

Mining **Future Skills**



MINING QUALIFICATIONS AUTHORITY

Final Report

14 November 2025

**TITLE: EXAMINATION OF THE SKILLS LEVELS AND KNOWLEDGE
OF THE EXISTING OCCUOPTIONAL HEALTH AND SAFETY
(OHS) REPRESENTATIVE IN THE MMS**

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Acronyms and Abbreviations

AR:	Augmented Reality
COMSOC:	Chambers of Mining Safety Officers Course
COP:	Code of Practice
CPD:	Continuous Professional Development
DMRE:	Department of Mineral Resources and Energy
HIRA:	Hazard Identification and Risk Assessment
ISO:	International Organization of Standardization
MCSA:	Minerals Council South Africa
MHSA:	Mine Health and Safety Act
MHSC:	Mine Health and Safety Council
MMS:	Minerals and Mining Sector
MQA:	Mining Qualifications Authority
MR:	Mixed Reality
NQF:	National Qualifications Authority
OHS:	Occupational Health and Safety
OHSA:	Occupational Health and Safety Act
PGM:	Platinum Group Metals
RPL:	Recognition of Prior Learning
SAMI:	South African Mining Industry
SAMTRAC:	Safety Management Training Course
SAQA:	South African Qualifications Authority
SOP:	Standard Operating Procedure
VR:	Virtual Reality

EXECUTIVE SUMMARY

This study investigates the essential role of Occupational Health and Safety (OHS) representatives in South Africa's minerals and mining sector (MMS). The purpose is to emphasise their importance in identifying and mitigating workplace hazards such as dust exposure, heavy machinery operations, and potential incidents. OHS representatives act as intermediaries, between the workforce and management, promoting safety awareness and compliance, while safeguarding workers' rights. However, the research identifies significant challenges in their current training, competencies, and career advancement opportunities.

Key findings reveal that existing OHS training programs, while covering foundational safety principles, are insufficient to meet the growing demands and responsibilities outlined in the Mine Health and Safety Act 29 of 1996 (MHSA), particularly after recent amendments. Critical gaps include inadequate technical knowledge in hazard identification, risk assessment, and emergency preparedness, as well as underdeveloped soft skills such as leadership, communication, and conflict resolution. Additionally, language barriers, and the lack of alignment between current training programs and recognized qualifications, further hinder the effectiveness of OHS representatives.

The study also highlights systemic barriers that prevent OHS representatives from transitioning into OHS officer roles. These include stringent qualification requirements, limited positions for career advancement, and workplace challenges such as gender biases, insufficient managerial support, and intimidation. Addressing these barriers, is essential to creating a pipeline for professional growth within the mining sector.

To bridge these gaps, the study explores innovative training methods such as virtual reality (VR), simulation-based learning, and gamification. These technologies enhance engagement, improve knowledge retention, and offer practical, risk-free learning experiences tailored to the complexities of mining operations. A proposed conceptual framework aims to systematically assess the competencies of OHS representatives, identify specific skills gaps, and inform targeted interventions.

Recommendations include revising training programs to incorporate advanced technical skills, soft skills, and recent MHSA amendments, as well as aligning training with the National Qualifications

Framework (NQF), for formal recognition. Further, the study advocates for mentorship programs, leadership development, and policies to support OHS representatives, fostering their growth into OHS officer roles.

By implementing these recommendations, the mining sector can improve workplace safety, enhance the professional capabilities of OHS representatives, and create a safer, more efficient industry. This approach not only addresses current shortcomings, but also positions the sector to meet future challenges through proactive and innovative safety practices

1. INTRODUCTION

Occupational health and safety (OHS) hold paramount importance in the mining sector of South Africa due to the intrinsic risks and hazardous conditions associated with mining operations. These risks include exposure to dust, chemicals, extreme temperatures, heavy machinery, and the potential for accidents such as rock falls and explosions. Ensuring the well-being of workers constitutes not only a legal and ethical obligation but is also essential for maintaining productivity and minimising operational disruptions. Effective OHS measures contribute to a reduction in the incidence of injuries, illnesses, and fatalities, thereby fostering a safer working environment and enhancing morale among workers. OHS representatives fulfil a crucial role within this framework by serving as intermediaries between the workforce and management. They are tasked with the identification of workplace hazards, ensuring compliance with safety regulations, promoting safety awareness, and advocating for workers' rights to a safe and healthy work environment. Their presence ensures that safety concerns are addressed expediently, nurturing a culture of prevention and continuous improvement in safety practices throughout the sector.

Taking the aforementioned factors into account, the research aims to thoroughly evaluate the current skill levels and knowledge deficiencies of OHS representatives in the Minerals and Mining Sector (MMS) and identify essential areas for enhancement in training and development programs.

1.1 Scope of Study

The study yields valuable insights on the existing skills levels, and knowledge gaps of the OHS representatives in the MMS, to identify critical areas of improvement in training and development programs, but not limited to the following:

- Analysing the content, coverage, and effectiveness of existing OHS training programs for representatives.
- Identifying the currently used assessment tools, used across different company sizes, and sub-sectors for OHS representatives.
- Comparing the skills and knowledge of OHS representatives, with the expected competencies of the OHS officers in the MMS, as defined by the MHSA 29 of 1996 and industry standard.
 - Identifying any discrepancies between the required competencies for OHS officer and the existing training provided to OHS representatives.
- Investigating the role of training and development programs, in equipping OHS representatives with the necessary skills and knowledge.
- Assessing the level of participation and completion rates for OHS training programs among representatives.
- Investigating the factors, hindering the successful transition of OHS representatives into officers (impact of factors such as experience, qualification, job responsibilities, and access to resources on the skills and knowledge levels of OHS representatives.)
- Based on the assessment findings, identifying, and prioritising the most critical skills and knowledge gaps among OHS representatives.
 - Developing innovative strategies for improving the training and development programs for OHS representatives for strengthening their competencies.

1.2 Problem Statement

Previous studies showed, that existing OHS training programmes are not comprehensive in developing all of the necessary skills required by OHS representatives, to be effective in their roles in the MMS, and eventually advance into OHS officer roles. Some of these gaps include a deeper understanding of OHS principles and management, including communication and meeting skills, as well as basic investigation and audit skills. In addition to these knowledge gaps, the absence of South African mining industry (SAMI) recognised National Certificates in OHS, hinder OHS representative to

advance to OHS officers. As it stands, candidates require technical competencies, and experience in mining and/or engineering operations, in addition to their OHS knowledge and experience. By analysing the differences between the required competencies, and existing training, and examining factors influencing skill development, the study aims to develop strategies for enhancing OHS training programs, to address key gaps and support the transition of representatives into officers.

1.3 Significance of Study

The outcomes of the study will contribute to potentially enhance the effectiveness of OHS practices within the MMS, by promoting the transition from OHS representatives to OHS officers. By identifying knowledge gaps, and critical skills deficiencies among OHS representatives, the study aims to provide insights into the shortcomings of current training programs, assessment tools, and competency standards. It will also help align the training provided with the expected competencies outlined in the MHSA. It is envisaged that the findings of this study will guide the development of innovative, sector-specific training strategies to strengthen the transition of OHS representatives into OHS officer roles, ultimately contributing to a safer and more efficient mining industry.

2. RESEARCH METHODOLOGY

This study sought to develop an understanding of OHS representative training, within the MMS, from a skills perspective. Further, was the need to identify if there are any existing OHS skills development frameworks, that are relevant to the MMS. If there are applicable frameworks, to determine what extent these skills are available to arrive at recommendations for closing gaps that may exist. Complementary to this, is the matter of understanding OHS frameworks, and determining if they are in use within the MMS. It was also necessary to determine if these frameworks could serve as a monitoring and evaluation tool, for OHS skills improvement.

2.1. Research Questions

The following research questions were developed to address the scope and problem statement of the study:

1. How effective is current OHS representative programmes (i.e. training) within the mining sector?
2. How are assessments of OHS representative competencies tools utilised within the sector?
3. What impact does OHS representative training have within the sector?
4. What are the barriers for OHS representatives to transition to OHS officers?

2.2. Research Objectives

To address the above-mentioned research questions, and alignment to the problem statement, the following research objectives were developed:

The research questions for this study were developed, according to the outcomes specified in the project scope. These research questions will be used during stakeholder engagements, to collect data and information relevant to this study.

