle Velocity (PPV) should not exceed **4 mm/sec** near residential areas. In open spaces far from residential areas and for underground blasting, PPV should not exceed **10 mm/sec**.

**Blasting Noise Control:** The impact of blasting noise must be measured in Decibels (Linear Peak or dB Peak).

**Acceptable Blasting Noise Limits:** Blasting noise should not exceed **80 dB (Lin Peak)** near residential areas.

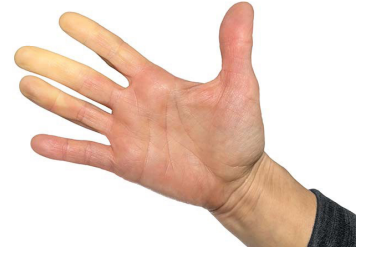
*(Source: Rwanda Standards board RS 117-5)*

**Standard Operation Procedures (SOPs) for Blasting:** In accordance with the Rwanda standards board, the following shall be observed:

- The mine owner shall have a documented procedure for blasting operations. The procedure shall require a technical design and report detailing the expected results and impact of the blasting operations. The design for blasting operations shall include pre-blasting survey (conditions of neighbor infrastructure within at least 1 km radius).
- The mine owner shall submit blasting plans as required by the governing body in charge of mines (RMB). The blasting plans shall include pre-blasting technical designs.
- A pre-blasting survey shall be conducted by the inspection team composed of the owner, an authorized person from the governing body in charge of mines (RMB), and local authority.
- The mine owner shall carefully design blasting operations so as to avoid affecting safety to neighbor community including infrastructure and the health and safety of people in the blasting area.
- Where repetitive blasting operations are to be conducted in the same area, effect of repetitive blasting shall be assessed.

- The design for blasting operations shall be approved by a competent blasting engineer.

**Vibration Control:** Workers using handheld machinery like pneumatic rock drills and pick hammers are at risk of developing Vibration White Finger (VWF), even with just one hour of usage daily, which can lead to numbness, severe pain, and tissue damage, potentially resulting in gangrene due to reduced blood supply to the extremities. Symptoms of VWF include discolored skin and foul discharge, and it is important to note that there is no cure for this condition. To prevent the adverse effects of vibration, employees must not exceed the specified tolerance limits, and safety procedures should be reinforced regularly. Recommendations for mitigating vibration exposure include limiting usage duration, employing vibration-dampened equipment, ensuring tools are maintained or equipped with anti-vibration handles, and encouraging lighter grips or proper support for heavier tools during operation.



**REMINDER:** Avoid long periods using handheld vibrating equipment. Work in short bursts, e.g.: Take regular breaks of at least 10 min every hour away from the tool.

*(Source: Rwanda Standards Board 117-2)*

## Personal protective equipment

Personal protective equipment (PPE) serves as the last line of defense against workplace hazards. When elimination, engineering, and administrative controls are not sufficient to mitigate risks completely, PPE helps protect workers from injuries and illnesses. Proper training on the correct use, maintenance, and replacement of PPE is essential to ensure its effectiveness in preventing occupational injuries and health hazards.

### REQUIREMENTS: Mine workers and owner's obligations on PPEs

#### Obligations of the mine owner:

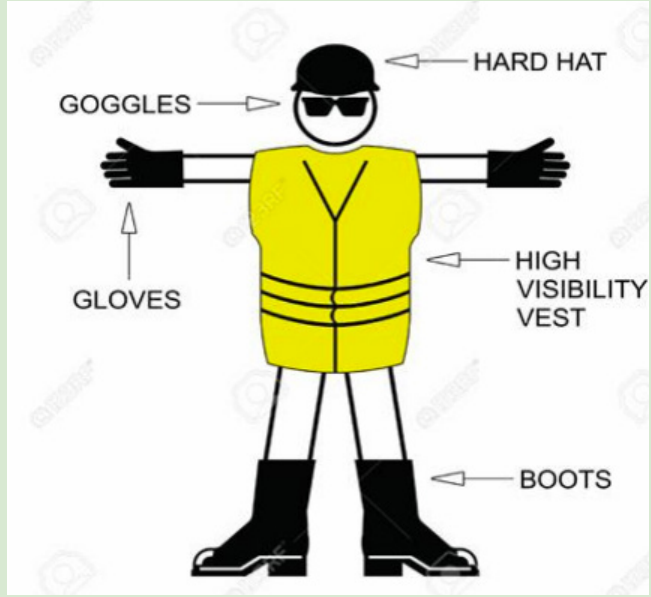
- To provide appropriate PPEs to mine workers free of charge
- To ensure that all mine workers have and wear appropriate PPEs

#### Obligations of the mine worker:

- To wear appropriate PPEs at all times when working in the mine
- To take good care of the PPEs provided to them

*(Source: Rwanda Standards Board 117-2)*

**Table 6: Basic PPEs in a mining operation**

Type of PPEs	Illustration
Hard hat: to protect against hazards of falling objects	
Gloves: for work that might cause injury to the hands	
Safety boots: to protect against danger of slipping or injury to the feet	
Reflective vest: to increase the wearer's visibility in low-light conditions or high-traffic areas	
Safety goggles: where there is a danger from flying particles that may cause injury to the eyes	
Respirator mask: where excessive airborne dust is produced	
Earmuffs: where excessive noise levels are produced	<p><i>Image source: Rwanda Standards 117-4:2024</i></p>

# 5. EMERGENCY RESPONSE PLAN

Mining, particularly in artisanal and small-scale mining settings, is an inherently hazardous activity that exposes workers and surrounding communities to significant risks. Emergency response arrangements should therefore be established and maintained. These arrangements should identify the potential for accidents and emergency situations and address the prevention of OHS risks associated with them. The arrangements should be made according to the size and nature of activity of the organization<sup>33</sup>.

A well-structured ERP offers numerous advantages for mining operations, ensuring better preparedness and a coordinated response to emergencies. Key benefits include:

**Enhanced Worker Safety:** An effective ERP provides clear protocols for immediate action, reducing injury rates and improving survival chances in critical situations.

**Minimized Operational Downtime:** Quick response mechanisms help mitigate damage and allow for faster recovery, ensuring continuity in mining activities.

**Protection of the Environment:** Emergency preparedness can prevent or reduce the impact of hazardous material spills and uncontrolled waste discharge.

**Regulatory Compliance:** Having an ERP aligns mining operations with national and international safety standards, avoiding legal penalties and enhancing the company's credibility.

**Improved Community Relations:** Effective emergency management fosters trust between mining companies and local communities, demonstrating a commitment to safety and sustainability.

**Cost Savings:** Proactive emergency preparedness reduces financial losses associated with property damage, medical expenses, and compensation claims.

## 5.1. COMMON EMERGENCIES IN MINING

Mining operations in Rwanda face unique challenges that make them particularly vulnerable to emergencies. According to the Rwanda standards RS 117-2, common emergencies include:

**Mine Collapses:** In Rwanda's mining sector, unstable underground tunnels, unsupported excavation, and heavy rainfall especially in high-risk areas with steep terrain can trigger sudden cave-ins, trapping or injuring miners. Many small-scale mining operations lack proper geological assessments and reinforcement structures, increasing collapse risks.

**Fires and Explosions:** Inadequate ventilation in many underground mines, combined with the presence of flammable gases and unsafe handling of explosives, can lead to deadly fires and explosions. Many mining sites rely on traditional methods of blasting without strict safety protocols, heightening the danger.

