



MIDLANDS STATE UNIVERSITY



AN EVALUATION OF THE EFFECTIVENESS OF SAFETY AND HEALTH CONTROL PROGRAMMES IN THE ZIMBABWEAN MINING SECTOR: A CASE STUDY OF MIMOSA MINE

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Declaration

I, Chida Mundiri, hereby declare that this project is my original work and affirm that it has not been submitted to this or any other University in support of an application for a Degree.

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Dedication

This research is dedicated to my wife Faith, my kids Ashley and Anotidaishe. I also dedicate it to Joramu, Zivisai, Fungai and Itai my family members. Their support was overwhelming and humbling, as a result it inspired me and gave me strength during the course of the degree programme.

Abstract

The study entitled ‘An evaluation of the Safety and Health Control Programmes in the Mining Sector: A case study of Mimosa Mine’, was carried out to find the solutions to the accidents that continue to happen in the mining sector. This was despite the fact that the Mining Sector has invested a lot of resources into Safety and Health and were pursuing a ZERO HARM trajectory which emphasized on Zero Accidents at workplaces. The study employed a descriptive case study approach in its investigation. The Mining Sector, Mining Employees and their Families, the Government and the Researcher were the key beneficiaries of the investigation. The study concluded that the Safety and Healthy Control Programmes were ineffective because of failure by management and employees to play their respective roles in the implementation of safety and health control programmes. Lack of engagement in the Safety and Healthy processes, production pressure and poor attitude of employees towards Safety and Health issues were highlighted as some of the key obstacles to making Safety and Health Control programmes effective. The researcher recommended engagement of employees from the formulation to the evaluation stages of safety and health control programs and attitude training programmes to employees by qualified practitioners among other recommendations preferably those with andragogical experience.

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ACRONYMS AND ABBREVIATIONS

BCL	Botswana Copper Company
CEO	Chief Executive Officer
EASHW	European Agency for Safety and Health at Work
EMA	Environmental Management Agency
EMS	Environmental Management System
ILO	International Labour Organization
ISO	Organization of International Standards
NCA	National Aids Council
NCOR	National Council for Osteopathic Research
SHE	Safety, Health and Environment
OHS	Occupational Safety and Health
OHSAMS	Occupational Health and Safety Assessment Management System
SHMS	Safety and Health Management System
TSCZ	Traffic Safety Council of Zimbabwe
UNDHR	United Nations Declaration of Human Rights
WHO	World Health Organization

CHAPTER ONE

THE RESEARCH PROBLEM

1. Introduction

Mining is one of the critical pillars of the world economy today. A multiplicity of minerals are mined everyday through underground and/or opencast mining that are processed and used in engineering, medical, agriculture, military, financial just to mention but a few sectors. The environment, equipment and processes that are obtained in the mining operations pose serious safety and health hazards to the employees that endeavour to ache a living for themselves and their families through working in these mines. Workers contract airborne diseases like pneumoconiosis and Silicosis due to dust inhalations common in mining operations. Workers are injured, maimed or even die due to occupational accidents and diseases at their workplaces. The occupational diseases and fatalities in the Zimbabwean mining sector continue to happen. The mining sector seems to be poorly positioned to curb the problems. This raises the question of the integrity of the mining safety and health control programmes insofar as the upholding of the sanctity of human life is concerned. It is common knowledge that accidents are caused by unsafe conditions, unsafe acts and unsafe environments. The mining sector, employees and government should work together in championing health and safety control programmes with a view to at least reducing and at most totally eradicating occupational diseases and accidents. The chapter will highlight background to the study and the statement of the problem. It will also put across the research questions and justify why the study is importance. Boundaries of the area that will be covered by the investigation will be drawn and limitations of the investigation will be explained before a summary round up the chapter.