- Primary Objective: Determine the content and effectiveness of OHS training programmes
 - Secondary Objective: Identification of existing OHS training programmes for representatives

- Primary Objective: Investigating the assessment tools that determine competence of OHS representatives.
 - Secondary Objective: Determining the variations in assessments utilised between small, medium, and large companies in evaluating OHS representatives
- Primary Objective: Comparison between the expected knowledge and skills of OHS representatives and current levels of OHS representatives.
 - Secondary Objective: Identification of key gaps between the required competencies for OHS officers, and the training currently provided to OHS representatives.
- Primary Objective: Determining the impact of current OHS representative training within the industry.
 - Secondary Objective: Investigating the current participation in training programmes by OHS representatives
- Primary Objective: Identification of the barriers to transition from OHS representative to OHS officer.
- Primary Objective: Identification of innovative strategies that can be developed to improve the training and development programs for OHS representatives.

2.3. Research Design

The research design, most appropriate to this study, is thematic and inferential. The purpose of an inferential research design is to provide the researcher with sufficient data to make certain inferences to a larger population. There was limited time to conduct data collection, and thus the design is most appropriate to the study. Within this study the researcher aimed to understand how effectively OHS representatives are being developed or upskilled, as well as how OHS representatives can progress to OHS officers.

2.4. Research Methodology

A mixed methods approach, combining qualitative and quantitative methods, were utilised in this study. This is the most appropriate approach to gather an understanding of skills as well as to gain insights into particular experiences of stakeholders. By combining both methods, the research team was able to validate findings from one method with the other (triangulation), achieve a more

representative view, and address research questions from multiple angles. It also contributed to the data confirming the themes identified during qualitative engagements.

2.4.1. Data Collection

Data collection techniques that will be used are:

1. **Surveys.** An online questionnaire was shared with a wider range of stakeholders, to allow for the gathering of data from more sources. The utilisation of surveys, promotes higher levels of engagement in the interaction, thus increasing data collected. This survey was distributed to 1250 contacts. A total of 102 responses were received on this survey. Respondents were not forced to answer any question, i.e. if they couldn't answer any one question, the respondents weren't prevented from continuing to subsequent questions. This resulted in varying response rates for the different questions.
2. **Interviews.** This method of data collection was utilised, with selected stakeholders, to gain insights into their experiences, related to the areas that are the focus of the study. Interviews were semi-structured, with attention given to the primary research questions. The interviews focused on engaging with subject matter experts, and persons that can add value to the findings, through their own experience and knowledge.
3. **Focus Groups:** A qualitative research methodology, focus groups involve a small cohort of participants—typically comprising six to twelve individuals—who engage in a moderated discussion centred around a specific topic or research objective. This method facilitates the collection of diverse perspectives, opinions, and insights within a more interactive environment than traditional one-on-one interviews. The primary advantages of focus groups include the capacity to investigate complex ideas through group dynamics, wherein participants substantively build upon one another's responses, thereby illuminating insights that might remain concealed in individual discussions. Moreover, focus groups yield rich, detailed data in a comparatively brief timeframe and enable researchers to observe non-verbal cues and interpersonal interactions that significantly enhance understanding of the subject matter.

2.4.2. Data Analysis Methods

The qualitative data that was gathered, through interviews and focus groups, was analysed using thematic analysis, to identify common themes. The quantitative data was gathered, using an online survey and the data was analysed, using descriptive statistics.

2.4.3. Sampling Procedures

Within this study it is necessary to ensure that there is representation from mining houses that mine the following commodities:

- Gold
- Platinum Group Metals (PGM)
- Coal

The aforementioned commodities have been selected due to the diverse mining methodologies applied in their operations. Furthermore, the scale of operations associated with these commodities ranges from small-scale to large-scale endeavours. The variations in scale will furnish the Mine Qualification Authority (MQA) with more precise data, thereby facilitating further inferences regarding other commodities. Both qualitative and quantitative methodologies will be employed in the assessment of the listed commodities. The sample will encompass representatives from the following areas:

- OHS Representatives
- OHS Officers
- Management
- Training and Development Practitioners (on-site)
- Subject Matter Experts (if applicable)
- Governing and advisory bodies (i.e. MHSC, MCSA, Mandela Mining Precinct)
- Training/Academic institutions

2.5. Qualitative Data Collection Questions

The following are the initial qualitative data collection questions (instruments) to be used during interviews and focus groups.

1. Content and Effectiveness of OHS Training Programs:

- What are the key components of existing OHS training programs for representatives?
- How comprehensive and effective, are the current OHS training programs, in covering necessary safety standards and regulations?
- To what extent do the training programs align with the specific needs of various sectors within the industry?

2. Assessment Tools for OHS Representatives:

- How are OHS representatives commonly assessed (i.e. what assessment tools are used) across different companies and industry sub-sectors?
- How do assessment tools differ between small, medium, and large companies, in evaluating OHS representatives?
- What are the strengths and limitations of these tools, in measuring OHS competencies?

3. Skills and Knowledge Comparison:

- What are the expected competencies for OHS representatives?
- How do the skills and knowledge, of current OHS representatives, compare to the expected competencies outlined for OHS representatives in the MSHA 29 of 1996?
- Are there specific skill areas, where OHS representatives consistently underperform, compared to the standards expected?
- What industry standards serve as benchmarks for assessing OHS representatives' competencies?
- Are there significant differences in the assessment tools used across sub-sectors, such as manufacturing, mining, and construction?

4. Discrepancies in Competencies and Training:

- What are the key gaps, between the required competencies for OHS officers, and the training currently provided to OHS representatives?
- Are there any sectors or company sizes where these discrepancies are more pronounced?
- How do these gaps impact the overall safety and operational performance within the mining sector?
- What methods should be used to prioritize these gaps for improvement?

5. Impact of Training Programs:

- How effective are current training and development programmes, in equipping OHS representatives with the necessary skills for their roles?
- What specific aspects of OHS training have the most significant impact on improving the competencies of OHS representatives?
- Are there any emerging training methods or technologies currently being used to improve OHS training programs?

6. Participation and Completion Rates in OHS Training:

- What is the level of participation in OHS training programs among representatives in different sectors?
- What are the completion rates of these programs, and what factors influence the successful completion of training?
- Are there any correlations between, completion rates, and the effectiveness, or perceived value of the training?

7. Barriers to Transition from OHS Representative to OHS Officer:

- What factors hinder OHS representatives from transitioning into OHS officer roles?
- How do experience, qualifications, job responsibilities, and resource availability affect the skills and knowledge development of OHS representatives?
- Are there specific organisational or structural barriers preventing representatives from progressing into officer positions?

8. Developing Strategies for Improvement:

- What innovative strategies can be developed to improve the training and development programs for OHS representatives?
- How can these strategies be customized to meet the unique needs of different sectors within the mining industry?
- What role can technology and modern training tools (e.g., simulations, e-learning) play in enhancing OHS training programs?

2.6. Ethical Considerations

The following common Ethical Principles will be applied across both qualitative and quantitative research:

1. **Respect for Participants:** Treat all participants with dignity and respect, ensuring their autonomy is upheld.
2. **Voluntary Participation:** Participation must always be voluntary, with no coercion, and participants should have the option to withdraw at any time.
3. **Beneficence:** Researchers should aim to maximize the benefits of the research and minimize any potential harm or risks to participants.
4. **Justice:** Ensure fair treatment of all participants, and equitable distribution of the research benefits and burdens.
5. **Integrity:** Researchers must be honest and transparent in their research practices, from data collection to reporting results.

2.7. Limitations and Delimitations

This study may be limited by several factors, namely:

- The time allowed to conduct this study is limited, and may impact the sample size, and amount data collected, or responses from qualitative research approaches.
- The subjective nature of contributions from stakeholders introduces potential biases that could affect the evaluation of training programs and tools.
- Variability in the implementation of training across companies of varying sizes may also lead to inconsistencies in training quality and outcomes.

- Although the research team is optimistic, that a large number of participants will be reached during stakeholder engagements, access to participants may be constrained by their job responsibilities and availability, which could result in a sample that does not fully represent the broader population.