**Flooding:** Unregulated water drainage, heavy seasonal rains, and the lack of proper dewatering systems are the main cause of sudden flooding in many mines across Rwanda, endangering workers and equipment. The risk is particularly high in underground mines located near rivers or in low-lying areas.

**Landslides:** Steep slopes, deforestation, and poor mining practices contribute to landslides, particularly in Rwanda's hilly terrain. Mining operations without proper slope stabilization or waste management can lead to soil erosion and deadly landslides, endangering workers and nearby communities.

<sup>33</sup> International Labor Organization (2001). *Guidelines on occupational safety and health management systems P.12.* <https://www.ilo.org/research-and-publications>

**Equipment-Related Accidents:** Many mines across the country use aging or poorly maintained machinery, increasing the risk of mechanical failures and fatal accidents. In small-scale operations, improper use of equipment due to limited technical training further exacerbates safety hazards.

An effective ERP enables mine operators and workers to respond quickly and efficiently to crises, reducing injuries and fatalities while also mitigating economic losses. Proper emergency preparedness involves risk assessment, training, resource allocation, and clear communication strategies to handle unforeseen incidents.

## 5.2. EMERGENCY RESPONSE PREPAREDNESS

Emergency preparedness outlines the response procedures and preventive measures that are essential for effective and timely management of an emergency situation<sup>34</sup>.

### Emergency response preparedness procedures

According to RS 117-2, P.24, the emergency response preparedness procedure should include the following:

- Engineering controls (such as containment, automatic alarms, and shutoff systems) proportionate to the nature and scale of the hazard
- Identification and secure access to emergency equipment available on-site and nearby
- Notification procedures for designated emergency responders
- Diverse media channels for notification of the affected community and other stakeholders
- A training program for emergency responders including drills at regular intervals
- Public evacuation procedures
- Designated coordinator for implementation
- Measures for restoration and clean-up of the environment following any major accident

### Developing an Emergency Response Plan

An effective emergency response plan is crucial for ensuring the safety of workers, protecting assets, and minimizing operational disruptions. Below are the key components of an effective ERP.

**Emergency Scenarios:** The ERP should outline potential emergency scenarios and their possible triggers. Examples include:

*Table 7: Examples of emergency scenarios*

Emergency scenario	Possible trigger
Mine Collapses	Unstable geological conditions, inadequate support structures, or seismic activity
Fires and Explosions	Flammable gases in underground, equipment malfunctions, blasting misfires

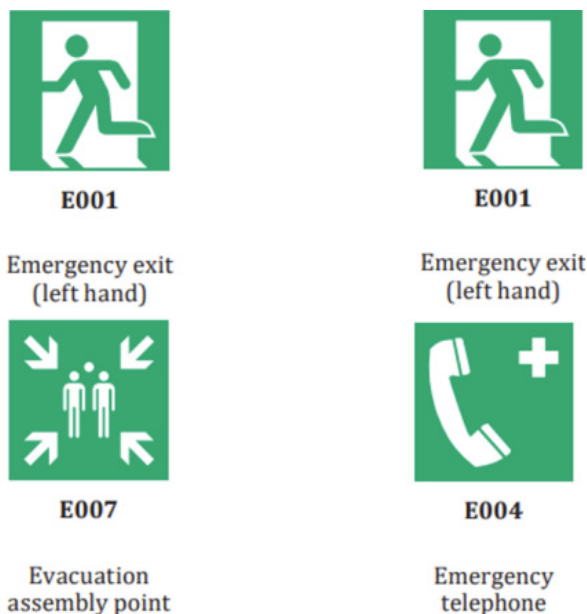
<sup>34</sup> Ministry of energy, mines and petroleum resources British Columbia (2017). *Guidelines for the mining industry*. <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/>

Hazardous Material Spills	Leaks or accidental discharges of toxic substances
Medical Emergencies	Poor ventilation, injuries from machinery, or heat stress

**Assigning Roles and Responsibilities:** Clearly defining roles is essential for a coordinated response during an emergency. Key roles include:

- *Emergency Response Coordinator:* Oversees emergency management efforts and coordinates with authorities
- *Safety Officers:* Ensures compliance with safety protocols and assist with evacuations
- *Medical Response Team:* Provides first aid and medical support
- *Communications Officer:* Disseminates information internally and externally
- *Equipment & Logistics Team:* Ensures that emergency resources are readily available and operational

**Emergency Evacuation Signage:** Evacuation signage is a critical component of emergency response preparedness in mining operations, ensuring the safety and well-being of all personnel in high-risk environments. Effective signage should be strategically placed throughout the mining site, clearly indicating multiple evacuation routes, emergency exits, and assembly points. These signs must be easily recognizable, utilizing bold graphics and universally understood symbols to convey urgency and direction, even in low visibility conditions. Regular inspections and maintenance of evacuation signage are essential to ensure they remain visible and legible. Additionally, conducting training sessions that familiarize workers with the signage and evacuation procedures can enhance preparedness, helping to facilitate a swift and organized evacuation during emergencies.



**Figure 5: Example of Safety Signs for Emergency Evacuation**

Source: RSB 117-2:2024

**Communication Protocols:** Reliable communication is crucial for a timely response in emergencies, and the Emergency Response Plan should encompass primary communication channels such as radio systems, sirens, alarms, and mobile networks, along with clear guidelines outlining the information flow, specifying who communicates what and when.

**Evacuation Plan:** A detailed evacuation plan is essential for the safe exit of personnel from hazardous zones, encompassing clearly marked evacuation routes that guide individuals to designated safe zones or assembly points, which are located away from potential dangers. Additionally, the plan should involve regular drills and training to ensure that all workers are familiar with the evacuation procedures,

enhancing their preparedness and ability to respond effectively during emergencies.

**Resource Inventory:** A comprehensive inventory of emergency resources is crucial for ensuring operational readiness in crisis situations. This inventory should encompass a variety of essential items, including rescue equipment such as stretchers, breathing apparatus, and gas detectors; fire suppression tools like extinguishers, sprinkler systems, and foam suppression systems; medical supplies including first aid kits, oxygen tanks, and defibrillators; protective gear such as helmets, gloves, respirators, and visibility vests; as well as backup power supplies, including generators, batteries, and lighting systems, to effectively respond to emergencies and safeguard personnel.

**Coordination Mechanism:** Collaboration with local authorities and emergency responders significantly boosts the effectiveness of an Emergency Response Plan (ERP). Key coordination elements involve establishing strong communication channels with emergency services, such as fire departments, medical teams, and law enforcement, to ensure a rapid and organized response during incidents. Key contact information is found in the next subchapter 5.3. Additionally, creating mutual aid agreements with nearby mines or industries allows for the sharing of resources and expertise, further enhancing the collective ability to manage emergencies effectively.

## 5.3. EMERGENCY RESPONSE PROCEDURES

### Incident reporting

Accurate and timely recording and reporting of incidents and accidents is critical to maintaining a safe and compliant mining environment. Effective reporting ensures that hazards are addressed promptly, lessons are learned to prevent future occurrences, and regulatory requirements are met. Rwandan mining regulations stipulate that any incident no matter how slight, shall be documented and kept at mine site<sup>35</sup>. Moderate, major and catastrophic incidents shall be reported to the governing body in charge of mines (RMB).