1.1 Background to the Study

Mining business the world over thrives on pushing large volumes of the Ore being mined. The industry uses a wide range of heavy duty mechanical, electrical, mobile among other equipment. The industry also employs a lot of people to operate and man the equipment either underground or on the surface. It is under such situations that Cole (2002) argues that issues of safety and health of workers should be given prominence. Regardless of the magnitude of the contribution of the mining sector to nations' gross domestic products, experts and the mining industry itself believe the business can be done in a zero harm

fashion. Identification of mining hazards and managing the hazards has always been the mining industry's top priority. The mining industry, like any other business recognizes that the employees are its critical pillar which should be protected from all forms of harm for business continuity.

Safety and Health control programmes fall under occupational safety and health departments in the mining sector. Hughes and Ferret (2011) defines safety and health as the concern for the physical and mental being of the individual at a place of work. In pursuit of the safety and health of their employees the mining sector subscribes to a wide range of Occupational Health Assessment Safety Management systems (OHSAMS). This is a framework that allows an organization to consistently identify and control its safety and health risks, reduce the potential for incidents and help achieve compliance with safety and health legislation. The systems are a combination of policies, procedures and practices that are designed to protect workers from occupational diseases, accidents and incidents. The programmes are individual and collective. Individual in the sense that the individual is empowered by the system to put their safety first in their work activities and collective in the sense that there is insistence on employees being brothers' keepers.

International best standards emphasize that large Organisations have Safety, Health and Environmental (SHE) departments whose mandates are to minimize health hazards and promote improved safety and health conditions at workplaces. This includes enforcing compliance with mandatory safety and health standards as a means of reducing or even eliminating occupational health hazards. In the United States, a Safety Director should be appointed for every two thousand (2000) people. In South Africa, Section 17 of the Occupational Health and Safety (OHS) Act (Act 85 of 1993), stresses that employers who employ 20 or more workers on mine premises must appoint a Safety Representative to monitor safety and health conditions (SA Labour Guide 2017). Botswana Mines, Quarries, Works and Machinery Regulation 1978 No.127 (S29) mandates the Senior Officers to take reasonable steps to protect their subordinates from occupational hazards. Zimbabwean Policy on Safety and health put the responsibilities of creation of a safe working environment on the shoulders of employers and employees. The policy recognises that workers have a wide range of safety and health rights that should be upheld. Zimbabwe's Occupational Safety and Health policy clearly spells out that every worker has the right to fair and safe labour practices and to know the occupational safety and health risks that they are likely to be exposed to.

A sizable number of mining companies in Zimbabwe are Occupational Health and Safety Assessment Series (OHSAS) 18001 certified. The system provides a framework to identify, control and decrease the risks associated with safety and health within the workplace. The system if properly implemented controls and monitors risks that can emanate from a company's day to day activities. Although mining companies in Zimbabwe subscribe to such systems they continue to record occupational diseases and accidents that maim and even kill workers.

Mining companies subscribe to International Organization for Standardization (ISO) 14001; 2015 certified. This is an Environmental Management System (EMS) standard that is used to manage environmental aspects, fulfil compliance obligations and addresses risks and opportunities. ISO 14001; 2015 standard is integrated to ISO 9001 in some mining organisations. ISO 9001 is a quality management system that specifies that companies should consistently provide products that meet applicable statutory and regulatory requirements. Such systems directly or indirectly support the safety and health of employees at their workplaces. Why then do we continue to have workers being injured, contracting occupational diseases and being killed in the mining industry? Are the systems inadequate or are they being poorly implemented by mining companies as a result failing to stamp out accidents at workplaces?

On the 5th of December 2016 China Associated press reported the death of 32 mine workers after a deadly underground explosion at Baomu Mining Company northeast of China. There was speculation that the fatal accident could have been caused by myriad violations of safety regulations.

India news reported on the 29th of December 2016 the death of 18 mine workers at Lalmatia Coal Mine in Jharkhand. The employees were killed when the Open Cast Mine caved in and buried them together with the excavators and Front End Loaders they were using to transport coal to the surface. Safety officials were immediately suspended and investigations were immediately instituted.