The delimitations of the study encompass a specific emphasis on current OHS representatives, thereby excluding individuals who may have transitioned to OHS officer roles or have vacated their positions. Additionally, the study is centered on the analysis of existing training programs and assessment tools, without the intention of developing new frameworks or certifications. The competencies under examination must align with the MSHA 29 of 1996, thereby ensuring clear standards for evaluation, although this focus may inadvertently overlook other significant competencies. It is anticipated that these additional competencies will be identified during engagements with stakeholders. Data collection will employ mixed methods, which will include surveys and interviews, but will exclude experimental or longitudinal designs. Lastly, this research study is restricted to OHS-related training, with other forms of professional development intentionally excluded from the scope to maintain a focused approach.

3. LITERATURE REVIEW

According to the Mine Health and Safety Act, No. 29 of 1996 (MHSA): an OHS representative, is an employee who is elected by a group of employees at a mine to represent them on issues of health and safety. One OHS representative must be appointed per shift and for every workplace (Mine Health and Safety Council, 2018). The role of an OHS representative is, to monitor compliance with health and safety regulations, identify hazards, and make recommendations for improving safety conditions in the workplace. The OHS representative also acts as a liaison, between the workforce and management, ensuring that workers' health and safety concerns are addressed, and that the mine complies with relevant legislation and standards aimed at minimizing risks. They may also be consulted on health and safety matters and perform regular inspections of the working environment (Mine Health and Safety Council, 2018).

OHS representatives are appointed, after being nominated and elected by their peers. Any employee is eligible to be elected as an OHS representative, unless they hold a management role, or are not familiar with the working conditions and operations which they are intended to represent (Boshoff, 2022). Once elected, the OHS representatives are formally appointed by the employer or mine management. The employer must ensure that the appointed OHS representatives are trained and have the necessary resources to fulfil their duties. This training typically includes OHS legislation (including the MHSA No.29 of 1996), hazard identification and risk assessment, and incident investigation and reporting procedures (Mine Health and Safety Council, 2018). Once appointed, the OHS representatives will serve a term of 2 to 5 years – depending on the mine's specific policies.

3.1. Roles and Responsibilities of OHS Representatives in the MMS

The MHSA defines a two-tier system of representatives for the South African Mining Industry (SAMI), namely (Coulson & Hermanus, 2022):

- Workplace/Part-time OHS representative – elected OHS representatives who only perform OHS duties in their workplace while continuing their regular employment responsibilities.
- Full-time OHS representative – elected OHS representatives that are appointed for 3 years, during which they leave their regular employment responsibilities and only focus on health and safety matters.

The authority and responsibilities, of both workplace/part-time and full-time OHS representatives, are described in the MHSA, section 26(b) and section 30. In addition to these responsibilities, OHS representatives are also authorised to direct employees to evacuate a work area should the OHS representative determine it to be unsafe.

Note: this responsibility is only applicable to the representative's workplace.

OHS representatives are required to collaborate with the appointed OHS officers at the operation.

An OHS officer is defined as an individual appointed in terms of Schedule 4 of regulation 2.17.1 of the MHSA, to ensure compliance with the Act's health and safety regulations in a mine (Mine Health and Safety Council, 2018). Their primary responsibility is to implement and oversee the mine's health and safety policies, ensuring that workplace hazards are identified and mitigated. The officer works to ensure that all safety protocols are followed, investigates incidents, conducts risk assessments, and facilitates training programs to promote a safe working environment. The OHS officer collaborates with OHS representatives and mine management to maintain and improve safety standards, aiming to prevent accidents and occupational diseases. OHS officers are required to hold a Minerals Council Chambers of Mining Safety Officers Course (COMSOC) Level 1 and Level 2; or Safety Management Training Course (SAMTRAC) certification and have knowledge, and experience in basic firefighting and first aid, risk management, accident investigations, and International Organization of Standardization (ISO) 14001 and ISO 45001 systems (ARM, 2023; Anglo American, 2024).

3.1.1. Comparison between the knowledge and competencies expected from OHS Representatives and OHS Officers

The knowledge and competencies expected from OHS representatives, and OHS Officers, vary slightly in terms of degree of involvement and accountability. Some of the key competencies of an OHS representative, and an OHS officer are summarised and compared in

Table 1.

Table 1: Key competencies of an OHS Representative and an OHS Officer (Mine Health and Safety Council, 2018)

OHS Representative Competencies	OHS Officer Competencies
<p>1. Knowledge of Health and Safety Laws</p> <p>Understanding the MHSA, its regulations, and other relevant health and safety laws.</p> <p>Awareness of the legal rights and responsibilities of both employers and employees concerning workplace health and safety.</p>	<p>1. In-depth Knowledge of Health and Safety Legislation</p> <p>A thorough understanding of the MHSA, its associated regulations, and relevant legal obligations.</p> <p>Knowledge of other regulations and legislation that impact the mining industry (i.e. DMRE guidance notes, amendments and MHSA regulation updates).</p>
<p>2. Hazard Identification and Risk Assessment</p> <p>Ability to identify potential health and safety hazards in the workplace.</p> <p>Conduct regular inspections to assess risks and monitor safety conditions.</p>	<p>2. Hazard Identification and Risk Management</p> <p>Skilled in identifying and assessing potential hazards and risks within the workplace.</p> <p>Expertise in conducting formal risk assessments and creating risk mitigation strategies.</p> <p>Ability to implement and monitor the effectiveness of control measures.</p>

OHS Representative Competencies	OHS Officer Competencies
<p>3. Incident Investigation</p> <p>Ability to investigate accidents, incidents, and dangerous occurrences.</p> <p>Gather relevant data, interview witnesses, and help identify the root cause to prevent future incidents.</p>	<p>3. Incident Investigation and Reporting</p> <p>Lead detailed investigations into accidents, injuries, and dangerous occurrences.</p> <p>Use root cause analysis methodologies to determine underlying causes of incidents.</p> <p>Prepare detailed reports and ensure corrective actions are implemented.</p>
<p>4. Health and Safety Audits</p> <p>Participate in audits and inspections, including reviewing the workplace safety policies and procedures.</p> <p>Recommend corrective actions to address any identified deficiencies.</p>	<p>4. Health and Safety Auditing</p> <p>Conduct formal internal and external health safety audits.</p> <p>Ensure the continuous improvement of safety management systems through regular review and refinement.</p>
<p>5. Communication and Consultation</p> <p>Facilitate communication between employees and management on health and safety matters.</p> <p>Raise health and safety concerns or issues to the appropriate authority within the workplace.</p> <p>Act as a representative of the workforce in health and safety meetings.</p>	<p>5. Compliance Monitoring</p> <p>Monitor and ensure that all aspects of the workplace comply with health and safety regulations.</p> <p>Regularly audit the workplace for compliance and report non-conformance to management.</p> <p>Implement corrective actions to address any non-compliance.</p>

OHS Representative Competencies	OHS Officer Competencies
<p>6. Training and Awareness</p> <p>Stay updated with ongoing health and safety training.</p> <p>Encourage employees to follow safety guidelines and participate in training programs.</p> <p>Promote awareness campaigns on occupational health and safety among employees.</p> <p>No educational level or qualifications are specified in the MHSA.</p> <p>Currently training programme aligns with NQF level 2 qualification.</p>	<p>6. Training and Education</p> <p>Develop and implement health and safety training programs for employees at all levels.</p> <p>Stay informed about new health and safety training methods and ensure workers are adequately trained.</p> <p>Promote safety awareness and encourage a culture of safety across the workforce.</p> <p>NQF Level 4 Qualification is required as well as relevant certification (COMSOC Level 1 and Level 2 or SAMTRAC) and competencies.</p>
<p>7. Emergency Preparedness</p> <p>Be familiar with the company's emergency procedures.</p> <p>Assist in the coordination of emergency drills and response activities.</p>	<p>7. Emergency Response and Preparedness</p> <p>Develop and maintain emergency preparedness plans in case of accidents, fires, or other disasters.</p> <p>Coordinate emergency drills and ensure that all employees are familiar with the emergency response procedures.</p> <p>Oversee first aid and medical response teams in the case of an emergency.</p>

