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Examining the Effectiveness of Occupational Health and Safety Practices in Workplaces: A Case Study of Kansanshi Mine

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Abstract
Despite comprehensive legal frameworks such as the Mines and Minerals Development Act No. 11 of 2015 and the Occupational Health and Safety Act No. 36 of 2010, workplace accidents and health risks remain a challenge in Zambia's mining sector. Kansanshi Mine, one of the largest copper operations, continues to face occupational hazards that question the consistency and effectiveness of its safety practices. This study examined the implementation of occupational health and safety (OHS) practices at Kansanshi Mine and their contribution to worker safety and organizational performance. A mixed-methods case study design was adopted, combining structured questionnaires and in-depth interviews. Data were collected from 70 workers and supervisors and 30 safety officers, managers, and experienced employees. Quantitative data were analyzed using SPSS and qualitative responses through thematic analysis. Findings revealed that OHS practices are generally established but unevenly implemented. The results show that 20 (20%) of the respondents indicated the presence of a Personal Protective Equipment (PPE) policy, 10 (10%) identified an emergency response and evacuation policy, 50 (50%) reported the incident/accident reporting and investigation policy, and 20 (20%) mentioned the environmental and waste management policy. These findings reveal that the incident/accident reporting and investigation policy is the most widely recognized, accounting for half of the responses. The study concludes that Kansanshi Mine has developed a moderately strong OHS framework that positively contributes to employee safety, productivity, and overall organizational performance. Demographic analysis revealed a workforce largely composed of young and middle-aged employees, with male dominance in managerial and technical safety roles. Educational levels varied by role: general workers mainly held secondary education, supervisors possessed post-secondary qualifications, and safety officers and managers were the most educated, with 40–66.7% holding degrees. It Recommends proposed strengthening of OHS practices and their impact on performance at Kansanshi Mine. Ensure timely and consistent distribution of high-quality PPE to all employees, including periodic replacement of worn-out equipment. Automated inventory management systems should be introduced to monitor PPE stock and anticipate shortages.

Keywords: Occupational Health and Safety, Mining, Kansanshi Mine, Workplace Safety, Organizational Performance, Productivity, Staff Retention, Safety Culture, Zambia

1. Introduction

1.1 Background

Occupational Health and Safety (OHS) refer to the regulations, procedures, and organizational strategies that ensure the physical, mental, and emotional well-being of workers in their work environment. It encompasses practices designed to minimize risks and hazards, promote employee health, and ensure safe working conditions across all industries, particularly in high-risk sectors such as mining. Globally, occupational health and safety is not merely a regulatory concern but a pivotal aspect of organizational sustainability and workforce productivity. The International Labour Organization (ILO) estimates that over 2.78 million people die annually from work-related illnesses and accidents, and over 374 million suffer non-fatal injuries (ILO, 2019). These statistics highlight the global urgency in enforcing effective OHS standards. As economies industrialize and expand, particularly in sectors like mining, the significance of safeguarding workers from operational hazards has become a vital issue, linked directly to economic and social sustainability (Törner & Pousette, 2017).

On a global policy level, the ILO's conventions such as C155 (Occupational Safety and Health Convention) and C187

(Promotional Framework for Occupational Safety and Health Convention) have offered comprehensive frameworks that member states are encouraged to adopt (ILO, 2019). These frameworks have guided many governments and private institutions in formulating policies that address safety risks, provide for continual improvement of health conditions at work, and reinforce a culture of prevention. However, despite this guidance, practical implementation varies due to disparities in economic resources, political will, and institutional capacity, especially in developing nations (Graveling *et al*., 2020).

Within the African continent, occupational health and safety has gained increased attention, particularly due to rapid industrial growth and urbanization. However, enforcement remains weak, and health and safety practices are often fragmented and under-resourced. A study by Aderibigbe and Mbohwa (2016) [1] in South Africa's mining sector revealed that although OHS legislation is in place, implementation is constrained by inadequate training, lack of accountability, and poor resource allocation. The African Union (AU) has also advocated for stronger occupational health frameworks through its Social Policy Framework for Africa (AU, 2016) [5], yet national enforcement remains inconsistent across countries.

In the Sub-Saharan African context, mining has long been recognized as both a critical economic driver and a hazardous occupation. Countries like South Africa, Ghana, and Zambia heavily rely on mining revenues, but the sector also reports a high incidence of occupational injuries and fatalities. According to Gbadamosi *et al*. (2021), Sub-Saharan Africa faces significant OHS challenges including limited legislation enforcement, poor record-keeping of accidents, and a general lack of safety culture in small- and medium-scale operations. Moreover, the high rate of informal employment and subcontracting further exacerbates the inability to maintain standardized safety practices (Asiedu & Akrofi, 2018) [4].

In Zambia, the mining industry remains the backbone of the national economy, contributing significantly to GDP and employment. Kansanshi Mine, one of the largest copper mining operations in the country, plays a central role in this sector. Health and safety protocols at the mine are guided by legislation such as the Occupational Health and Safety Act No. 36 of 2010, and the Mines and Minerals Development Act No. 11 of 2015. Despite these legal instruments, mining sites continue to face recurring incidents of injuries and occupational diseases (Mulenga *et al*., 2020). Several studies have highlighted challenges such as insufficient training, lack of compliance monitoring, and ineffective communication of safety policies (Mundia & Phiri, 2021). Concerns have also been raised regarding how well mining companies like Kansanshi translate written OHS policies into daily operational practices and how these efforts shape organizational performance outcomes.

1.2 Statement of the Problem

Despite the existence of legal and institutional frameworks guiding Occupational Health and Safety (OHS) in Zambia's mining sector, workplace injuries, fatalities, and occupational diseases remain unacceptably high, particularly at major mining sites such as Kansanshi Mine (Mulenga *et al*., 2020). Legislation such as the Mines and Minerals Development Act No. 11 of 2015 and the Occupational Health and Safety Act No. 36 of 2010 is intended to safeguard mine workers. However, the persistent occurrence of accidents suggests limited effectiveness of these measures in practice (Phiri *et al*., 2023). According to the Mine Safety Department (2022), over 150 occupational accidents were reported in North-Western Province, with Kansanshi Mine contributing a significant share. This points to weaknesses in the enforcement and internal application of OHS strategies.

1.3 Objectives of the Study

To examine the effectiveness of occupational health and safety (OHS) in workplaces.

1.4 Specific objectives of the study

1. To establish the occupational health and safety practices employed in mines.
2. To examine the effectiveness of the occupational health and safety strategies on organizational performance.
3. To ascertain the relationship between occupational health and safety practices and organizational performance at Kansanshi Mine.
4. To determine the challenges affecting the effectiveness of occupational health and safety (OHS) practices on organizational performance.