South African Gold Mines are already mining the world's deepest depth of around 4,120m at Driefontein Mine according to the Daily Vox of June 2016. The deeper the mine goes the greater the risks of gas explosions, rock falls, tremors and earthquakes. In July 2017 Kyle Cowan reports in the Sunday Times that three (3) miners died following a seismic accident and one was trapped by a rock fall at Tae Lekoa Gold Mine on the 23 rd. of July 2017.

In May 2016 four (4) mine workers died at Botswana Copper Limited (BCL) mine due to a Shaft Elevator accident. Six employees who were in the same elevator were critically injured. The news were announced by the Minister of Mines and Energy Kitso Makaila who immediately ordered an independent safety audit of BCL.

In Zimbabwe, mining workers continue to be extremely exposed as they work underground or on the surface. It seems the mining sector did not learn enough lessons from the 1972 Wankie Colliery Kamandama Shaft disaster that claimed the innocent lives of four hundred and twenty seven (427) people. This is because near misses of Kamandama disaster potential magnitude are still being experienced in the Zimbabwean mining sector. In 2012 about 157 Mimosa Mine employees were trapped underground after a fire broke out. Although all the employees were later on successfully rescued the incident caused a lot of panic among employees and their families in particular and those in the Zimbabwe mining industry in general. Underground fires have killed a lot of people the world over due to restricted space and poor ventilation that is obtained in underground environments. On the 19th of July 2014 Newsday newspaper reported the collapse of ZIMPLATS Bimha mine shaft. The Chief Executive Officer (CEO) of ZIMPLATS was quoted thanking the management and employees proactive response that averted a disaster by timely evacuating all personnel and equipment. A collapse of a mine can burry whoever will be working within the vicinity and history has shown that chances of getting survivors from such happenings are limited. Such near misses do not augur well for the mining sector and brings to the fore the effectiveness of the safety and healthy control programs in the Zimbabwean mining sector.

Fatalities still happen in the Zimbabwean Mining sector despite spirited efforts by the mining sector to eradicate the problem through a multiplicity of business management policies that are anchored on the safety and health of their employees and their stakeholders. ZIMPLATS CEO regretted the loss of life of an employee through a fall of ground accident in his 2014 ZIMPLATS Holdings limited Integrated Annual Report. In the same year Nehanda Radio reported on the 25th of February 2014 a Skanlink Bus accident that resulted in the death of four (4) Unki Mine employees and injuring of several others. Sanlink (Private)Limited was a contract company that transported UNKI Mine workers from Shurugwi Mine to their homes in Shurugwi town and Gweru. National Mine workers Union of Zimbabwe reportedly blamed UNKI Mine for causing the accident by forcing workers to work long hours. Very recently a Mimosa employee lost his life after being trapped by the Machine he was using after forgetting to switch it off according to New Zimbabwe Vision of the 1st of July 2017.

The Mining Industry in general and platinum industry sector in particular ploughs in a lot of resources in the Safety and Health programmes of their employees. Being certified to various international safety standard systems is an integral part of their business policies i.e. OHSAS 18001, ISO 9001 and ISO 14001. They believe ZERO HARM is achievable in their mining activities. The aim is to achieve zero harm to employees, machinery and equipment. They believe a faultless safety record is built on creation of positive culture of responsibility and empowerment among employees through continuous education.

To ensure that the ZERO HARM initiative achieves the intended goals some mining companies in Zimbabwe have partnered with various Organizations in the country that champions the safety and health issues of employees. Mimosa Mining Company have partnered with a wide range of organizations in furtherance of safety and healthy aspects of their employees. The organizations include Chamber of Mines, National Aids Council (NAC), Traffic Safety Council of Zimbabwe (TSCZ) and the Environmental Management Agency (EMA) of Zimbabwe.