OHS Representative Competencies	OHS Officer Competencies
<p>8. Safety Reporting and Documentation</p> <p>Report unsafe practices or working conditions to the employer or health and safety committee.</p> <p>Keep records of inspections, incidents, and follow-up actions.</p>	<p>8. Safety Planning and Policy Implementation</p> <p>Ability to develop and implement comprehensive safety management plans that align with the MSHA.</p> <p>Ensure company policies, procedures, and systems follow health and safety standards.</p> <p>Regularly review and update safety policies based on legislative changes or incident trends.</p>
<p>9. Workplace Health Promotion</p> <p>Promote health initiatives and programs aimed at improving the well-being of workers, such as stress management or ergonomics.</p>	<p>9. Environmental and Occupational Health Management</p> <p>Monitor and manage occupational hygiene programs, including dust, noise, and hazardous substances.</p> <p>Ensure that health monitoring and surveillance programs (like noise-induced hearing loss prevention) are in place.</p>
<p>10. Collaboration with the Health and Safety Committee</p> <p>Act as a liaison between workers and the health and safety committee.</p> <p>Collaborate with other OHS representatives, supervisors, and management to promote a culture of safety.</p>	<p>10. Collaboration with Health and Safety Committees</p> <p>Participate in and support the work of the mine’s health and safety committee.</p> <p>Provide technical advice and guidance to OHS representatives and committee members.</p>

OHS Representative Competencies	OHS Officer Competencies
	<p>11. Leadership and Communication Skills</p> <p>Act as a leader in promoting health and safety standards in the workplace.</p> <p>Provide clear and effective communication regarding health and safety policies to workers, management, and external stakeholders.</p> <p>Liaise with trade unions, contractors, and government inspectors on health and safety matters.</p>
	<p>12. Continuous Professional Development</p> <p>Engage in ongoing learning and professional development to keep current with changes in legislation, safety best practices, and new technologies.</p>
	<p>13. Data Management and Record Keeping</p> <p>Maintain accurate and up-to-date health and safety records, including incident logs, risk assessments, and safety training records.</p> <p>Prepare statistical reports for senior management and government regulators.</p> <p>Ensure all documentation complies with legal requirements.</p>

There are opportunities for OHS representatives to transition into an OHS officer role – however, this is not always the case. Identifying the barriers preventing OHS representatives from transitioning into OHS officers, forms a key component of this research study.

3.2. Existing Training Programmes

The training for OHS representatives, in the SAMI, is outlined in the document: MQA/SP/0120/10: Occupational Health and Safety activities for part-time/workplace representatives and shop stewards in the MMS published by the MQA.

The requirement for the training certification is described by the MQA/SP/0120/10 document (Mine Qualifications Authority, 2021), and will be briefly summarised in this section. The purpose of the course is to enable OHS representatives to represent employees in all aspects of OHS by exercising their rights and authority according to the MHSA (as discussed in section **Error! Reference source not found.**). The course is aligned to three South African Qualifications Authority (SAQA) Unit Standards, namely (Mine Qualifications Authority, 2021):

- SAQA US ID 259639: Explain basic health and safety principles in and around the workplace.
- SAQA US ID 259622: Describe the functions of the workplace health and safety representatives.
- SAQA US ID 244383: Conduct continuous hazard identification and risk assessment within the workplace.

The essential embedded knowledge that is addressed in the unit standard includes (Mine Qualifications Authority, 2021):

- Knowledge relating to working on a surface mine:
 - Relevant aspects of the MHSA.
 - Emergency preparedness and response.
 - Aspects relating to strata control.
 - Relevant terminology.
 - Possible non-conformances, their consequences and mitigating actions.
- Occupational Health, Safety and Environmental Issues:
 - Significant hazards and risks related to working in a surface mine, their consequences and mitigating actions.
 - PPE requirements and the reason for each.
- Applicable statutory and site-specific requirements:

- Relevant clauses from applicable acts and regulations relating to working in a surface mine.
 - Codes of practice and in-company Procedures.
- Relevant ISO clauses.
- Use of mobile fire and rescue equipment.

There are several accredited training providers, listed with the MQA, and some of these training providers may be engaged during the stakeholder engagements and focus groups. At this time, literature related to the specific content of the training programmes presented by these accredited training providers, could not be identified.

3.3. Barriers Preventing Transition from OHS Representative to OHS Officer

In 2022, a research study was conducted by Dr Nancy Coulson and Prof May Hermanus for the Mine Health and Safety Council (MHSC), titled “Develop Guidelines for Recognition of Prior Learning and Training of occupational health and safety representatives and union shop stewards in the SAMI”. The aim of this study was *“to assist the MHSC in developing guidelines for recognition of prior learning (RPL) and training of Occupational Health and Safety representatives and union shop stewards in the South African Mining Industry (SAMI)”* (Coulson & Hermanus, 2022).

According to this study, three contextual factors lower the effectiveness of OHS representatives:

1. Pressures from Management/Leadership - These representatives were tasked with coordinating or liaising with workplace representatives on behalf of the employer, with employers referring to them as their “eyes and ears” (Coulson & Hermanus, 2022).
2. Discrimination and Intimidation - Although section 83 of the MSHA protects them from discrimination, this protection is not always upheld. Nearly 40% of workplace OHS representatives reported being relocated due to their role, and 20% experienced abuse or threats from supervisors and co-workers, actions that should be strongly condemned within the SAMI (Coulson & Hermanus, 2022).

3. Lack of Soft Skills - International comparisons (in countries such as the United Kingdom, United States of America, Canada, and Australia) show that training for OHS representatives abroad focuses on the skills needed to represent workers, while in South Africa, the emphasis is on basic OHS competencies. This suggests that OHS representatives in South Africa are overburdened and that other workers may lack adequate OHS and interpersonal/soft skills (Coulson & Hermanus, 2022).

The findings and recommendations arising from this investigation will be considered and assessed in conjunction with the results of the stakeholder engagements and focus group discussions conducted in this study, in order to ascertain whether these issues persist and continue to inhibit the transition to OHS officers. The barriers identified are corroborated by the outcomes from the stakeholder engagements detailed in Section 4.3.

3.4. Innovative Training Strategies

Several innovative and modern training, as well as education strategies have been developed - and evolved into practical methods of improving the learning experience, both for students in tertiary institutions, as well as training for employees and professionals in the workplace. Combining new technologies, and teaching methods, and integrating real-time data, can yield more effective training, better knowledge retention, and improved engagement in training sessions.

Innovative training methods and technologies, like Virtual Reality (VR), gamification, Artificial intelligence (AI), tracking progress via wearable technologies, and others, are altering the way organisations approach health and safety training, especially in high-risk industries. These strategies offer flexible, engaging, and effective ways to improve employee safety, reduce incidents, and enhance training outcomes. Each approach can be tailored to align with specific organisational needs, and when combined, they create a comprehensive training programme, that is more effective for employees.

3.4.1. Training and Education Methods

3.4.1.1. Collaborative and Social Learning (Peer Learning)

Peer learning encourages workers to collaborate and learn from each other, through workshops, peer assessments, or team-based tasks – which can promote a culture of safety and improve knowledge transfer. Online forums or platforms, can be used for employees to discuss safety concerns, share experiences, and ask questions about best practices and safety protocols. These platforms can foster a sense of community, allowing continuous learning and ongoing engagement with other OHS representatives.

3.4.1.2. Blended Learning

Blended learning combines traditional in-person (face-to-face) training with digital methods - creating a more flexible and engaging approach. It can include live demonstrations, hands-on exercises, e-learning modules, and practical assessments.

3.4.1.3. Interactive E-learning Platforms

E-learning platforms offer interactive, multimedia content that workers can engage with at their own pace. These platforms often combine videos, quizzes, and interactive scenarios to provide a well-rounded learning experience. It allows for flexible training schedules - and is ideal for workers in remote work sites.

3.4.1.4. Mobile Learning and Micro-Learning

Mobile learning allows employees to access training materials, such as videos, quizzes, and manuals, on mobile devices. This is especially useful for remote workers, or those working in environments like mines, where they may not have access to traditional classroom settings.

Microlearning involves, delivering content in short, easily digestible segments. For example, a quick 5-minute video explaining a safety procedure, or a quiz testing knowledge on specific safety measures.

Both of these techniques offer flexibility in the training schedule and location – reducing potential downtime and absence of employees. It enables employees to refresh their knowledge, during short intervals, without disrupting their work targets. This learning approach also enables the employees to address specific knowledge gaps and/or reinforces key safety concepts.