1.5 Research Questions

1. What are the Occupational Health and Safety (OHS) practices employed at Kansanshi Mine, and how are they implemented?
2. How do the Occupational Health and Safety (OHS) strategies at Kansanshi Mine impact organizational performance and productivity?
3. What is the relationship between occupational health and safety practices and organizational performance at Kansanshi Mine?
4. What are the Challenges affecting the effectiveness of occupational health and safety (OHS) practices on organizational performance?

1.6 Theoretical Framework

The study was grounded in the Systems Theory of Accident Causation (STAC), a comprehensive model increasingly adopted in occupational health and safety research within high-risk industries such as mining. Originally conceptualized by Leveson (2015) and further advanced by scholars like Underwood and Waterson (2017), the theory posits that accidents are not isolated incidents caused by human error alone but rather the result of dysfunctional interactions among various system components people, equipment, organizational procedures, and environmental conditions. In this framework, safety was conceptualized not as the absence of incidents but as the active presence of well-functioning constraints, controls, and feedback loops throughout an organization.

Traditional linear models such as Heinrich's Domino Theory or Reason's Swiss Cheese Model often oversimplify causality by focusing on sequential events or individual culpability. In contrast, the Systems Theory of Accident Causation emphasizes the complexity and interconnectedness of organizational systems. It argues that weaknesses in feedback, inadequate supervision, insufficient hazard identification, and poor communication between operational levels collectively create systemic vulnerabilities. These latent failures, when left unmanaged, can manifest as serious accidents or ongoing safety inefficiencies (Underwood & Waterson, 2017). The theory shifts the responsibility for safety from frontline workers alone to a broader organizational context, where managers, policies, and technical systems are equally accountable.

2. Literature Review

2.1 Occupational health and safety practices employed in mines

Globally, mining remains one of the most hazardous industries, primarily due to the nature of the work environment, which exposes workers to a wide range of physical, chemical, biological, and ergonomic hazards. These risks include exposure to airborne toxins such as silica dust and diesel particulate matter, physical injuries from falling rock or equipment malfunctions, and chronic health issues such as musculoskeletal disorders and respiratory diseases (Wachter, 2021). The high incidence of fatal and non-fatal injuries makes occupational health and safety (OHS) in mining a persistent global concern.

According to the International Labour Organization (ILO), more than 2.78 million workers die annually due to occupational accidents or work-related illnesses, with a significant proportion of these fatalities originating from extractive sectors like mining, construction, and manufacturing (ILO, 2020). In addition to fatalities, the ILO estimates hundreds of millions of workers suffer from non-fatal work-related injuries and illnesses each year, many of which were preventable through improved safety practices.

To mitigate these risks, developed countries have implemented robust OHS frameworks that integrate both regulatory compliance and continuous improvement mechanisms. In countries such as Australia, Canada, and the United States, occupational health and safety practices in the mining sector are guided by comprehensive legislation, industry-specific standards, and advanced technological tools. For instance, Australia's Model Work Health and Safety Regulations mandate risk assessments, worker consultations, and regular safety audits for all high-risk industries, including mining (Safe Work Australia, 2022).

2.2 The effectiveness of occupational health and safety strategies on organizational performance

Research demonstrates that effective Occupational Health and Safety (OHS) strategies are fundamental to enhancing organizational performance, particularly in high-risk industries such as mining, construction, and manufacturing. These strategies contribute to a variety of performance outcomes, including the reduction of accident-related costs, increased productivity, and improved worker satisfaction (ILO, 2020; Wachter, 2021). In industries where workers are regularly exposed to hazardous conditions, the costs associated with workplace accidents can be enormous. Direct costs typically include medical expenses, compensation claims, and legal fees, while indirect costs encompass lost work time, decreased employee morale, and the potential damage to a company's reputation (Hoffmeister *et al*., 2021). By minimizing the frequency and severity of these incidents, companies can reallocate resources that would otherwise be spent on accident-related expenses to support core operations. This shift not only reduces the financial burden of incidents but also optimizes financial planning, enhancing resource allocation and leading to improved productivity across the organization (Gunningham *et al*., 2020).

In developed countries, particularly within the mining sector, the integration of OHS strategies into broader strategic management frameworks has consistently led to measurable improvements in safety metrics and overall operational efficiency. For instance, mining corporations in Australia and Canada that adhere to international safety standards, such as ISO 45001, report significantly lower incident rates and demonstrate superior compliance with both national and international safety regulations. ISO 45001 provides a comprehensive, structured approach to managing health and safety risks, ensuring that safety considerations are embedded within all organizational processes rather than being treated as isolated activities (Le Coze, 2019). By aligning their operations with ISO 45001, these companies benefit from a systematic framework that incorporates hazard identification, risk assessments, and continuous improvement processes. Through these measures, they are able to ensure a safer work environment, reduce the likelihood of accidents, and foster a culture of safety across the workforce.

Moreover, the rise of digital tools has dramatically transformed how organizations approach OHS management, leading to proactive rather than reactive risk management. Predictive analytics, real-time monitoring, and digital incident reporting systems enable organizations to anticipate and mitigate risks before they result in accidents or injuries. By leveraging data analytics, companies can gain insights into potential hazards, monitor safety performance in real-time, and adapt their safety protocols accordingly (Hendrick *et al*., 2020). For example, wearable devices such as smart helmets and body sensors can monitor workers' physical conditions, including fatigue levels, body temperature, and exposure to hazardous gases. These tools enable immediate intervention if a worker's safety is compromised, preventing accidents before they occur. Additionally, real-time monitoring systems provide continuous surveillance of operational processes, alerting managers to emerging safety issues and enabling swift corrective actions. This approach not only improves the safety of individual workers but also enhances the resilience of the organization by ensuring that operations can continue smoothly even in the face of potential hazards (Hoffmeister *et al*., 2021).

2.3 The Relationship Between Occupational Health and Safety Practices and Organizational Performance at Kansanshi Mine

Numerous global studies have underscored the intricate relationship between Occupational Health and Safety (OHS) practices and organizational performance, establishing that robust safety frameworks do not merely prevent accidents but also significantly enhance productivity, employee morale, and profitability. Scholars have consistently reviewed this dynamic interplay using both qualitative and quantitative approaches. For instance, Fernández-Muñiz, Montes-Peón and Vázquez-Ordás (2017) [20], in a comprehensive study across Spanish industrial firms, adopted a structural equation modeling technique to examine how OHS management influences firm performance. Their findings revealed a statistically significant positive correlation between proactive safety policies and both operational and financial metrics, indicating that companies that invest in safety systems also report higher productivity and reduced absenteeism rates.