**Reporting Requirements:** Rwanda Standard Board 117-2 (page) requires that accidents need to be reported in accordance with their severity. Accidents that result in the death of an individual, cause a person to become unconscious or require hospitalization, or feature injuries that could potentially lead to permanent disability must be reported immediately to the governing body in charge of mines (RMB). Along with the notification, the presumed cause of the accident should be included, which will serve as a foundation for the subsequent investigation into the actual cause of the incident. Prompt reporting is essential to ensure that appropriate measures can be taken to prevent similar occurrences in the future

Various incidents occurring at the mine site must be officially reported to the governing body in charge of mines (RMB) within 24 hours. These incidents include any accidents involving explosives, such as accidental ignition or detonation, significant flooding of mine workings or failure of dams, accidental explosions or large fires caused by dust, gas, oil, or vapor, electrical shocks or burns requiring medical treatment, extensive caving or subsidence in underground work, and prolonged failures of the main ventilation system. All reports must adhere to the prescribed format detailed in chapter 7: Practical tools, to ensure consistency and compliance

**Record keeping<sup>36</sup>:** Rwandan mining regulations require mine managers to maintain a comprehensive register documenting all accidents, dangerous occurrences, and diseases. This register must be accessible to inspectors from the governing body in charge of mines (RMB), and relevant extracts should be submitted as formal reports. All incidents, no matter how minor, must be recorded and retained at

35 Rwanda Standards Board. (2024). RS 117-2: *Mining and Quarrying-Health and safety requirement\_ General*. <https://portal.rsb.gov.rw/webstore.php>

36 Rwanda Standards Board. (2024). RS 117-2: *Mining and Quarrying-Health and safety requirement\_ General*. <https://portal.rsb.gov.rw/webstore.php>

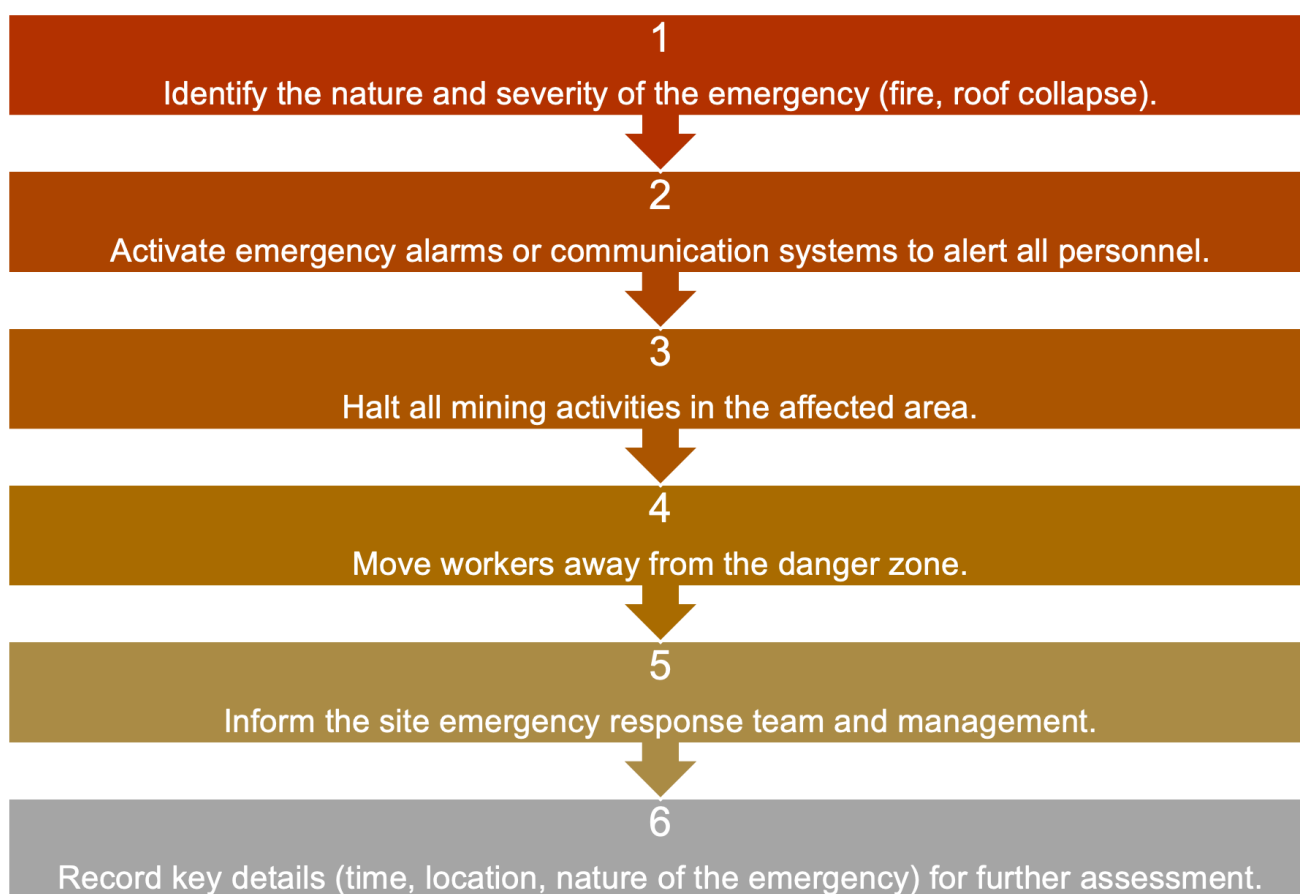
the mine site. For incidents classified as moderate, major, or catastrophic, additional reporting to the governing body in charge of mines (RMB), is mandatory, ensuring a thorough and transparent approach to workplace safety and health in the mining industry. Refer to the accident reporting and risk register templates included in chapter 7: Practical tools.

## Response action

Effective emergency response is critical in mining operations to ensure the safety of workers, protect assets, and minimize operational disruptions. This guideline outlines key actions to be taken in response to emergencies, including first response measures, evacuation procedures, and medical assistance.

**First Response:** The objective of first response is to secure the site and ensure workers' safety immediately after an incident. The following steps can be taken:

*Figure 6: Steps for emergency first response*



**Evacuation Procedures:** Evacuation procedures ensure safe and orderly evacuation from hazardous areas. The table below highlights key elements of an effective evacuation procedure.

*Table 8: Evacuation procedures*

Elements	Actions
Designated evacuation Routes	<ul style="list-style-type: none"> <li>■ Identify the primary and secondary evacuation routes</li> <li>■ Keep the routes clear of obstructions</li> </ul>

Assembly Points	<ul style="list-style-type: none"> <li>Direct workers to pre-identified safe zones/assembly points</li> <li>Conduct headcounts to ensure everyone is accounted for</li> </ul>
Emergency evacuation Coordination	<ul style="list-style-type: none"> <li>Assign evacuation leaders to guide workers</li> <li>Implement a buddy system, ensuring no one is left behind</li> </ul>
Handling Special Cases	<ul style="list-style-type: none"> <li>Assist injured or disabled workers</li> <li>Use emergency lighting if visibility is poor</li> </ul>
Re-entry Protocols	<ul style="list-style-type: none"> <li>Restrict access until the site is declared safe by authorities or competent staff members</li> </ul>