3.4.2. Training and Education Technologies

3.4.2.1. *Immersive Technologies*

Immersive technologies, such as Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR); have been extensively trialled and incorporated into training and education programmes. The use of VR, is often combined with the concept of simulation-based training (discussed in section 3.4.2.2), and ‘gamification’ (discussed in section 3.4.2.3), to provide a holistic experience to the trainee or student – immersing them into a realistic representation of an operational environment without the associated risks and hazards.

VR immerses the trainee in a fully simulated environment. For example, in mining, employees can experience dangerous scenarios, like underground collapses, gas leaks, or fires without any real risk. This type of simulation allows trainees to practice emergency responses, or work through complex safety protocols, in a controlled, risk-free setting. AR overlays virtual safety information, and instructions onto a worker’s view of the real world, typically via smart glasses or mobile devices. AR can be used on-site to guide workers through safety protocols and show hazard hotspots.

Based on an extensive literature review and analysis by Scorgie, et al. (2024), several studies have indicated, that the use of VR in training and education, has improved knowledge retention and skills development - compared to traditional paper-based training (including the use of videos in traditional lecture settings). Although the authors commented that there are multiple immersive technologies available – each presenting different capabilities and advantages, immersing trainees or students in an environment significantly contributes to their learning experience and knowledge retention (Scorgie, et al., 2024).

3.4.2.2. *Simulation-based Training*

Simulation-based training uses realistic models of equipment, or work environments to practice safety protocols. This can include, digital twins of equipment, or real-time simulated hazard scenarios, that allow workers to practice handling emergencies, or routine safety checks in a low-risk setting. It; therefore, allows workers to gain hands-on experience with real-world equipment or environments, without the associated risks; improves decision-making and emergency response by offering immersive, scenario-based learning; and it can be tailored to specific situations or equipment.

Simulation-based training is often combined with immersive technologies, to enable trainees to fully experience the environment - and activities, that may otherwise, be extremely hazardous and high-risk.

3.4.2.3. *Gamification*

Gamification incorporates game elements (points, leader boards, levels, rewards) into safety training, to enhance engagement and motivation. Instead of a traditional classroom or lecture-based training, employees earn points or rewards for completing safety tasks, solving safety-related challenges, or passing quizzes (Faiella & Ricciardi, 2015). This training approach has been shown to increase engagement by making safety training fun and competitive; encourage continuous learning through rewards and progress tracking; and facilitate better retention of safety protocols through interactive, scenario-based challenges.

Gurer, et al. (2023) conducted a study in which the authors developed a detailed and realistic 'serious game' (aimed at game-based learning) named MINING VIRTUAL. A serious game is defined as “a serious game in an educational setting is considered to be a purposeful learning environment that targets key curriculum areas for explicit learning. Serious games are games or game-like interactive systems developed with game technology and design principles for a primary purpose other than pure entertainment” (The Ministry of Education and Training, Victoria, Australia, 2017). The structure of the MINING VIRTUAL game is shown in Figure 1.

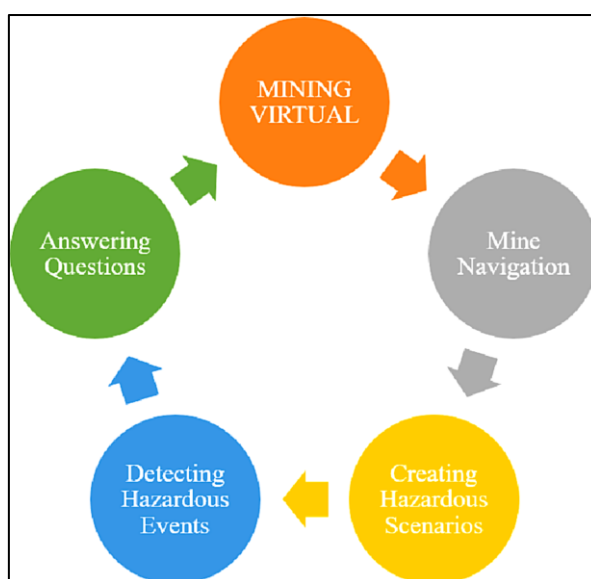


Figure 1: MINING VIRTUAL Game Structure (Gurer, et al., 2023)

The MINING VIRTUAL game is set in an underground coal mine, shown in Figure 2. The production operation, mining unit operations, such as ventilation, and moving equipment are simulated in this game. This visual simulation, is combined with information windows, when moving into certain areas or selecting certain objects or machines, multiple choice question quizzes, and hazard identification activities, to enable trainees to recognise hazards and practice certain skills while simply playing a game (Gurer, et al., 2023).

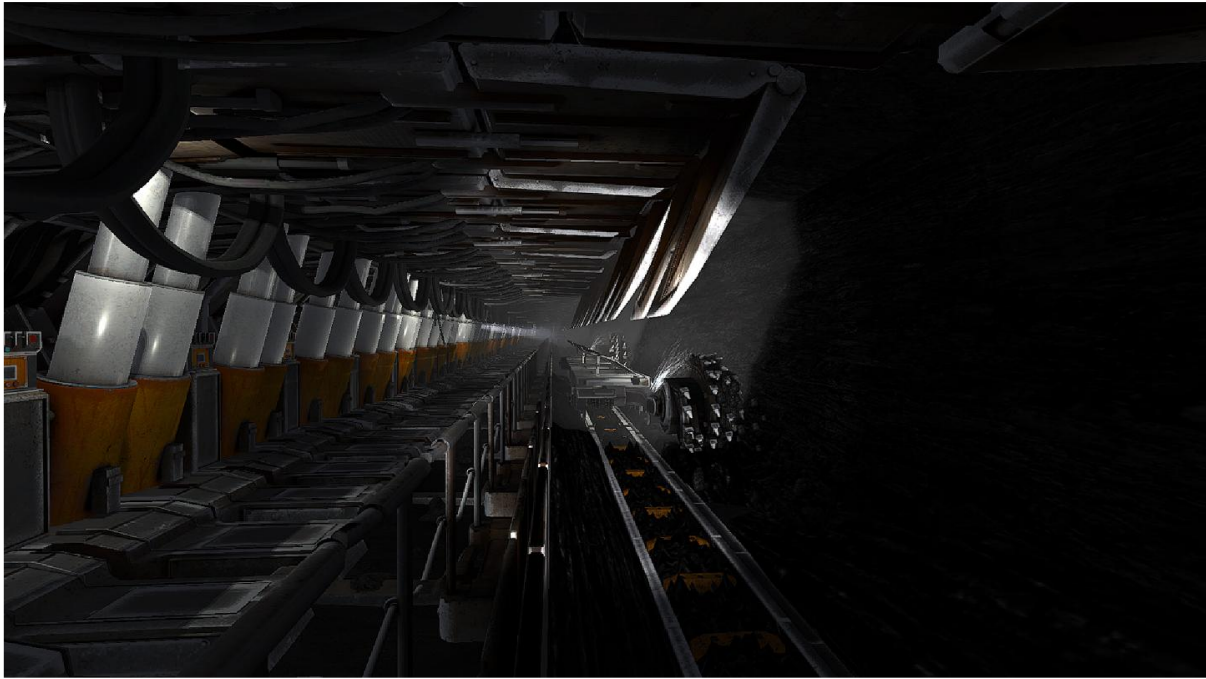


Figure 2: A scene from MINING VIRTUAL game (Gurer, et al., 2023)

However, it is important to note, that even though gamification and serious games present exciting opportunities to improve existing training strategies, and encourage more engagement, the organisation needs to ensure that the focus is on developing the correct skills (Armstrong & Landers, 2018). Organisations presenting OHS training, for the mining environment, must ensure that the critical skills that need to be developed, are well-defined, to ensure that new training tools and technologies align with the envisaged outcome.

4. RESULTS AND DISCUSSION

In November 2024, a series of stakeholder engagements and focus groups were conducted at various locations, as well as online, to collect data and information regarding training and operational perspectives relevant to the objectives established for this study. In addition to these engagements, a survey was compiled and distributed to over 1,000 potential respondents, yielding a total of 102 complete responses. The findings from the survey, stakeholder engagements, and focus groups are discussed in this section. It is noteworthy that during all engagements, recurring topics and concerns surfaced consistently. Therefore, it is evident that similar challenges and issues are prevalent across the MMS concerning OHS representatives and the skills training programs. Please refer to Section 2.3

for a comprehensive overview of all the questions posed and discussed during these engagements. It should be noted that not all questions could be posed to every respondent due to time constraints.