Similarly, a large-scale meta-analysis by Clarke (2021) [15], which reviewed data from over 250 studies worldwide, confirmed that organizations with mature safety cultures tend to report superior organizational outcomes, such as reduced turnover rates, higher quality outputs, and better compliance with regulatory frameworks. Clarke emphasized that OHS practices act as strategic levers, not just operational requirements, and that safety performance must be integrated into broader organizational goals for maximum impact. This analytical view was further validated by Cooper and Lu (2019) [16], who conducted a longitudinal study across manufacturing firms in Singapore. Their research applied both safety climate and performance indices and concluded that firms with effective hazard control mechanisms, participatory safety committees, and continuous training programs observed improvements in profitability, suggesting a direct link between systemic safety initiatives and business performance.

In global mining contexts, where risks are particularly elevated, OHS becomes even more critical. A study by Borys, Else and Leggett (2019) [9] examined Australian mining operations and highlighted that enterprises which embedded safety into core managerial functions reported improved production efficiency and enhanced employee engagement. The study applied a mixed-methods approach combining safety audits with employee surveys, and demonstrated that perceived management commitment to safety had a motivational effect on workers, leading to reduced error rates and increased task efficiency. In a similar vein, the International Council on Mining and Metals (ICMM, 2020) provided cross-national data indicating that companies with integrated health and safety management systems particularly those adopting ISO 45001 standards reported not only fewer accidents but also better shareholder returns and brand reputation.

Furthermore, studies have reviewed the mechanisms through which OHS practices influence organizational performance. Robson *et al*. (2016) categorized these mechanisms into three core pathways: behavioral (enhanced employee compliance and awareness), operational (streamlined procedures and hazard elimination), and strategic (reputation and legal risk management). Their global survey of over 1000 firms found that the behavioral dimension is the most immediate but the strategic dimension yields the highest long-term impact. This nuanced understanding suggests that safety initiatives contribute to performance not only through injury prevention but also via broader organizational synergies such as employee retention, stakeholder trust, and regulatory alignment.

2.4 Personal Critique on the Literature

In the first thematic area, globally, the literature demonstrates a comprehensive understanding of the variety of occupational health and safety (OHS) practices employed in mining industries, particularly in developed countries like Australia, Canada, and the United States. Scholars such as Gunningham (2018) emphasize a shift toward integrated safety management systems that combine technology, regulation, and worker participation. While these insights are valuable, a personal critique is that the global literature is often contextually removed from the economic, technological, and regulatory environments of developing countries. Moreover, much of the global research leans heavily on advanced tools like AI-driven monitoring and predictive analytics, which may not be applicable in resource-constrained contexts like Zambia.

2.5 Research Gap

Despite the breadth of literature on occupational health and safety (OHS) practices, notable research gaps persist, particularly in the context of developing countries like Zambia. Globally, existing studies predominantly focus on technologically advanced OHS systems and their correlation with organizational performance in developed nations, often overlooking the realities of low-resource settings.

3. Methods and Procedures

3.1 Research Design

This study employed a mixed-methods case study design to examine the effectiveness of occupational health and safety (OHS) practices at Kansanshi Mine. A case study design is particularly suitable for exploring real-life, context-specific issues where multiple variables interact, and outcomes are influenced by organizational and human factors (Yin, 2018). Mixed methods integrate both qualitative and quantitative techniques, producing a fuller understanding of complex research problems. In this study, qualitative methods such as semi-structured interviews and focus group discussions were used to explore perceptions, experiences, and challenges surrounding OHS strategies, while quantitative methods, including structured questionnaires and review of company records, measured the statistical relationships between OHS practices and organizational performance indicators such as productivity and accident rates.

3.2 Target population

The target population consisted of employees at Kansanshi Mine across multiple organizational levels, including general mine workers, supervisors, safety officers, and departmental managers. These groups were chosen because they were directly or indirectly involved in the design, implementation, and monitoring of occupational health and safety practices.

3.3 Sampling Technique

The study used a stratified purposive sampling design to select participants with relevant knowledge and experience of OHS practices at Kansanshi Mine. Purposive sampling allows the deliberate inclusion of individuals who can provide detailed and contextually rich information, making it especially valuable in case study research (Etikan *et al*., 2016) [19].

3.4 Sample Size

A total of 100 participants was included in the study, divided between qualitative and quantitative components. For the quantitative strand, 80 participants comprising frontline workers and supervisors completed structured questionnaires. This provided statistical data on compliance levels, safety practices, and organizational performance indicators.

3.5 Techniques for Data Collection

The study collected data using both qualitative and quantitative methods, tailored to address the research objectives. Semi-structured interviews and focus group discussions was gathered qualitative data from safety officers, managers, and experienced workers.

3.6 Data Analysis Techniques
After gathering data, there was need to process the data before it was analyzed. This involved data organization in line with the above themes set to capture the research's specific objectives. Data organization in this study will involve 4 stages as follows:

3.6.1 Pre-processing
The primary purpose of pre-processing was to correct problems identified in the raw data such as elimination of unusable data, interpretation of ambiguous answers and contradictory data from related questions.

3.6.2 Development of coding schemes
After correcting the errors that may influence data analysis, the researcher formulated a coding system. The core function of the coding was to create codes and scales from responses which was then summarized and analyzed in various ways. The coding also helped in addressing challenges of missing data in that the missing data will be given its own code hence making analysis easy.

3.7 Data Analysis
Data analysis was conducted in two complementary stages, reflecting the mixed-methods approach. Qualitative data from interviews and focus groups were be transcribed and analyzed thematically following Braun and Clarke's (2019) [10] six-step framework, which includes familiarization, coding, theme identification, reviewing, defining, and reporting.

This process helped identify recurring themes such as "safety culture," "training adequacy," and "systemic barriers." Thematic analysis is particularly effective in highlighting lived experiences and uncovering hidden organizational dynamics. Quantitative data from structured surveys were analyzed using SPSS 25 software. Descriptive statistics, including means, frequencies, and standard deviations, summarized participant responses, while inferential tests such as Pearson correlation and multiple regression examined relationships between OHS practices and organizational performance.

4. Presentation of Findings
4.1.1 Gender
Figure 4.1.1 presents the distribution of respondents according to sex. The results show that 80 (80%) were male while 20 (20%) were female. This indicates that the study was male-dominated, with men accounting for the majority of the sample. The higher number of male participants may be attributed to their greater availability during the data collection period or their higher representation in the population under study.

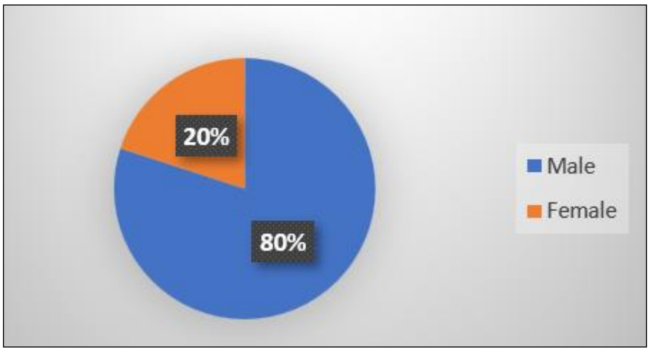

Fig 4.1.1: Gender

4.1.2 Age
Figure 4.1.2 presents the distribution of respondents according to age. The results show that 5 (5%) were aged 20–30 years, 10 (10%) were aged 31–40 years, 76 (76%) were aged 41–50 years, 8 (8%) were aged 51–60 years, and 1 (1%) was at retirement age. This indicates that the study was dominated by respondents in the 41–50 years age group, who accounted for more than three-quarters of the sample.