## Fire-Fighting<sup>37</sup>

**Table 9:** Classification of fires and extinction methods

Classification	Description	Extinguishing methods
Class A	These are fires involving solid materials normally of an organic nature (compounds of carbon), in which combustion generally occurs with the formation of glowing embers.	<ul style="list-style-type: none"> <li>Water in the form of a jet or spray or such other agents may be used as suitable fire-extinguishing agents</li> </ul>
Class B	These are fires involving liquids or liquefiable solids. The choice of an effective extinguishing agent hinges on their attribution to one of two groups:  a) those that are miscible with water  b) those that are not miscible with water	<ul style="list-style-type: none"> <li>Where the fire falls under “Class B a)”, the extinguishing agents include water spray, foam, and vaporizing liquids; and</li> <li>Where the fire falls under “Class B b)”, the extinguishing agents are vaporizing liquids, carbon dioxide and dry chemical powders and such other agents</li> </ul>
Class C	These are fires involving gases or liquefied gases in the form of a liquid or gas leak or liquid spillage and these include methane, propane, butane.	<ul style="list-style-type: none"> <li>Foam or dry chemical powder can be used to control fires involving liquid spills and gas leaks</li> <li>Water, in the form of spray, may only be used to cool the containers</li> </ul>
Class D	These are fires involving metals. Extinguishing agents containing water are ineffective and even dangerous; carbon dioxide and the bicarbonate classes of dry chemical powders may also be hazardous if applied to most metal fires.	<ul style="list-style-type: none"> <li>Powdered graphite, powdered talc, soda ash, limestone and dry sand are normally suitable for Class “D” fires.</li> <li>Special fusing powders may also be used for fires involving some metals, especially those which are radioactive.</li> </ul>

37 Rwanda Standards Board. (2024). RS 117-2: Mining and Quarrying-Health and safety requirement\_ General. <https://portal.rsb.gov.rw/webstore.php>

**Medical Assistance:** Every mine site must have a designated first aid room equipped with ample first aid kits. Trained personnel should be available to effectively use these kits. Additionally, the first aid room is required to maintain detailed records of treated cases, including the injured or ill person's name, the nature of the injury or illness, the treatment provided, the name of the person administering the treatment, along with the date and time of the treatment. Providing prompt and appropriate first aid to injured workers during an accident is crucial to minimize the consequences and prevent further harm. The essential step-by-step process includes:

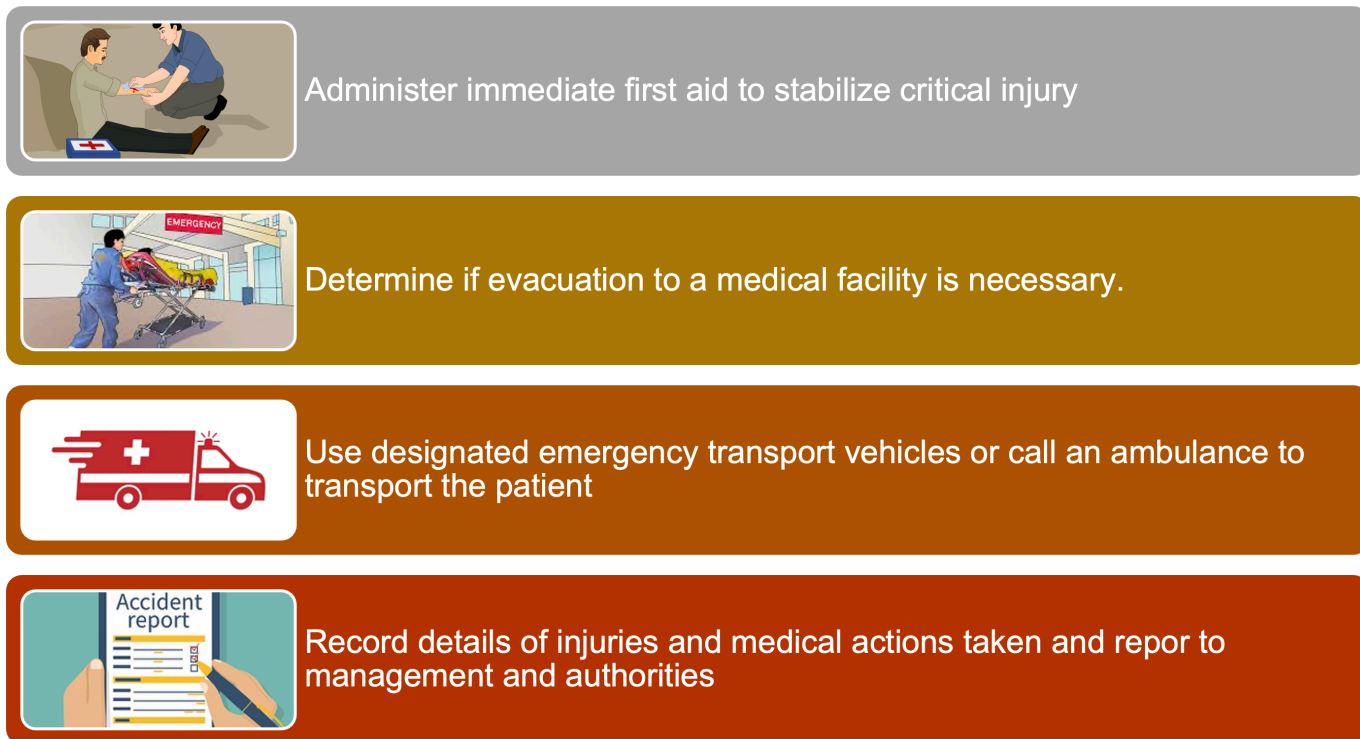


Figure 7: Process to provide medical assistance following an accident

### Post Emergency Actions

Post-emergency actions are crucial in ensuring that mining operations recover effectively while prioritizing worker safety and future risk mitigation. This section outlines essential steps to analyze incidents, support affected workers, and update emergency response plans based on lessons learned.

**Incident investigation:** According to RS 117-2, A final investigation report shall be conducted and report submitted to the governing body in charge of mines (RMB) within 7 days. During an investigation, it is essential to:

- Conduct a detailed review of the incident, including witness statements and environmental conditions
- Identify the root causes and contributing factors
- Develop corrective actions to prevent similar incidents from happening again
- Prepare a detailed investigation report and communicate findings to management and relevant stakeholders

**Worker support:** Worker support is a critical aspect of mine safety, aiming to provide necessary medical and psychological support to affected workers. This involves ensuring all injured workers receive prompt and proper medical treatment, offering psychological counseling and support programs where necessary,

providing financial and insurance assistance when applicable, and closely monitoring recovery progress to facilitate a smooth reintroduction into the workforce.

## Collaboration with stakeholders

Effective collaboration with stakeholders, including regulatory agencies, local authorities, and surrounding communities, is essential for ensuring compliance, fostering trust, and enhancing emergency response effectiveness. This section provides guidelines for engaging with key stakeholders to promote safety and sustainability in mining operations.

**Engaging regulatory agencies:** To ensure compliance with legal requirements and industry best practices, the mining company should:

- Foster transparent communication with all relevant regulatory bodies including RMB, the Rwanda National Police and local authorities
- Regularly review and update emergency response plans to ensure alignment with national and international standards
- Promptly submit all required reports and incident documentation (see section 6.2. Incident Reporting and Learning) for detailed information on reporting.
- Actively engage in government-led inspections and audits to promote operational safety

**Collaboration with local authorities:** Close collaboration with local authorities strengthens emergency preparedness and coordination by taking advantage of local emergency response units. To ensure full collaboration with local authorities, mining companies should:

- Establish partnerships with Rwanda national police, and medical services
- Develop joint emergency response drills to improve coordination
- Share emergency contact details and response protocols with relevant authorities.