4.1. Effectiveness of Current OHS Representative Training Programmes and Assessment Tools

Current/existing training programmes that are available for the OHS representatives, consist of three main unit standards, namely:

- SAQA US ID 259639: Explain basic health and safety principles in and around the workplace.
- SAQA US ID 259622: Describe the functions of the workplace health and safety representatives.
- SAQA US ID 244383: Conduct continuous hazard identification and risk assessment within the workplace.

The current training programme is presented over 10 days; and three days practical, in a workplace environment, or mock-up, where trainees are expected to perform some of their expected duties as OHS representatives – including hazard identification and risk assessment.

The theoretical component is presented over seven days, in a classroom format, and is on the three-unit standards. The expectations outlined in the MHSA and, in some cases, Standard Operating Procedures (SOPs) are specific to a mine site or company. The theoretical component, is assessed individually, using a combination of summative (conducted verbally to assess comprehension), and formative assessments (written or interactive questioning in the session) - on the content covered in the three-unit standards and legislative topics covered in the sessions.

Following the theory, a practical component is introduced, whereby trainees are taken to a simulated working environment, or mock-up. This is done in groups, and trainees are expected to perform certain OHS representative duties, such as hazard identification and workplace inspection. For the practical component, trainees are assessed in their group and not individually – which has caused some concern among some stakeholders - on how to guarantee the competency of a single OHS representative following the practical assessments.

Finally, trainees are typically given a logbook – which they must take into their workplace. They are expected to perform and record certain safety related tasks or activities during a 10-day period. This logbook must be signed off by the safety officer and will then form part of their portfolio of evidence whereby the trainee will be declared competent or not.

Although several stakeholders agreed that the content and presentations of current training programmes are comprehensive, and effective as it is, there were several gaps/shortfalls identified. These gaps/shortfalls were discussed in the engagements, that prevent OHS representatives from being effective in their roles – which could lead to incidents occurring that should have been prevented.

4.2. Shortfall (Gaps) in Current Training Programmes

Although existing OHS representative training programmes are currently aligned with the prescribed duties in the MHSA and the three-unit standards that form the training syllabus - there are some critical shortfalls that has been identified and discussed during the stakeholder engagement. These shortfalls have a direct impact on whether or not an OHS representative is successful and effective in their role in the workplace.

4.2.1. Recent amendments to the MHSA

The recent amendments to the MHSA, that includes OHS representatives, in the preparation, implementation and revision of any Code of Practice (COP) at the mine (Section 9). The OHS representative needs to be consulted, with respect to training provided (Section 10), and on the determination of all measures, including changing the organisation of work - and the design of safe systems of work (Section 11). These amendments increase the scope of responsibility of OHS representatives and must be included in the training material. Preparing OHS representatives for these roles and equipping them with the necessary skills to perform these roles, needs to be included in training programmes.

4.2.2. Lack of other unit standards and Technical Knowledge

Considering the roles and responsibilities outlined for OHS representatives in the MHSA (refer to section 3.1), some stakeholders mentioned that the existing training programmes may be ‘too basic’ - and may not include enough material/focus on the technical knowledge, and other skills required, for OHS representatives to be successful in their roles in the workplace. It was noted that additional unit standards should be included in OHS representative training programme, to sufficiently equip OHS representative to perform their duties.

These include:

- SAQA US ID 14609: Participate in management of conflict.
- SAQA US ID 244518: Apply specialist incident investigation techniques to a specific incident in a work environment.
- SAQA US ID 259597: Explain emergency preparedness and response procedures.

Another shortfall, identified during the stakeholder engagements, is the lack of technical knowledge. Some stakeholders mentioned that their company already require OHS representatives to complete their Competence A as part of their training, and for artisans and engineers, Competence B is also required as part of their OHS training. This is important to ensure that OHS representatives have knowledge on the environment and associated hazards, and risks in order to be able to successfully identify and assess the environment – preventing potential major incidents.

4.2.3. Soft Skills (Communication- and Leadership Skills)

One of the major challenges, identified during the engagements, is some OHS representatives’ - inability to effectively communicate and be assertive in the workplace - once they identified any hazard, negligence or misconduct. This is supported by a lack in workplace leadership skills, and conflict management. None of these soft skills are included and developed in the existing training programmes and are essential to the success of OHS representative in their roles in the workplace. In order to enhance assertiveness skills - the development of the necessary communication-,

leadership- and conflict management skills - will improve the relationship between OHS representatives, the workforce, and their supervisors/managers.

In the past, soft skills have been overshadowed by the technical skills required to perform certain tasks in the MMS. However, in recent years there has been a significant drive to developing leadership in the workplace, and improve on communications skills, to ultimately improve working conditions, moral, and the overall performance of teams.

4.2.4. Language Skills

Language is a major challenge in any training environment – especially considering the trainees’ typical level of education and proficiency in languages, other than their home language. In most cases, training and training material is presented in English – which is not the home language of many in the MMS workforce. In some cases, training may be presented in Fanakalo – which may assist the learning of some trainees, but training materials and documentation will still be written in English. It is, therefore, important to assist trainees to fully understand the training material and OHS documentation. It was also mentioned during the engagements, that it is ideal to present training in the home languages of the trainees – this will increase the comprehension and retention of knowledge and improve the effectiveness of the training programme. However, the feasibility and practicality of this will need to be assessed, by the relevant training centers.

4.2.5. Frequency of Training

Based on the engagements with stakeholders, it was noted that training should be attended when an OHS representative is hired, when job changes occur, and periodic refresher courses, should also form part of the training plan in the appointment period.

4.3. Barriers Preventing the Transition from OHS Representative to OHS Officer

The stakeholder engagements highlighted several barriers that prevent OHS representatives from moving into OHS officer roles. These barriers are discussed in this section.

4.3.1. Communication Skills

Communication is a key part of the responsibility of an OHS representative. As mentioned previously, for most of the workforce in the MMS, language and general communication, outside of their home language, may prevent OHS representative from aspiring to become an OHS officer. In addition, someone struggling to communicate, will also tend not avoid conflict, and not be assertive in a situation where it becomes essential to their role. On the other side, a lack in communication skills and people skills, may result in conflict since the relevant OHS representative may seem to abuse power because they do not know how to interact with people.

A lack of leadership skills in the workplace, effective communication skills and conflict management skills - all contribute to OHS representative not being successful or effective in their roles – and will therefore not aspire to grow in such a role.

4.3.2. Impatient Leadership and Pressures from Management

Certain stakeholders have indicated that impatience from leadership or production pressures imposed by management may place undue stress on the designated OHS representative, potentially prompting them to resign from their position. If management and leadership fail to provide adequate support to the OHS representatives in their roles, it is likely that these individuals will not engage in further educational opportunities necessary to transition into OHS officer positions.

In some cases, OHS representatives are not treated with respect for their roles and often feel that they are treated as being incompetent, and overruled in the workplace.

4.3.3. Gender Biases

The following discussion points were highlighted by some of the stakeholders during the engagements:

- Gender roles – some women may be expected to be polite, accommodating and nurturing, often nudging them to take caretaking roles. Although much growth has taken place in terms of women in mining, and opportunities to grow in their roles, the reality is, that some in the workplace may still place this expected behaviour onto women in the workplace, and not necessarily allow them to be the authority on OHS in that area. Juggling these responsibilities, often places added stress on women as they attempt to rise up the corporate ranks competing for jobs against men who don't face the same expectations.
- Sexual harassment – results in women leaving their jobs early and not advancing their careers.
- Other gender biases – Receiving less salary than colleagues of a different gender in the same job, being passed over for promotions or other important career opportunities and feeling isolated from the rest of the team may motivate women to pursue other opportunities.