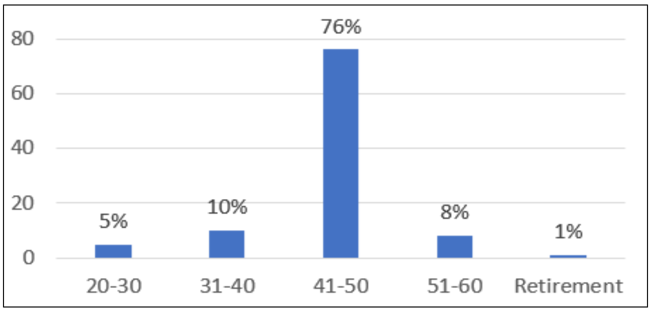

Fig 4.1.2: Age

4.1.3 Qualifications and level of education
Figure 4.1.3 presents the distribution of respondents according to their highest level of education. The results show that 10 (10%) had attained secondary education, 40 (40%) held a certificate, 20 (20%) had a diploma, and 30 (30%) had a degree. This indicates that the majority of respondents possessed certificate-level education, accounting for four-tenths of the sample.

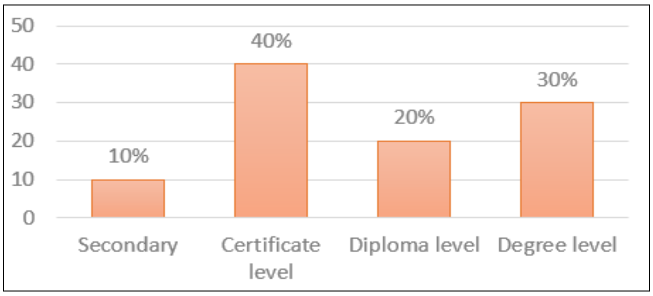

Fig 4.1.3: Qualifications and level of education

4.1.4 Work experience
Figure 4.1.5 presents the distribution of respondents according to the duration of their employment at Kansanshi Mine. The results show that 2 (2%) had worked for less than 1 year, 10 (10%) for 1–5 years, 80 (80%) for 5–10 years, 3 (3%) for 10–15 years, and 5 (5%) for more than 15 years. This indicates that the majority of respondents had between 5 and 10 years of work experience, representing the most stable and experienced segment of the workforce.

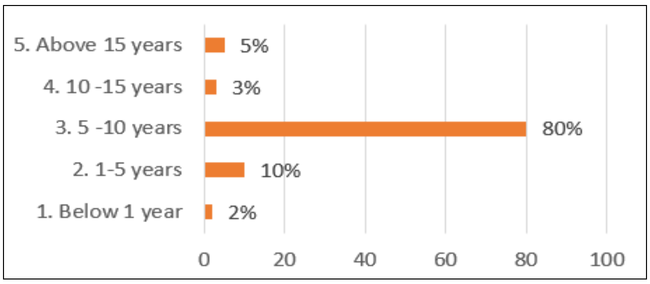

Fig 4.1.4: Work experience

4.1.5 Position Occupied

Figure 4.1.4 presents the distribution of respondents according to their position in the organization. The results show that 7 (7%) were operator workers, 4 (4%) were supervisors, 4 (4%) were safety officers, 5 (5%) were managers, and 80 (80%) were general workers. This indicates that the study was largely dominated by general workers, who made up the vast majority of the sample.

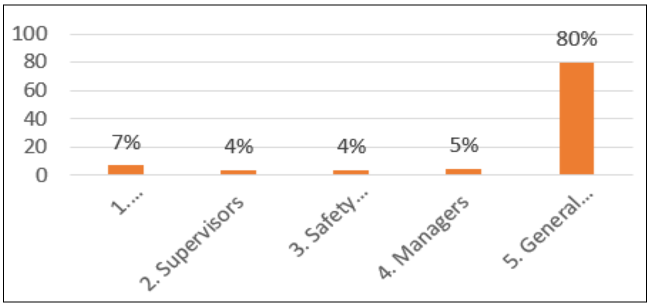

Fig 4.1.5: Position Occupied

4.2 Presentation of Results Based on Occupational Health and Safety Practices at Kansanshi Mine

4.2.1 Occupational Health and Safety Policies Implemented at Kansanshi Mine

Figure 4.2.1 presents the Occupational Health and Safety (OHS) policies implemented at Kansanshi Mine. The results show that 20 (20%) of the respondents indicated the presence of a Personal Protective Equipment (PPE) policy, 10 (10%) identified an emergency response and evacuation policy, 50 (50%) reported the incident/accident reporting and investigation policy, and 20 (20%) mentioned the environmental and waste management policy.

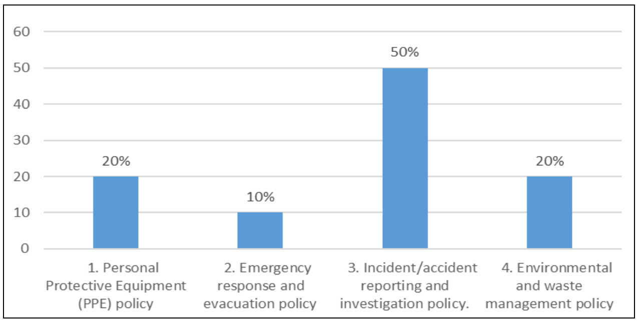

Fig 4.2.1: Occupational Health and Safety Policies Implemented at Kansanshi Mine

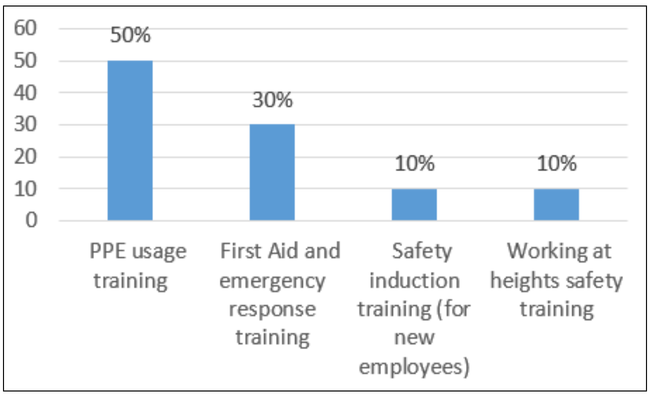

Fig 4.2.2: Types of Occupational Health and Safety (OHS) Training Provided at Kansanshi Mine

Figure 4.2.2 presents the types of Occupational Health and Safety (OHS) training offered at Kansanshi Mine. The results show that 50 (50%) of the respondents reported receiving PPE usage training, 30 (30%) indicated First Aid and emergency response training, 10 (10%) mentioned safety induction training for new employees, and another 10 (10%) indicated training on working at heights.