**Community engagement:** The objective of community engagement is to build trust and ensure the safety of surrounding communities. The following can be done to achieve optimal community engagement:

- Conducting regular community awareness programs on mining-related risks and emergency preparedness
- Establishing feedback mechanisms for community concerns regarding safety and environmental impact
- Implementing social responsibility initiatives to support local development
- Collaborating with community leaders to develop evacuation plans that consider nearby settlements

### Tip: Contact information of key regulatory bodies and emergency numbers

Rwanda Mines Petroleum & Gas Board RMB:

Email: [info@rmb.gov.rw](mailto:info@rmb.gov.rw) Phone: +250788386220/Toll Free: 2930

Rwanda National Police (RNP):

Email: [info@police.gov.rw](mailto:info@police.gov.rw) Phone: 112 | +250 788 311 155

National Police Fire and Rescue:

Phone: 0788 311 120

Ambulance:

Phone: 912

**Note:** For emails of district offices type: info@*district name*.gov.rw (*insert district name in the place holder highlighted in yellow*)

## 5.4. ESTABLISHING A RESCUE TEAM

**Team composition and selection:** Mine management shall select team members based on physical fitness, reliability, and willingness to participate in rescue operations. Include miners from different shifts and roles to ensure 24/7 coverage and diverse skills.

**Defining roles and responsibilities:** Clearly assign roles such as team leader, first aid responders, communication officers, and equipment handlers. Establish a chain of command and decision-making protocols for emergency scenarios.

**Equipping the team:** Provide essential rescue equipment, including breathing apparatus, first aid kits, stretchers, communication devices, safety ropes, helmets, and lighting. Ensure all equipment meets safety standards and is regularly maintained.

**Developing and conducting training programs:** The mine shall develop a comprehensive training program covering:

- **Basic and advanced first aid** including CPR and trauma management.
- **Use of rescue equipment** such as self-contained breathing apparatus (SCBA), gas detectors, and stretchers.
- **Mine emergency procedures** including evacuation plans, communication protocols, and hazard identification.
- **Firefighting techniques** relevant to underground conditions.
- **Search and rescue operations** including confined space navigation, victim extrication, and safe recovery

Training should combine theory with practical drills and simulated emergency exercises.

**Conducting Drills:** Conduct frequent rescue drills (at least quarterly) to keep skills sharp and identify improvement areas. Schedule annual refresher courses and certification renewals to maintain high

preparedness levels.

**Collaboration and Coordination:** The mine should establish links with local emergency services, hospitals, and government agencies for coordinated response during major incidents. Share training resources and participate in joint exercises where possible.

**Documentation and Reporting:** The mine shall maintain records of team member training, drill outcomes, equipment inspections, and incident reports. Use these records to review and improve rescue readiness continuously.

# 6. MONITORING AND EVALUATION

Monitoring and Evaluation (M&E) in occupational health and safety is essential to ensure compliance with safety regulations, protect workers, and improve workplace conditions. A strong M&E system helps organizations identify risks, implement corrective actions, and achieve continuous improvement in safety standards.

## Benefits of a strong M&E system include:

- Enhancing workplace safety and reduces accidents
- Ensuring compliance with legal and regulatory requirements
- Identifying areas for improvement in OHS policies and practices
- Increasing accountability among stakeholders
- Providing data-driven insights for decision-making
- Building a culture of safety and continuous learning

## 6.1. CONTINUOUS IMPROVEMENT

### Setting Goals

Setting goals is a critical component of continuous improvement in Occupational Health and Safety (OHS). By defining clear objectives, organizations can systematically reduce risks, enhance compliance, and create a safer work environment. Effective goal-setting ensures that safety initiatives align with broader organizational priorities and regulatory requirements.

**Table 10: Setting OHS goals**

Steps to set goals	Actions
Step 1: Identifying organizational needs	<ul style="list-style-type: none"> <li>■ Conduct risk assessments to determine current challenges</li> <li>■ Gather input from employees and stakeholders</li> <li>■ Analyze past incidents and trends to identify improvement areas</li> </ul>
Step 2: Establishing clear, measurable objectives	<ul style="list-style-type: none"> <li>■ Define Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) goals</li> <li>■ Align objectives with legal requirements and company policies</li> <li>■ Prioritize goals based on risk levels and organizational priorities</li> </ul>
Step 3: Defining KPIs	<ul style="list-style-type: none"> <li>■ Identify metrics such as incident rates, near-misses, and compliance levels</li> <li>■ Set benchmarks based on industry standards</li> <li>■ Establish a system for collecting and analyzing KPI data. <i>See chapter 2.4</i></li> </ul>
Step 4: Developing an action plan	<ul style="list-style-type: none"> <li>■ Outline detailed steps to achieve goals</li> <li>■ Assign responsibilities to relevant teams or individuals</li> <li>■ Set timelines and milestones for progress tracking</li> </ul>
Step 5: Implementing the plan	<ul style="list-style-type: none"> <li>■ Communicate goals and expectations to employees</li> <li>■ Provide necessary training and resources</li> <li>■ Integrate safety initiatives into daily operations</li> </ul>
Step 6: Monitoring and adjusting	<ul style="list-style-type: none"> <li>■ Conduct regular reviews of progress</li> <li>■ Collect and analyze feedback from employees and stakeholders</li> <li>■ Modify strategies as needed to ensure continuous improvement</li> </ul>

## Tracking progress

Tracking progress on OHS measures is crucial for ensuring that safety initiatives are effective and continuously improving. By systematically monitoring safety performance, organizations can identify gaps, measure the impact of interventions, and make data-driven decisions to enhance workplace safety. This involves setting clear performance indicators, collecting data on incidents and near-misses, and incorporating employee feedback to refine OHS strategies.

## Regular Inspections

**Self-assessment:** Internal safety audits and reviews should be conducted at scheduled intervals, utilizing checklists to identify potential hazards and areas for improvement. Employees should be encouraged to participate in self-assessments and report concerns, fostering a culture of proactive safety monitoring.

**Independent audits:** Third-party auditors should be engaged to provide an objective evaluation of OHS performance. Results should be benchmarked against industry standards and best practices, with recommendations implemented to enhance safety measures and compliance.

**Government inspections:** Mining companies must ensure compliance with national and local OHS regulations by preparing necessary documentation and safety records for regulatory reviews. Any issues raised by government inspectors should be addressed promptly to maintain compliance and workplace safety standards.

## 6.2. INCIDENT REPORTING AND LEARNING

Rwanda Standards 117-2 requires that all injuries, regardless of severity, must be reported immediately to the responsible mine official. An incident report form should be completed and taken with the injured individual to the health center, clinic, or hospital, with a copy retained. The form is outlined in chapter 7, practical tools. A preliminary report must be completed within 24 hours and communicated to the governing body in charge of mines (RMB) while a final investigation report should be conducted and submitted to the governing body in charge of mines (RMB), within 48 hours.

**Reporting Requirements:** Rwanda Standard Board 117-2 P.21 requires that accidents need to be reported in accordance with their severity.

*Table 11: Accident reporting timeline*

Immediate Reporting
<ul style="list-style-type: none"> <li>■ An accident involving death of a person</li> <li>■ An accident in which any person becomes unconscious or is admitted in a hospital; and</li> <li>■ An accident in which the injuries sustained by any person could lead to permanent</li> </ul>
Reporting within 24 hours
<ul style="list-style-type: none"> <li>■ Any accident due to explosives including an accidental ignition or detonation of explosives The flooding of any considerable portion of the workings or the failure of any dam or reservoir used for conserving water or slimes</li> <li>■ Any accidental explosion or large fire due to the ignition of dust, gas, oil or vapour Any accidental fire underground or accidental large fire on the surface</li> <li>■ Any electrical shock or burns to a person who consequently receives medical treatment The extensive caving of any underground working or any extensive subsidence of any ground which is not normal for the method of mining in practice Any prolonged failure of the main ventilation system or part of it</li> </ul>

**Investigating roots causes:** Understanding the fundamental causes of incidents is crucial for preventing their recurrence and enhancing overall workplace safety. To effectively identify underlying issues, root cause analysis techniques such as the 5 Whys and the Fishbone Diagram should be employed.