4.3.4. Qualification Requirements

The qualifications requirement, for becoming an OHS officer, seems to be a major reason for OHS representatives not transitioning into OHS officer roles. These requirements include:

- Require a trade or blasting ticket. If the OHS representative does not have a trade or blasting ticket, they will not qualify to pursue becoming an OHS officer unless they first obtain one of these certifications.
- The duration of OHS representative training is 10 days; whereas the OHS officer training requires a 12-month learnership.
- In order to qualify for an OHS officer, a 3-year National Diploma is required in mining. Prospective individuals will, therefore, need to invest three years into further studies – which is often seen as too long by some.
- The SAMTRAC and COMSOC training programmes are not mapped by the NQF and is therefore not recognized as prior learning for the National Diploma.

4.3.5. Educational Background

As previously discussed, a large number of the workforce in the MMS do not have the educational background, or qualify to pursue further studies, and training towards becoming an OHS officer. The

selection process, for OHS representation does not require any specific educational level, or even relevant competencies, since it is based on peer selection via nomination and election from the workforce. Therefore, in some cases, individuals are appointed, as OHS representatives that are incapable of, or do not qualify for further studies, or training, to become OHS officers – meaning their career path in OHS ends at being an OHS representative.

4.3.6. Structural Barriers

There were few structural barriers identified during the engagements. One barrier mentioned was that, in contrast to the positions of OHS representatives, there exists a limited number of OHS officer positions at any given mine—significantly fewer than those of OHS representatives. Considering this factor, it becomes evident that not all OHS representatives are able to transition into OHS officer roles due to the insufficient availability of positions.

4.4. Innovative Strategies to Improve Current Training Programmes

Based on discussions with stakeholders from mining operations and training facilities, the potential for integrating innovative technologies into existing training programs was examined. It appears that e-learning methods, whether online or self-paced, are not preferred by training centers. E-learning has become merely a mechanical exercise, resulting in inadequate knowledge retention among trainees. While some stakeholders indicated that modifications have been made to their e-learning components to enhance effectiveness, there seems to be a prevailing consensus among most stakeholders that e-learning is not the optimal training strategy.

The adoption of technologies such as simulations and VR presents promising opportunities to enhance learning and knowledge retention by rendering the educational process more engaging. However, certain stakeholders have emphasised that the educational level of some trainees may complicate the learning experience when utilising these technologies. For some stakeholders, traditional mock-ups remain the preferred option, as they provide a more realistic experience in comparison to VR.

In conclusion, a strategy that presents substantial opportunities for educating and training the younger generation is gamification. While existing training programs and assessments are not structured in a manner conducive to straightforward conversion into a gamification strategy, it may be worthwhile to explore the feasibility of adapting certain practical materials or assessments to such a platform.

5. KEY FINDINGS

The current OHS training programmes cover fundamental safety principles, hazard identification and the roles of OHS representatives in the workplace. These provide foundational knowledge. Unfortunately, these programmes might be considered to be too basic, to meet the complex responsibilities of the OHS representatives – especially considering the recent amendment to the MHSA, and expectations from the mines. Some of the key additional skills required by OHS representative, outside of the current scope of training programmes, include:

1. Technical skills to be able to identify risk in the area of work (e.g. include Competence A in training syllabus and Competence B for Engineers and Trade).
2. Other critical planning and investigative skills required to conduct emergency preparedness planning, and incident investigations, is not currently included in training programmes but form an essential part of the duties of OHS representatives.
3. Soft skills such as leadership in the workplace, and communication skills, enabling assertiveness, or to be courageous.
4. Develop content in current training programmes to include recent amendments to the MHSA affecting the scope of responsibilities of an OHS representative.
5. Additional tools that may be useful (based on conversations during the stakeholder engagements):
 - Guidelines on doing a proper workplace inspection and risk assessment – i.e. what to look for and how to ask questions to check if a condition is safe. (Not all OHS representatives are trained in all the jobs/work areas and may find it difficult to know what to look for.)
 - OHS representative booklet to use if the company does not have one to guide their actions and tasks.
 - A self-evaluation, or needs analysis matrix, to check if individual OHS representatives may need additional skills to be able to be effective in their roles.

The current assessment tools include summative and formative assessments during classroom lectures, direct observation, and provider-developed evaluations (formative assessments). Portfolios of evidence are established, including a logbook of activities during workplace training, for

submission – this will serve as proof of competence. Group-based risk assessments are used during the practical training component but are not ideal because they are not necessarily tailored to specific workplaces (especially for small companies) or individuals.

Identifying any gaps in training or any individual OHS representative’s knowledge and understanding of their workplace-specific risks and procedures is essential. All aspects (including soft skills and additional technical knowledge) of the OHS representative’s role and responsibilities (and skills required to be effective in this role) must form part of a holistic training program. Inadequate training leads to missed hazard identification, and unsafe work practices, contributing to accidents, and ineffective use of PPE. It may also result in lower safety standards - affecting overall productivity and employee well-being, and potential work stoppages.

Systems and protocols, need to be in place on mines to support the OHS representatives in their roles, in other words:

- Training managers and supervisors should include understanding the role of OHS representatives, and how to support them to be effective in that role – leadership should not manipulate or intimidate OHS representatives to motivate agendas other than the health and safety of employees in the workplace.
- Clear structures and systems must be in place on how the information provided by OHS representatives is recorded and actioned upon.
- Improved, and greater involvement, of safety representatives in decision-making, related to the integration of COPs and SOPs. This additional role is now stipulated in the MHSA as part of the latest amendments.

Several barriers hindering the transition of OHS representatives into OHS officer roles have been identified through a literature review and the stakeholder engagements. These barriers are summarised below but are not necessarily easy to overcome for all OHS representatives – enabling them to transition into OHS officer roles. These barriers include:

1. Educational Background – Many representatives lack the formal qualifications required for advanced roles, like Safety Officers. Representatives are elected without consideration of qualifications, aptitude or career aspirations – which also contributes to the low number of OHS representatives transitioning into OHS officer roles.

2. Program Limitations – Current OHS training programs are not recognised as formal qualifications, e.g. COMSOC is not mapped to NQF and is, therefore, not considered for recognition of prior learning for the 1st year on the national diploma.
3. Structural Barriers – Limited OHS officer positions are available, compared to the number of OHS representatives in the system. It is proposed that focus should be on the full-time OHS representatives for growth and succession planning, (not excluding the temporary OHS representatives from applying for such a programme).

Other barriers influencing the success and effectiveness of OHS representatives, in their roles in the workplace include:

1. Soft skills – A lack of communication skills and leadership skills results in OHS representatives struggling to communicate with people in the workplace effectively. The confidence to take charge of a situation and be assertive, is also a major barrier that requires additional skills training.
2. Lack of sufficient technical knowledge – Technical skills relevant to the workplace, and tasks immediately associated with the OHS representative's workplace, is critical to enable them to effectively identify hazards, and assess risks in their immediate environment.
3. Language skills – This links back to the communication skills in the workplace, but also the OHS representatives' ability to fully understand the training material and retain the knowledge gained during training. This is something that will have to be addressed in future – whether it is in the form of language skills development or presenting training in a variety of languages – allowing trainees to be trained in their home language.
4. Confidence and authority – Some OHS representatives have experienced discrimination and intimidation in the workplace, impacting their confidence to perform their duties. Promoting support from leadership, through company policy and safety culture, may enable OHS representatives to become more confident in their roles, and perform their duties with assertiveness, and authority because they have the support of their supervisors and management.

There is an opportunity to include new technology and modern training concepts, such as VR and gamification, to enhance the learning experience and knowledge retention of trainees during OHS training programmes. These technologies and training concepts will likely not replace traditional

classroom presentation and discussions but will enhance the trainees’ understanding of the material and the application thereof. Including simulations to enable scenario-based learning, will allow trainees to develop an experiential frame of reference against which they will assess and interpret their working environment – beyond textbooks and classroom discussions.

Based on the methodology followed, as well as the findings of this study, the following conceptual framework (Figure 3) is developed for assessing skills levels and knowledge gaps of OHS representative in the South African MMS.



Figure 3: Conceptual Framework for Assessing Skills Levels and Knowledge Gaps of OHS Representatives in the MMS

The framework is designed to systematically identify and analyse the existing skills levels, and knowledge gaps of OHS representatives in South Africa's mining sector. This enables targeted interventions to enhance their competencies and support a safer working environment. The key components for this framework are summarised in Table 2.