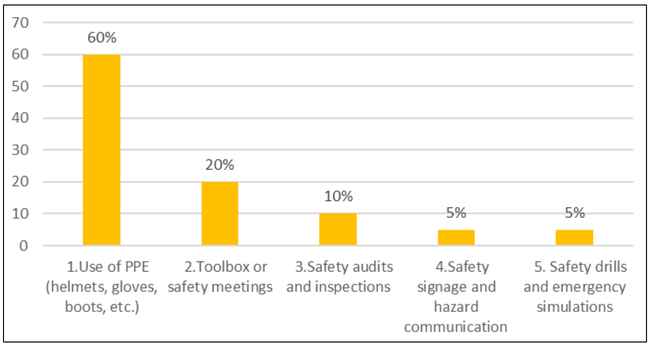

Fig 4.2.3: Commonly Enforced OHS Practices at the Workplace

Figure 4.2.3 presents the Occupational Health and Safety (OHS) practices commonly enforced at the workplace. The results show that 60 (60%) of the respondents reported the use of Personal Protective Equipment (PPE) such as helmets, gloves, and boots, 20 (20%) indicated that toolbox or safety meetings are regularly conducted, 10 (10%) identified safety audits and inspections as a common practice, 5 (5%) mentioned the use of safety signage and hazard communication, and another 5 (5%) indicated that safety drills and emergency simulations are carried out.

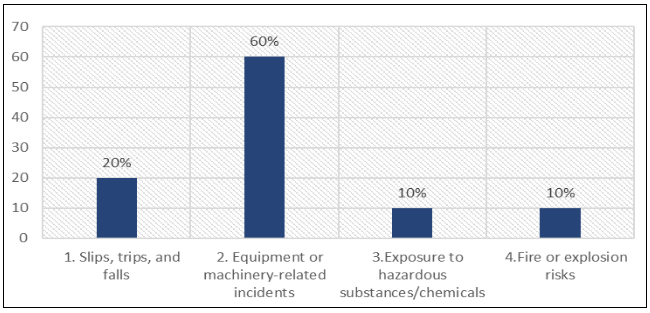

Fig 4.2.4: Common Types of Workplace Accidents or Incidents

Figure 4.2.4 presents the types of accidents or incidents commonly experienced in the respondents' sections. The results show that 20 (20%) of the respondents reported slips, trips, and falls, 60 (60%) indicated equipment or machinery-related incidents, 10 (10%) identified exposure to hazardous substances or chemicals, and another 10 (10%) mentioned fire or explosion risks.

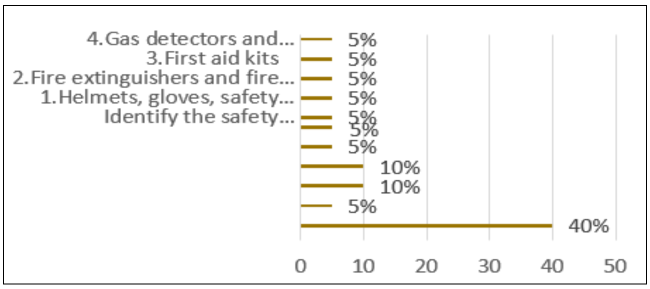

Fig 4.2.5: Safety Procedures Followed and Safety Equipment Provided in Departments

Figure 4.2.5 presents the safety procedures and the equipment or tools provided to employees at Kansanshi Mine. The findings show that the most commonly followed procedure, reported by 40 (40%) respondents, is the consistent use of Personal Protective Equipment (PPE) such as helmets, gloves, boots, and reflective clothing. Other procedures mentioned include permit-to-work systems for hazardous tasks (10%), hazard identification and reporting (10%), lockout/tagout procedures before machinery maintenance (5%), emergency evacuation and fire drill procedures (5%), and confined space entry procedures (5%).

4.3 Presentation of Results Based on Effectiveness of OHS Strategies

4.3.1 Perceived Effectiveness of OHS Program in Preventing Accidents

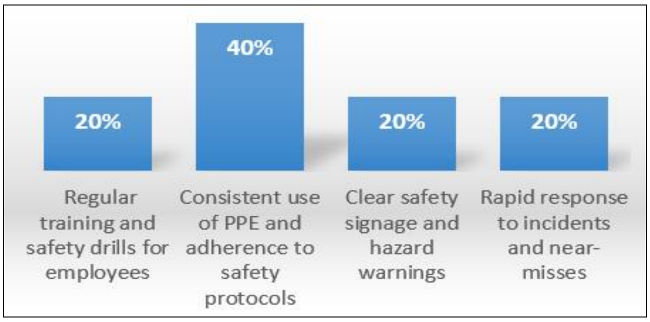

Figure 4.3.1 presents employees' views on the effectiveness of the Occupational Health and Safety (OHS) program at Kansanshi Mine in preventing accidents and ensuring workplace safety. The results show that 40 (40%) of the respondents indicated that the OHS program is effective due to the consistent use of Personal Protective Equipment (PPE) and adherence to safety protocols. Additionally, 20 (20%) stated that regular training and safety drills play a crucial role in improving safety awareness among employees, while another 20 (20%) cited clear safety signage and hazard warnings as contributing factors. The remaining 20 (20%) reported that rapid response to incidents and near-misses enhances overall workplace safety.

4.3.2 Communication of Safety Rules to Employees

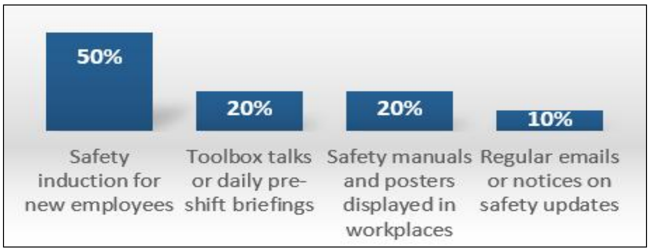

Figure 4.3.2 presents the methods through which safety rules are communicated to employees in their respective departments at Kansanshi Mine. The results show that 50 (50%) of the respondents indicated that safety rules are communicated primarily through safety induction sessions for new employees. Additionally, 20 (20%) reported that toolbox talks or daily pre-shift briefings are used to reinforce safety expectations. Another 20 (20%) stated that safety manuals and posters displayed within the workplace serve as a means of communication, while 10 (10%) indicated that safety rules are shared through regular emails or safety notices.