**Implementing corrective actions:** Corrective actions must be developed and implemented to address the identified root causes. These actions should be practical, sustainable, and regularly monitored for effectiveness. Additionally, responsibility for follow-up and verification should be clearly assigned to ensure lasting improvements in safety.

**Debriefing:** Debriefing sessions should be conducted following incidents to discuss lessons learned. Findings and preventive strategies should be communicated to employees and integrated into training programs and safety policies, thereby enhancing awareness and helping to prevent similar incidents in the future.

### **6.3. REPORTING OHS COMMITMENTS AND MEASURES**

Mining companies should prepare periodic OHS reports outlining key findings, progress, and challenges. These reports should be shared with stakeholders, including management, employees, and regulatory bodies. Insights from reports should be used to inform policy adjustments and future safety initiatives, ensuring ongoing improvement in workplace safety standards. By following this guideline, companies can foster a proactive safety culture, reduce risks, and achieve a high standard of workplace safety through effective monitoring and evaluation.

# 7. PRACTICAL TOOLS

## 7.1. WORKPLACE POLICY FOR OCCUPATIONAL HEALTH AND SAFETY

The tool was developed based on ILO OHS 2001 and ISO 45001 which provide elements which should be included in the OHS policy:

### Part 1: Statement of intent

1.1 This is a safety and health policy of:

1.2 The overall aim of our policy is:

1.3 The specific objectives of our policy are:

Signed by: Name/s and title/s

Signature/s

Date/s

Review date:

### Part 2: Responsibilities for safety and health

2.1 The overall and final responsibility for safety and health rests with:

2.2 The day-to-day responsibility for ensuring this policy is put into practice by:

2.3 To ensure safety and health standards are maintained/improved, the following people have responsibility in the following areas:

2.4 All employees should:

### Part 3: Arrangements for safety and health

3.1 Hazard identification and risk assessment:

3.2 Communication and workers' consultation:

3.3 Information and training:

3.4 Reporting, investigation and recording accidents:

3.5 Safety and health inspections:

3.6 Emergency (fire precautions, fire drill, first aid and evacuation) arrangements and procedures:

3.7 Hazard control measures including PPEs:

3.8 Policy review:

3.9 Others:

## 7.2. ACTION PLAN TEMPLATE: WORKPLACE OHS POLICY IMPLEMENTATION

In developing this tool, count was taken to elements which a policy should contain as per ILO OHS 2001 and ISO 45001. The template was also designed by ensuring that for each policy element, there are corresponding targets, responsible, activities, timeline, resources and indicators.

Policy Element (informed by policy specific objective/s)	Target	By whom	Specific tasks (activity)	Deadline	Resources needed	Completion indicators

### 7.3. CHECKLIST: POTENTIAL HAZARDS SPECIFIC TO MINING ACTIVITIES

This toll was developed based on common hazards present in the Rwandan mining sector as seen in RS 117-2 and findings of the gap analysis in mining conducted in 2024. This is in line with point 1.1.

<b>Physical hazards</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Are there falling rocks and debris			
Are there possibilities cave-ins and collapses			
Are there heavy equipment that can cause accidents			
Are there explosives or combustible materials in the area			
Are there high levels noise			
Are there sources of vibration			
Are there extreme temperatures			
Is there a possibility of dust exposure			
<b>Chemical hazards</b>			
Is there possibility of acid mine drainage			
Is there possibility of chemical spills and leaks			
<b>Ergonomic hazards</b>			
Does work lead to repetitive movements			
Does work involve heavy lifting and manual handling			
Do workers work in poor postures			

## 7.4. RISK REGISTER TEMPLATE

Risk	Risk rating	Mitigation action	Responsible person	Due date
Ex: Roof collapse	High	Install support system	Frank (mining engineer)	22.02.2025
Ex: Tailings landslide	High	Plant trees	J a m e s (environmentalist)	30.05.2025

Source: Ministry of Public Services and Labor

Reference: Risk matrix

		Likelihood			
		Likely (3)	Possible (2)	Unlikely (1)	
Consequence	Fatal Injury (4)	High (16)	High (12)	High (8)	Medium (4)
	Serious Injury (3)	High (12)	High (9)	Medium (6)	Medium (3)
	Significant Injury (2)	High (8)	Medium (6)	Medium (6)	Low (2)
	Minor Injury (1)	Medium (4)	Medium (3)	Low (2)	Low (1)

Risk Rating	Urgency of action
High (8-16)	Immediate
Medium (3-6)	Within 3 months
Low (1-2)	Keep monitoring at low level

## 7.5. INCIDENT REPORT TEMPLATE

**Incident report form**

**Subject:**

**Incident date:**

**Incident time:**

**Mine:**

**Manager:**

**1. Description of incident (with photos if possible):**

**2. Immediate causes identified:**

**3. Key Learnings:**

**4. Corrective actions:**

Source: Rwanda Standards Board

## 7.6. ACCIDENT REPORT TEMPLATE

### Accident report form

#### Section 1: Brief of compliance

#### Section 2: Employer details

1. Name of operator(company/cooperative/any):

If licensed, please add license status:

2. Name of mine site:

3. District& sector & cell:

4. Mineral(s) mined:

5. Names of supervisors in area of incident

**ID:**

**Tel:**

#### Section 3: Accident or dangerous occurrence details

1. Number of people killed:

2. Number of people totally disabled:

3. Number of people injured:

4. Date of accident or dangerous occurrence:

5. Time of accident or dangerous occurrence:

6. Location of accident or dangerous occurrence (GPS coordinates):

7. Name of working place:

8. Depth below the surface (in meters):

9. Did accident or dangerous occurrence occur during normal working hours or overtime?

10. Did accident happen at normal workplace?

### Section 4: Accident inspection details

Item	Yes	No	Details
Previous recommendations regarding safety was executed?			
Daily risk assessment data available			
All risks and their severity are daily recorded			
Records clearly show available risk management policies			
Daily Incident data available			
Mine or quarry follows standard designs			
Bench angle not too steep			
Bench width not too thin			
Bench length not too long			
Tunnel Width and shape appropriate			
Tunnel adequately supported			
Support has the capacity to handle the stress caused by excavation			
Ventilation present			
Daily gas detector data available			

### Section 5: Incident causes

**Section 6: Describe the Incident/Findings:** Give a step-by-step description of what happened and main factors that caused it. The more serious the incident, the more detail is needed.