Table 2: Key Components for the Conceptual Framework

Inputs	Process	Outputs
<p>Legislative and Regulatory Requirements:</p> <ul style="list-style-type: none"> ▪ Compliance with the Mine Health and Safety Act (MHSA) and the Occupational Health and Safety Act (OHSA). ▪ Integration of international standards such as ISO 45001: Occupational Health and Safety Management Systems. 	<p>Data Collection:</p> <ul style="list-style-type: none"> ▪ Surveys and Questionnaires: Gather self-assessed skill levels and perceptions of competencies. ▪ Interviews: Obtain qualitative insights from stakeholders about skill gaps. ▪ Workplace Observations: Evaluate real-time performance of OHS representatives. 	<p>Categorized Skill Levels:</p> <ul style="list-style-type: none"> ▪ Gap Analysis: ▪ Identify discrepancies between required skills and current abilities. ▪ Highlight deficiencies in technical knowledge, practical application, or compliance.
<p>Current Skill Requirements:</p> <ul style="list-style-type: none"> ▪ Competencies in Hazard Identification and Risk Assessment (HIRA). ▪ Proficiency in emergency response and crisis management. ▪ Knowledge of regulatory compliance, incident reporting, and safety audits. 	<p>Competency Benchmarking:</p> <ul style="list-style-type: none"> ▪ Align findings with National Qualifications Framework (NQF) for South Africa. ▪ Benchmark against international best practices in OHS management. 	<p>Knowledge Gaps Identification:</p> <ul style="list-style-type: none"> ▪ Specific gaps, such as emergency response readiness or mental health management.

Inputs	Process	Outputs
Interpersonal skills such as effective communication and conflict resolution.		
<p>Stakeholder Perspectives:</p> <ul style="list-style-type: none"> ▪ Input from mining companies, labour unions, government agencies, and regulatory bodies. ▪ Feedback from OHS representatives and mine employees regarding challenges and needs. 	<p>Gap Analysis:</p> <ul style="list-style-type: none"> ▪ Identify discrepancies between required skills and current abilities. ▪ Highlight deficiencies in technical knowledge, practical application, or compliance. 	<p>Recommendations:</p> <ul style="list-style-type: none"> ▪ Customized training modules and capacity-building initiatives. ▪ Establishment of Continuous Professional Development (CPD) programs. ▪ Policy enhancements for OHS education integration.

This conceptual framework can support mining companies to design and implement targeted OHS training programs; policy makers to develop and refine OHS education and safety regulations; training providers to align training curricula with the sector's specific needs; and researchers to investigate and innovate OHS competency development strategies.

Key benefits of the framework include:

- Promotes a proactive approach to workforce safety.
- Ensures alignment with regulatory standards and global best practices.
- Enhances the professional capacity of OHS representatives in South Africa's mining sector.

6. RECOMMENDATIONS

The recommendation for this study, is based on three main focus areas, i.e. recommendation on the revision of the training programmes, the inclusion of recent MHSA Amendments into the MQA program, and recommendation to address the barriers preventing OHS representatives to transition into OHS officer roles.

6.1. Recommendations to revise existing OHS Training Programs:

- Introduce advanced unit standards in technical skills program, for safety representative in mining, such as the additional SAQA unit standards, mentioned in Section 4.2.3 and Competence A, as well as Competence B where Engineering and Metallurgy relevant technical knowledge is required.
- Include risk and safety skills, such as incident investigation and critical thinking.
- Soft skills, such as leadership skills in the workplace, communication skills, and conflict management, will aid assertiveness and confidence, and enable OHS representative to manage conflict and apply OHS coaching in the workplace.
- Planning skills, like emergency planning, are essential for the responsibilities prescribed by the MHSA. This is covered in one of the proposed additional unit standards to be included in training programmes (SAQA US ID 259597).
- Align training programs with formal qualifications (e.g., NQF standards) to be able to build a Recognition of Prior Learning (RPL) system, towards the National Diploma for OHS officers.
- Implement technology, to improve the learning experience, and exposure towards understanding risk within a specific environment.
- Combine existing learning strategies, with practical simulations, for comprehensive learning.
- Use multilingual training materials, to overcome language barriers.

Activity: Revise existing OHS training program curricula, to incorporate additional content towards developing the additional skills identified in this research study. These programmes revision and additions, needs

to be investigated - in collaboration with training institutions and other stakeholders such as mining companies, MQA and labour unions (if necessary).

Timeframe: This should be done as soon as possible - to ensure the OHS representatives develop the necessary skills and knowledge for their roles. This can possibly take place over a 12- to 18-month period.

Aligning training programmed with formal qualification, to be mapped against the NQF, toward RPL may take a bit longer. If this is pursued, it should be done in 24 months.

6.2. Include the recent MHSA Amendments into the MQA Program:

- Section 9: Inclusion of safety representatives for the consultation on the preparation, implementation or revision of any code of practice
- Section 10: Inclusion of safety representatives for the consultation in respect of training provided.
- Section 11: Inclusion of safety representatives for the consultation on the determination of all measures, including changing the organisation of work and the design of safe systems of work.

Activity: Revise existing OHS training program curricula, to include additional content towards developing the skills required to perform the tasks, based on the new amendments to the MHSA. The required content and assessment need to be investigated, in collaborations with training institutions and other stakeholders such as mining companies, MQA and labour unions (if necessary).

Timeframe: This should be done as soon as possible - to ensure the OHS representatives are equipped to perform the duties prescribed in these amendments. This can possibly take place over an 8- to 12-month period.

6.3. Address barriers preventing OHS representatives from transitioning to OHS officers:

- Develop leadership skills among OHS representatives, to enable career progression and independent learning towards a goal.
- Intentionally, develop career paths for OHS representatives, during their three-year term (similar to a graduate program). Focus should be placed on the full-time OHS representatives. OHS representatives should be viewed as part of the talent pipeline – with a professional development plan and mentorship during their term.
- Address gender biases and create inclusive policies for all employees – if it does not already exist.
- Periodic Updates and Feedback – Regularly review training content, to align with new regulations and workplace needs. Establish channels for feedback from safety representatives and management.

Activity:

These recommendations can be implemented through revising and updating COP and SOPs on site.

A professional development strategy can be developed, per mining company, to allow a clear for OHS representatives to work through toward qualifying as an OHS officer. Such a strategy should include obtaining the necessary qualifications, skills development and being guided through a mentorship programme.

Timeframe:

Review and updating of COPs and SOPs should be done periodically – i.e. every 12- to 24-months.

Development of a professional development strategy for prospective OHS officer in current OHS representative roles should be done as soon as possible, i.e. 8- to 12-months.

By addressing these barriers, and combining it with a personal development plan, and mentorship program, the challenges faced by the OHS representative should be reduced – potentially motivating

them to aspire towards becoming OHS officers. However, it is important to note, that considering all of these barriers and the availability of OHS officer positions in the industry, it is recommended that the progression to OHS officer, should be viewed as a talent pipeline - and an associated development programme should be in place, to assist selected individuals to pursue OHS officer roles. These individuals may be selected by the mine's leadership, or possibly even apply for this development programme – similar to graduate programmes.

7. CONCLUSION

The research underscores the essential function of OHS representatives, as well as the necessity for comprehensive OHS training programs within South Africa's MMS. It identifies numerous deficiencies in the existing training programs, competencies, and avenues for career advancement. Although current training initiatives address fundamental safety principles, they frequently fall short of satisfying the increasing demands and responsibilities of OHS representatives, particularly in light of the recent amendments to the MHSA.

The key findings underscore the necessity for improved technical skills, the development of soft skills, and increased language proficiency to augment the effectiveness of OHS representatives. Furthermore, obstacles such as inadequate formal qualifications, structural limitations, and challenges faced in the workplace impede their progression to OHS officer roles. Innovative training strategies, which incorporate technological advancements such as VR, simulations, and gamification, demonstrate promise in bridging these gaps and enhancing knowledge retention.

The study proposes a conceptual framework for the systematic assessment of the skills and knowledge of OHS representatives, along with targeted recommendations for the revision of training programs to align them with formal qualifications and to address barriers to career progression. The implementation of these recommendations has the potential to significantly enhance the competency of OHS representatives, facilitate their career advancement, and ultimately contribute to a safer and more productive mining industry.

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