4.3.3 Employee Involvement in Safety Programs

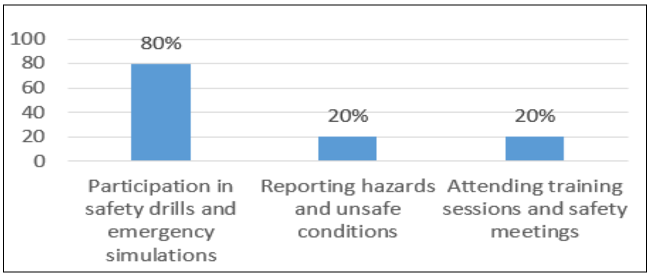

Figure 4.3.3 presents the level of employee involvement in safety programs at Kansanshi Mine. The results show that 80 (80%) of the respondents indicated participation in safety drills and emergency simulations, suggesting that active engagement in practical safety exercises is the primary form of involvement. Additionally, 20 (20%) reported involvement through hazard reporting and identification of unsafe conditions, while another 20 (20%) stated that they participate by attending training sessions and safety meetings.

4.3.4 Enforcement of OHS Compliance by Supervisors.

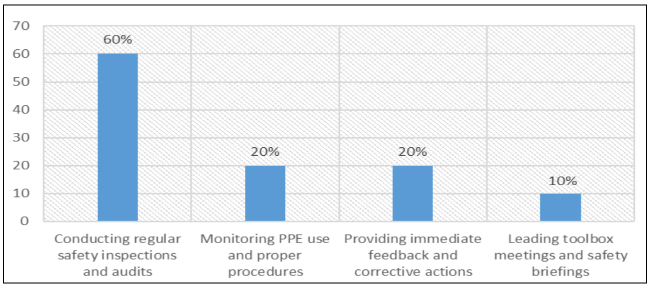

Figure 4.3.4 presents employees' perceptions of how supervisors enforce Occupational Health and Safety (OHS) compliance at Kansanshi Mine. The results show that 60 (60%) of the respondents indicated that supervisors enforce compliance through regular safety inspections and audits. Additionally, 20 (20%) reported that supervisors monitor the use of PPE and adherence to proper safety procedures, while another 20 (20%) stated that supervisors provide immediate feedback and take corrective action when safety violations are identified. A smaller proportion, 10 (10%), indicated that supervisors lead toolbox meetings and safety briefings to reinforce safety expectations.

4.3.5 Challenges Affecting the Effectiveness of OHS Practices

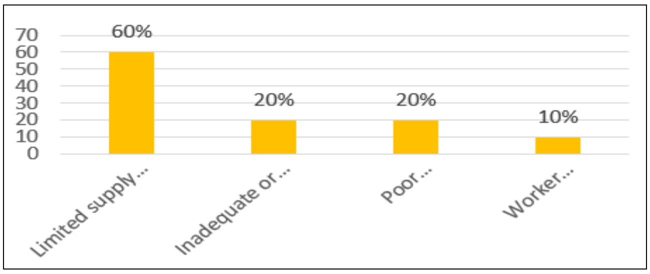

Figure 4.3.5 presents the main challenges affecting the effectiveness of Occupational Health and Safety (OHS) practices at Kansanshi Mine. The results indicate that 60 (60%) of the respondents identified limited supply or delayed provision of Personal Protective Equipment (PPE) as the major challenge. This suggests that even though safety policies require PPE use, inadequate availability may hinder consistent compliance.

4.4 Presentation of Results Based on Contribution of OHS Practices to Increased Productivity

Fig 4.4.1: Presents respondents' views on how Occupational Health and Safety (OHS)

Figure 4.4.1 presents respondents' views on how Occupational Health and Safety (OHS) practices have contributed to increased productivity at Kansanshi Mine. The results show that 50 (50%) of the respondents indicated that OHS practices have reduced accidents and downtime by creating a safer work environment. Additionally, 40 (40%) reported that employees are able to focus on their tasks without fear of injury, which enhances efficiency and overall performance.

4.4.2 Influence of Adherence to Safety Procedures on Employee Morale and Motivation

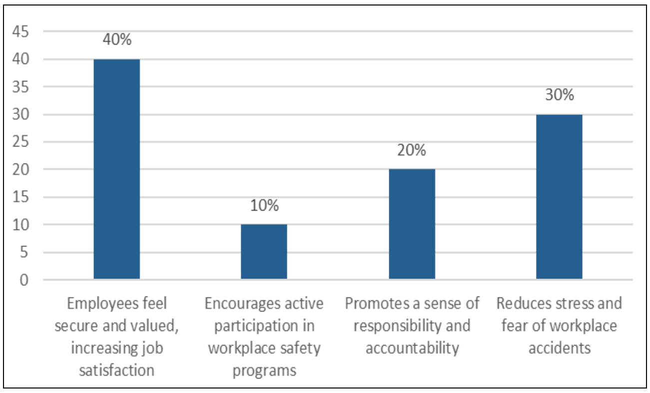

Figure 4.4.2 illustrates how adherence to safety procedures influences employee morale and motivation at Kansanshi Mine. The majority of respondents, 40 (40%), indicated that when employees feel secure and valued by the organization, their job satisfaction increases. This is followed by 30 (30%) who stated that adherence to safety procedures reduces stress and fear of workplace accidents, enabling workers to perform their tasks with confidence. Furthermore, 20 (20%) reported that compliance with safety rules promotes a sense of responsibility and accountability among employees.

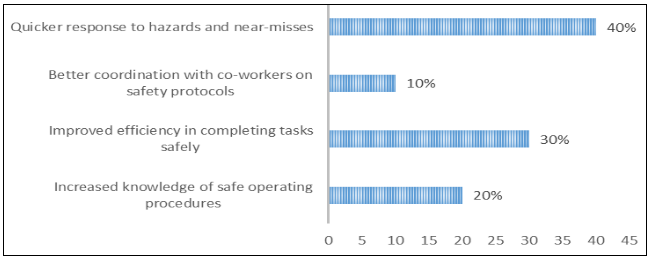

Fig 4.4.3: Presents the benefits of Occupational Health and Safety (OHS) training on employees' day-to-day work performance

Figure 4.4.3 presents the benefits of Occupational Health and Safety (OHS) training on employees' day-to-day work performance at Kansanshi Mine. The findings show that OHS training has significantly enhanced employees' response to hazards and near-misses, with 40% of respondents indicating that they are now able to react more quickly and appropriately to potential safety risks. Additionally, 30% reported improved efficiency in completing ta sks safely, demonstrating that training equips workers with the necessary skills and confidence to perform their duties without compromising safety.