### Section 7: Preventive measures

<b>Recommendations to prevent recurrence:</b>			
Technical Factors/Causes of the Incident (if any):	Corrective Actions Needed:	By whom	By when
Human Factors/Causes of the Incident (if any):	Corrective Actions Needed:	By whom	By when
Organizational Factors/Causes of the Incident (if any):	Corrective Actions Needed:	By whom	By when
Other recommendations			
<i>This space available for any other comments or details (this may include a numbered list of any evidence collected)</i>			

### Section 8: Inspector details

NAME (IN BLOCK LETTERS):

DATE:

## 7.7. EMERGENCY DRILL CHECKLIST

Item	Check
<b>NOTIFICATION</b>	
Activate Notification Procedures for Emergency Contacts	
Notify relevant government information	
Notify mine management	
Notify Police	
Notify Fire/Rescue (if necessary)	
Notify Neighboring Mines (if necessary)	
Notify Family Members of the affected	
<b>SHUT DOWN OPERATION</b>	
Assemble Employees	
Debrief all affected employees	
Account for All Persons Known to be at the Mine	
Assign Employees to Tasks	
<b>SECURITY AND SITE MONITORING</b>	
Follow Mine Emergency Response Plan	
Set up a Mine Emergency Command System	
Delegate Authority and Assign Duties	
Give Appropriate Orders	
Brief Arriving Personnel	
Follow Appropriate Safety Precautions	
Request/Dispatch Additional Persons to Mine as Required	
Take Appropriate Actions Relative to Site Recovery	
Establish a Shift Rotation Schedule for Command Personnel	
<b>COMMUNICATIONS</b>	
Establish External Communications (Government, Miner's Representatives, Medical, Legal, Etc.)	
<b>MEDICAL ARRANGEMENTS</b>	
Arrange for Ambulance and Medical Services	
<b>ACQUISITION OF EQUIPMENT, MATERIALS, AND SERVICES</b>	
List All Equipment in the Mine and on the Surface	
Locate and Check On-site Equipment for Possible Use	
Arrange for Heavy Equipment if Required	
Provide Transportation for Equipment	
Obtain Personal Protective Equipment	
Establish Press Briefing Area	
<b>INFORMATION</b>	
Appoint a Spokesperson for the mining company	
Update Family Members on a Regular basis	
Brief the Press and Media	

Source: The document was developed to support mining companies when conducting an emergency drill.



## 7.10. EMERGENCY RESPONSE PLAN TEMPLATE

### **Company Information**

- Company Name:
- Site Location:
- Plan Effective Date:

### **Emergency Contact List**

- List emergency contacts including supervisors, medical teams, fire department, police, and government agencies.

### **Roles and responsibilities**

- Names and roles of personnel responsible for coordinating emergency response.

### **Potential Emergencies**

- Identify possible emergencies such as fire, explosion, collapse, flooding, gas leaks, hazardous material spills, and medical emergencies.

### **Emergency Response Procedures**

- Provide step-by-step actions for each type of emergency.

### **Emergency Communication Plan**

- Outline how to report emergencies, including radio, phone, alarm systems, and escalation procedures

### **Evacuation Plan**

- Detail evacuation routes, assembly points, and safe exit procedures.

### **Roles & Responsibilities**

- Define roles for emergency responders, safety officers, first aid personnel, and management.

### **Emergency Equipment & Locations**

- List locations of fire extinguishers, first aid kits, PPE, breathing apparatus, and other emergency equipment.

### **Medical & First Aid Procedures**

- Describe first aid response steps, contacts for medical teams, and the nearest hospital.

### **Training & Drills**

- Schedule and frequency of emergency response training and drills.

### **Incident Documentation & Reporting**

- Explain how to record and report incidents, including investigation steps and corrective actions.

### **Plan Review & Updates**

- Define how often the plan will be reviewed (e.g., annually) and who is responsible for updates.

### **Approval & Signatures**

- Signed by the responsible authority to confirm approval and implementation.

Source: The document was developed to support mining companies to properly plan for emergency response.

## 7.11. WORKER FEEDBACK FORM

### Section 1: Worker Information

Name (Optional):

Job Title/Role:

Mine Site:

Date:

### Section 2: Safety Observations

What safety concerns have you noticed in your workplace?

- Unsafe working conditions
- Faulty or missing equipment
- Lack of proper safety training
- Insufficient PPE (Personal Protective Equipment)
- Other (please describe):

Have you or a coworker experienced a near-miss or accident recently?

- Yes
- No

If yes, please describe what happened:

### Section 3: Suggestions for Improvement

What actions do you think could improve safety in your workplace?

Are there any specific safety trainings or resources you would find helpful?

### Section 4: Additional Comments

Do you have any other feedback regarding workplace safety?

Source: The template was developed internally to support mining companies in soliciting feedback from workers.

## 7.12. FIRST AID TRAINING MANUAL

First aid is the immediate care given to an injured or ill person before professional medical help arrives. The goal of first aid is to preserve life, prevent the condition from worsening, and promote recovery.

### Basic first aid principles

- Remain calm and assess the situation.
- Ensure the safety of yourself and the injured person.
- Call emergency services if necessary.
- Provide appropriate care within your level of training.

### Assessing the situation

- Check for responsiveness.
- Look for signs of breathing and circulation.
- Identify any hazards that may pose additional risks.
- Follow the **DRABC** approach (Danger, Response, Airway, Breathing, Circulation & Bleeding).
  - **D** - check for DANGER
    - To you
    - To others
    - To the victim
  - **R** - RESPONSE
    - Is victim conscious?
    - Is the victim unconscious?
  - **A** - check AIRWAY
    - Is the airway open?
    - Is airway clear of object?
  - **B** - check for BREATHING
    - Is chest rising and falling? LOOK
    - Can you hear the victim breathing? LISTEN
    - Can you feel the breath on your cheek? FEEL
  - **C** - check for CIRCULATION & BLEEDING

### Cardiopulmonary resuscitation (CPR)

- Perform chest compressions and rescue breaths at a ratio of 30:2.
- Use an automated external defibrillator (AED) if available.
- Continue CPR until medical help arrives or the person recovers.

### **Treating wounds and bleeding**

- Apply direct pressure to control bleeding.
- Clean wounds with antiseptic and cover with a sterile bandage.
- Recognize signs of infection and seek medical help if needed.

### **Managing fractures and sprains**

- Immobilize the injured area.
- Apply ice to reduce swelling.
- Avoid moving the injured limb unnecessarily.

### **Handling burns**

- Cool the burn under running water for at least 10 minutes.
- Cover with a sterile, non-stick dressing.
- Avoid applying creams or breaking blisters.

## 11. Heat-Related Emergencies

- Treat heat exhaustion by moving the person to a cool place and hydrating them.

### **Medical emergencies (heart attack, stroke, seizures)**

- Recognize symptoms and call emergency services immediately.
- Provide supportive care until medical professionals arrive.
- Do not restrain a person having a seizure; keep them safe from harm.

### **First aid kits and equipment**

- Essential items include bandages, antiseptic wipes, gloves, and a CPR mask.
- Keep a first aid kit at home, work, and in vehicles.

### **Emergency contact and reporting**

- Know emergency numbers in your area.
- Provide clear and concise information when calling for help.
- Document incidents for future reference and learning.

Source: United Nations Buddy First Aid Course (UNBFAC)

## 7.13. OHS COMMITTEE TERMS OF REFERENCE

### **Members of an occupational health and safety committee in a private enterprise**

Members of the occupational health and safety committee in a private enterprise are selected from the employees of the enterprise as follows:

(a) in an enterprise with less than ten employees, the occupational health and safety committee is composed of one employee at decision making level in the enterprise selected by the employer.

(b) in an enterprise with at least ten to 29 employees, the occupational health and safety committee is composed of two employees including one employee at decision making level in the enterprise selected by the employer and representing him or her and one employees' representative.

(c) in an enterprise with 30 employees and above, the occupational health and safety committee is composed of five employees including three employees at decision making level in the enterprise selected by the employer and representing him or her and two employees' representatives elected by their peers. If an enterprise has more than two employees' representatives, they select among themselves two employees' representatives to be members of the occupational health and safety committee.

(d) in an enterprise that has an employee in charge of occupational health and safety or a health officer, the employee must be among members of the occupational health and safety committee.

After establishment of the occupational health and safety committee in the enterprise, its members elect among themselves the Chairperson, Vice Chairperson and Secretary where applicable; and the Chairperson must be an employer's representative.

If an enterprise has different branches, each branch establishes its own occupational health and safety committee.