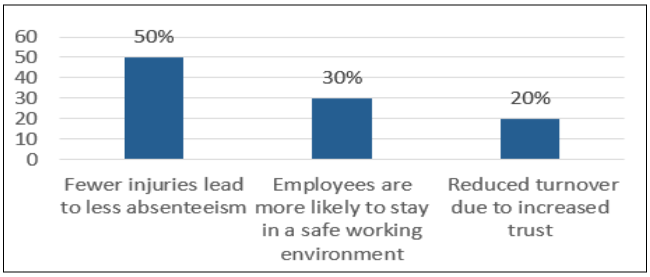

Fig 4.4.4: Illustrates how occupational safety practices have influenced absenteeism and staff retention at Kansanshi Mine

Figure 4.4.4 illustrates how occupational safety practices have influenced absenteeism and staff retention at Kansanshi Mine. The results reveal that effective safety practices have contributed significantly to reducing absenteeism, with 50% of respondents indicating that fewer workplace injuries have resulted in employees taking fewer sick days or leave due to accidents. Additionally, 30% of the participants reported that a safe working environment encourages employees to remain with the organization, demonstrating that safety is an important factor in promoting staff loyalty. Furthermore, 20% agreed that improved safety practices have reduced employee turnover by fostering trust between employees and management, making staff feel valued and protected.

4.5 Presentation of results based on Challenges affecting the effectiveness of occupational health and safety (ohs) practices on organizational performance

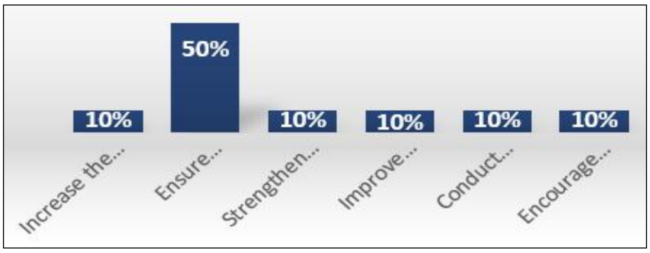

Figure 4.5.1 presents respondents' recommendations for improving Occupational Health and Safety (OHS) practices at Kansanshi Mine. The results show that 50 (50%) of the respondents recommended ensuring constant availability and quality of Personal Protective Equipment (PPE), suggesting that reliability of protective gear is viewed as the most important factor in enhancing safety. Additionally, 10 (10%) of the respondents suggested increasing the frequency and coverage of OHS training for all employees, while another 10 (10%) emphasized strengthening supervision and enforcement of safety protocols. A further 10 (10%) recommended improving communication channels for safety updates and hazard reporting, and 10 (10%) highlighted the need for regular audits, inspections, and risk assessments.

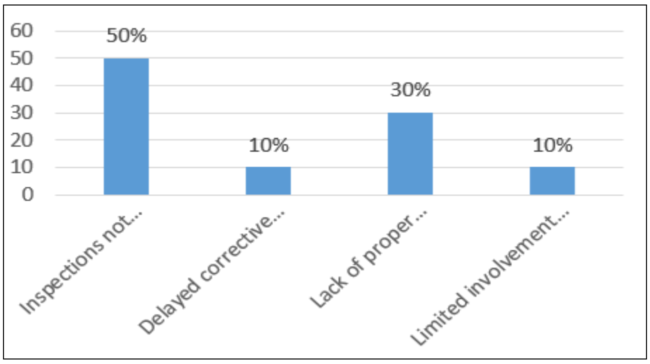

Fig 4.5.2: Challenges Experienced During Safety Audits and Workplace Inspections

Figure 4.5.2 The data shows that the most significant challenge, reported by 50% of respondents, is that inspections are not conducted regularly. Irregular inspections reduce the chances of identifying hazards early and lower compliance with OHS procedures. Additionally, 30% of respondents indicated that there is a lack of proper documentation of hazards, suggesting that even when hazards are detected, they may not be properly recorded, which affects follow-up actions.20% of the responses show that corrective actions are delayed after hazards are reported, meaning that issues remain unresolved for longer, increasing the likelihood of accidents.

4.6 Discussions

Presentation of Results Based on Objective One:

Figure 4.1.1 presents the distribution of respondents according to sex. The results show that 80 (80%) were male while 20 (20%) were female. This indicates that the study was male-dominated, with men accounting for the majority of the sample.

Figure 4.1.2 presents the distribution of respondents according to age. The results show that 5 (5%) were aged 20–30 years, 10 (10%) were aged 31–40 years, 76 (76%) were aged 41–50 years, 8 (8%) were aged 51–60 years, and 1 (1%) was at retirement age.

Figure 4.1.3 presents the distribution of respondents according to their highest level of education. The results show that 10 (10%) had attained secondary education, 40 (40%) held a certificate, 20 (20%) had a diploma, and 30 (30%) had a degree.

Figure 4.1.4 presents the distribution of respondents according to their position in the organization. The results show that 7 (7%) were operator workers, 4 (4%) were supervisors, 4 (4%) were safety officers, 5 (5%) were managers, and 80 (80%) were general workers. This indicates that the study was largely dominated by general workers, who made up the vast majority of the sample.

Figure 4.1.5 presents the distribution of respondents according to the duration of their employment at Kansanshi Mine. The results show that 2 (2%) had worked for less than 1 year, 10 (10%) for 1–5 years, 80 (80%) for 5–10 years, 3 (3%) for 10–15 years, and 5 (5%) for more than 15 years.

Figure 4.1.6 presents the distribution of respondents according to their department or section. The results show that 20 (20%) were from IT, 4 (4%) from Operations, 7 (7%) from Administration, and 5 (5%) from Human Resources.

Presentation findings on Objective one

Figure 4.2.1 presents the Occupational Health and Safety (OHS) policies implemented at Kansanshi Mine. The results show that 20 (20%) of the respondents indicated the presence of a Personal Protective Equipment (PPE) policy, 10 (10%) identified an emergency response and evacuation policy, 50 (50%) reported the incident/accident reporting and investigation policy, and 20 (20%) mentioned the environmental and waste management policy.

Figure 4.2.2 presents the types of Occupational Health and Safety (OHS) training offered at Kansanshi Mine. The results show that 50 (50%) of the respondents reported receiving PPE usage training, 30 (30%) indicated First Aid and emergency response training, 10 (10%) mentioned safety induction training for new employees, and another 10 (10%) indicated training on working at heights

Figure 4.2.3 presents the Occupational Health and Safety (OHS) practices commonly enforced at the workplace. The results show that 60 (60%) of the respondents reported the use of Personal Protective Equipment (PPE) such as helmets, gloves, and boots, 20 (20%) indicated that toolbox or safety meetings are regularly conducted, 10 (10%) identified safety audits and inspections as a common practice, 5 (5%) mentioned the use of safety signage and hazard communication, and another 5 (5%) indicated that safety drills and emergency simulations are carried out.

Figure 4.2.4 presents the types of accidents or incidents commonly experienced in the respondents' sections. The results show that 20 (20%) of the respondents reported slips, trips, and falls, 60 (60%) indicated equipment or machinery-related incidents, 10 (10%) identified exposure to hazardous substances or chemicals, and another 10 (10%) mentioned fire or explosion risks.

Figure 4.2.5 presents the safety procedures and the equipment or tools provided to employees at Kansanshi Mine. The findings show that the most commonly followed procedure, reported by 40 (40%) respondents, is the consistent use of Personal Protective Equipment (PPE) such as helmets, gloves, boots, and reflective clothing. Other procedures mentioned include permit-to-work systems for hazardous tasks (10%), hazard identification and reporting (10%), lockout/tagout procedures before machinery maintenance (5%), emergency evacuation and fire drill procedures (5%), and confined space entry procedures (5%).

Presentation of findings Objective two

Figure 4.3.1 presents employees' views on the effectiveness of the Occupational Health and Safety (OHS) program at Kansanshi Mine in preventing accidents and ensuring workplace safety. The results show that 40 (40%) of the respondents indicated that the OHS program is effective due to the consistent use of Personal Protective Equipment

(PPE) and adherence to safety protocols.

Figure 4.3.2 presents the methods through which safety rules are communicated to employees in their respective departments at Kansanshi Mine. The results show that 50 (50%) of the respondents indicated that safety rules are communicated primarily through safety induction sessions for new employees. Additionally, 20 (20%) reported that toolbox talks or daily pre-shift briefings are used to reinforce safety expectations. Another 20 (20%) stated that safety manuals and posters displayed within the workplace serve as a means of communication, while 10 (10%) indicated that safety rules are shared through regular emails or safety notices.

Figure 4.3.3 presents the level of employee involvement in safety programs at Kansanshi Mine. The results show that 80 (80%) of the respondents indicated participation in safety drills and emergency simulations, suggesting that active engagement in practical safety exercises is the primary form of involvement. Additionally, 20 (20%) reported involvement through hazard reporting and identification of unsafe conditions, while another 20 (20%) stated that they participate by attending training sessions and safety meetings.

Figure 4.3.4 presents employees' perceptions of how supervisors enforce Occupational Health and Safety (OHS) compliance at Kansanshi Mine. The results show that 60 (60%) of the respondents indicated that supervisors enforce compliance through regular safety inspections and audits. Additionally, 20 (20%) reported that supervisors monitor the use of PPE and adherence to proper safety procedures, while another 20 (20%) stated that supervisors provide immediate feedback and take corrective action when safety violations are identified. A smaller proportion, 10 (10%), indicated that supervisors lead toolbox meetings and safety briefings to reinforce safety expectations.

Figure 4.3.5 The results indicate that 60 (60%) of the respondents identified limited supply or delayed provision of Personal Protective Equipment (PPE) as the major challenge. This suggests that even though safety policies require PPE use, inadequate availability may hinder consistent compliance. Additionally, 20 (20%) of the respondents reported that inadequate or infrequent OHS training affects safety effectiveness, indicating that some employees may not receive the necessary skills and knowledge to manage risks. Another 20 (20%) mentioned poor communication of safety rules, suggesting that not all employees receive clear or timely information regarding safety requirements.

Presentation of Finding objective three

Figure 4.4.1 The results show that 50 (50%) of the respondents indicated that OHS practices have reduced accidents and downtime by creating a safer work environment. Additionally, 40 (40%) reported that employees are able to focus on their tasks without fear of injury, which enhances efficiency and overall performance. A smaller proportion, 10 (10%), noted that proper hazard management has improved workflow within departments.

Figure 4.4.2 The majority of respondents, 40 (40%), indicated that when employees feel secure and valued by the organization, their job satisfaction increases. This is followed by 30 (30%) who stated that adherence to safety procedures reduces stress and fear of workplace accidents, enabling workers to perform their tasks with confidence. Furthermore, 20 (20%) reported that compliance with safety rules promotes a sense of responsibility and accountability among employees. The remaining 10 (10%) noted that safety adherence encourages active participation in workplace safety programs.

Figure 4.4.3 The findings show that OHS training has significantly enhanced employees' response to hazards and near-misses, with 40% of respondents indicating that they are now able to react more quickly and appropriately to potential safety risks. Additionally, 30% reported improved efficiency in completing tasks safely, demonstrating that training equips workers with the necessary skills and confidence to perform their duties without compromising safety.

Figure 4.4.4 The results reveal that effective safety practices have contributed significantly to reducing absenteeism, with 50% of respondents indicating that fewer workplace injuries have resulted in employees taking fewer sick days or leave due to accidents. Additionally, 30% of the participants reported that a safe working environment encourages employees to remain with the organization, demonstrating that safety is an important factor in promoting staff loyalty.

Figure 4.5.1 presents respondents' recommendations for improving Occupational Health and Safety (OHS) practices at Kansanshi Mine. The results show that 50 (50%) of the respondents recommended ensuring constant availability and quality of Personal Protective Equipment (PPE), suggesting that reliability of protective gear is viewed as the most important factor in enhancing safety.

5. Conclusions and Recommendations

5.1 Conclusions

The study concluded that Kansanshi Mine has developed a moderately strong OHS framework that positively contributes to employee safety, productivity, and overall organizational performance. Demographic analysis revealed a workforce largely composed of young and middle-aged employees, with male dominance in managerial and technical safety roles. Educational levels varied by role: general workers mainly held secondary education, supervisors possessed post-secondary qualifications, and safety officers and managers were the most educated, with 40–66.7% holding degrees.

5.2 Recommendations

Ensure timely and consistent distribution of high-quality PPE to all employees, including periodic replacement of worn-out equipment. Automated inventory management systems should be introduced to monitor PPE stock and anticipate shortages.

Extend regular safety training to all departments, including administrative units, with tailored modules based on risk levels. Incorporate multilingual materials and practical drills to reinforce awareness and competence.

Expand anonymous reporting channels and provide timely feedback on reported hazards. Encourage a culture of proactive reporting without fear of reprisal to improve hazard identification and management.

Standardize Safety Drills and Emergency Preparedness: Conduct regular, realistic emergency drills across all departments, ensuring participation by both high-risk and low-risk units. Evaluate drill effectiveness and use lessons learned to improve future preparedness.

Decentralize first-aid points and ensure adequate staffing and medical supplies at all work areas. Provide advanced first aid training to selected employees to enhance response times during emergencies.

Maintain clear, visible, and multilingual safety signs across all work areas. Strengthen communication channels, including digital platforms, posters, and briefings, to ensure timely dissemination of safety information.

Develop standardized enforcement protocols and supervisory training to address inconsistencies. Establish accountability measures to ensure that compliance is uniform across production and administrative units.

Encourage visible management commitment, continuous safety sensitization, and employee participation in safety initiatives. Align safety practices with organizational goals to embed safety as a core value across the mine.

Implement continuous monitoring and evaluation mechanisms to assess the effectiveness of OHS strategies and identify areas for improvement.

6. Acknowledgements

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