### **Term of office of members of an occupational health and safety committee**

(1) Occupational health and safety committee members in private enterprises have a term of office of three years renewable.

(2) A member of the occupational health and safety committee who loses his or her position is replaced within one month from the date of loss of membership.

(3) A person who replaces a member of the occupational health and safety committee completes the term of office of the member replaced.

(4) In State organs, except the Chairperson, the Secretary and the Legal Advisor who are permanent members of the occupational health and safety committee, other members of the occupational health and safety committee are elected for a term of office of three years renewable once.

### **Display of the list of members of an occupational health and safety committee**

(1) The employer displays the list of names of members of an occupational health and safety committee within the appropriate and visible place in premises of the workplace.

(2) A copy of the list of names of members of the occupational health and safety committee is submitted to the labor inspector of where the enterprise is located, in case of a private enterprise.

### **Responsibilities of an occupational health and safety committee**

An occupational health and safety committee has the responsibilities to

- (a) analyze occupational hazards to which an employee, an intern or apprentice of a private enterprise or State organ may be exposed;
- (b) conduct investigations in case of an occupational hazard or disease and propose preventive and protection measures for that accident or disease;
- (c) conduct investigations on an occupational accident resulting in death or causing permanent incapacity or having revealed the existence of a serious danger to the occupational health and safety of the employee, intern or apprentice and to draw conclusions;
- (d) submit regularly to the employer updated statistics on occupational hazards, diseases and deaths and to make quarterly reports indicating how the concerned enterprise or organ is progressing in taking measures to prevent them;
- (e) ensure the implementation of occupational health and safety laws and regulations;
- (f) advise on an initiative relating to most reliable methods of work through the choice of materials necessary for the work and to match them with workplace;
- (g) explain, through effective means, the meaning of an occupational risk;
- (h) provide advice on occupational health and safety training programs and how they may be revised;
- (i) examine, in appropriate time, documents concerning occupational health and safety training activities, duration and forecast budget to ensure effective implementation of activities;
- (j) ensure that appropriate measures are taken to provide training to employees and upgrade their skills in the field of occupational health and safety;
- (k) ensure the organization and training of first-aid team at workplace within enterprise or organ and ensure that the team is provided with equipment necessary for discharging its duties and to work in the manner that an employee, an intern or apprentice gets first aid in case of an occupational hazard;
- (l) sensitize an employee, an intern or apprentice on occupational health and safety related issues, and develop a culture of prevention of occupational hazards and diseases and fight against transmissible diseases or any other public health danger.

#### **Training for occupational health and safety committee**

An employer provides an occupational health and safety committee with training on occupational health and safety before starting its responsibilities and whenever necessary.

Meeting of an occupational health and safety committee

- (1) A meeting of the occupational health and safety committee is held at least once a quarter and whenever necessary at the invitation of its Chairperson or, in his or her absence, by its Deputy Chairperson.
- (2) The invitation of the meeting of the occupational health and safety committee specifies its agenda and is issued to the members of the committee within three working days before the meeting is held.
- (3) The meeting of the occupational health and safety committee is held within the premises of the workplace during working hours and the decisions are taken by consensus.

#### **Register of an occupational health and safety**

- (1) An employer provides the occupational health and safety committee with the register for recording occupational health and safety related information. (2) The register mentioned in Paragraph (1) of this Article comprises the following two parts: (a) the part that contains reports of the occupational health

and safety committee regarding findings of inspections and investigations conducted and minutes of the committee meetings; (b) the part that contains information on occupational hazards, diseases and deaths and actions taken against them.

### **Quarterly report**

An occupational health and safety committee in a private enterprise or State organ prepares a quarterly report on the state of occupational health and safety and submits it to the employer.

### **Monitoring of functioning of an occupational health and safety committee**

The employer, the labor inspector from where the organ is located and the person in charge of occupational health and safety at national level are responsible for monitoring the functioning of occupational health and safety committee.

*Source: Ministerial Order n° 02/MIFOTRA/23 of 01/08/2023 on OHS*

## 7.14. DAILY LOGBOOK OF SURFACE MINE ACCESS

<b>Company Name:</b>															
<b>Surface mines:</b>								<b>Mine site name:</b>							
<b>Starting date:</b>								<b>Ending date:</b>							
No.	Features to be observed (YES, NO or N/A)	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		D/S	N/S	D/S	N/S	D/S	N/S	D/S	N/S	D/S	N/S	D/S	N/S	D/S	N/S
1	Overburden is stripped at least 3 meters back from the pit wall edge.														
2	Overburden and waste rock is stockpiled at least 10 meters back from the pit wall edge. and are stockpiled referring to their angle of repose.														
3	No undercutting of overburden.														
4	No undercutting of pit walls without strong supports in place and in good condition.														
5	No major fractures, evidence of wall rock falling or signs of movement or shifting of pit wall.														
6	No major fractures away from pits at least within 50m														
7	No major cracks on surface parallel to foot wall edge or heaving at the toe of the pit wall.														
<b>Access</b>															
8	Waste rock berms constructed 2-4m from wall bottom where heaving of the toe observed.														
9	Long metal rods on site and in use for scaling of loose rock.														
10	Pit bottom evacuated before scaling.														

11	Scaling of loose rock done from the top or at a safe distance from the bottom of pit.																		
12	Pit wall angles are no steeper than 80° in strong unfractured rock and 50° in highly weathered rock or an angle deemed safe by a competent person.																		
<b>Access paths and roads</b>																			
13	Access paths show no signs of collapse or cracking, standing water and are in good condition.																		
14	Access paths and roads are free of obstructions.																		
15	Access paths and roads are of a sufficient width to enable passage of any haulage/transport equipment used (wheelbarrows, trucks, persons).																		
16	There is sufficient mechanism of relocating runoff water from pits.																		
17	Other findings																		
<b>Decision</b>																			
18	Is it permitted for workers to enter?																		
19	Day Team Leader (Name and Signature)																		
20	Evening shift Team Leader (name and Signature)																		
21	Approved by Mine Manager (Names and Signatures)																		

Source: Rwanda Standards Board

## 7.15. DAILY LOGBOOK OF UNDERGROUND MINE ACCESS

<b>Company name:</b>															
<b>Tunnel/Adit/Shaft name:</b>								<b>Mine site name:</b>							
<b>Starting date:</b>								<b>Ending date:</b>							
S/N	Features to be observed (YES, NO or N/A)	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		D/S	N/S	D/S	N/S	D/S	N/S	D/S	N/S	D/S	D/S	D/S	N/S	D/S	N/S
1	All main entrances are in good condition?														
2	All underground openings meet with required standard														
3	Are gravitational sources such as roofs, backs, sides, floor and walls in good condition?														
4	Are the lighting and supply system in good condition?														
5	Lighting in places meet with standard.														
6	Is there communication system between surface and underground.														
7	Are evacuation plans in place														
<b>Access</b>															
8	All adits have alternative exits at least within no more that 100 m apart each other.														

9	Ladders or steps are in good condition and meet standard for movements in all adits and any inclines that are steeper than 45°.														
10	All inclines steeper than 45° are equipped with a handrail or rope in good condition														
11	All adits and tunnels are free of rubbish, equipment's and tools not in use and other debris														
12	Access path and ramps show no sign of collapse of cracking, standing water and are in good condition														
13	Access path and ramps are of sufficient width to enable passage of any haulage/ transport equipment used														
<b>Support of adits, tunnels and shafts</b>															
14	All adits and shafts where weak rock is found are properly supported with timbers or other suitable materials														

Source: Rwanda Standards Board

## 8. REFERENCES

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