Despite all these well-meaning and noble initiatives the mining sector continues to be bedevilled by incidents and accidents. Questions regarding the extent to which the safety and health of the employees who work in the mining sector is guaranteed are then raised. That is the reason why the researcher has taken it upon himself to put the effectiveness of the health and safety control programmes in the mining sector under the microscope.

1.2 Statement of Problem

The efforts that the mining sector is putting in the health and safety of their employees is plausible but the picture which is on the ground continues to be pallid as incidents and accidents continue to happen. Nagy and Cenker (2002) argue that employees will continue to be killed and maimed if occupational health and safety are practiced on ad hoc basis. Therefore, it becomes necessary to evaluate the effectiveness of health and safety control programs in Zimbabwe mining sector and proffer ways to improve the situation.

1.3 Research Questions/Hypothesis

- How adequate are Safety and Healthy control programmes in the Mining Sector?
- What are the Safety and Health control programs at Mimosa Mine?
- What are the challenges faced by the Mimosa Mine in implementing Safety and Healthy control programs?

- How can Safety and Healthy control programs be improved in the mining sector?

1.4 Significance of the Study.

Evidence on the ground indicates that many Zimbabwe mining companies are committed to achieving ZERO HARM in their operations. Their budgets towards safety and healthy continue to increase. They subscribe to a wide range of Safety and Health International Standards Organisations and are periodically audited. The main thrust being to prevent accidents and deaths during their mining operations. This is what has motivated the researcher to assess the effectiveness of the safety and healthy control programmes in the mining sector. The study aims to provide awareness on how safety and health control programmes can be improved to prevent accidents and a wide range of individuals and institutions will benefit from the research.

1.4.1 Researcher

Research is a complicated and involving process that will inevitably sharpen the research skills of the Researcher. The skills will be needed to help solve political, social and economic challenges faced by the fast changing World. The researcher will also benefit by being awarded a degree upon successful completion of his programme.

1.4.2 Government

Government is involved directly or indirectly through investigations and offering assistance to accident victims if a major accident occurs in a mine. Improvement in Safety and Health programmes in the mining sector through this research will ensure that government resources will be redirected to other needy areas.

1.4.3 Mining Industry and Employees

Improvement of Safety and Health programmes in the Mining Sector through this research will improve the quality of working life of mining employees through ZERO accidents and incidents.

1.4.4 Family Unit

Accidents cause untold suffering to the dependants of the accident victims who are breadwinners due to disability. Improvement of Safety and Health programmes in the Mining Sector through this research will promote peace, stability and development of the family unit.

1.5 Delimitations.

The thrust of the research is to evaluate the effectiveness of health and safety control programmes in the Zimbabwe mining sector with the main focus on Mimosa mine. Mimosa Mine is located in the Midlands province, in the district of Zvishavane. The mine is in ward 5 area which is under Chief Wedza. The research sought to identify the safety and health programmes being implemented by the Zimbabwe mining companies and the challenges they face in the implementation of the programmes with particular reference to Mimosa Mine. Respondents were limited to the employees of Mimosa company.

1.6 Limitations

The research faced a number of limitations as follows;

1.6.1 Time

The time for the research faced competition from other responsibilities of the researcher who is a father, worker and student. However the researcher ensured that the time limitation would not affect the quality of the research by strict scheduling of his activities including reducing his leisure time.

1.6.2 Finance

The researcher was not a sponsored student as a result he used his personal meagre financial resources to pay for stationery, transport and airtime during the collection of the data. Although this was a real limitation the researcher ensured that the research programme got the necessary financial support by strict budgeting.

1.6.3 Polarised Society

Initially some of the respondents were suspicious and were not comfortable to divulge the required information but after employing the necessary communication skills they cooperated.

1.6.4 Confidentiality

One of the major limitations to the research was the level of confidentiality maintained by large organisations. The researcher had to follow the required procedures in order to be allowed to carry out his research.

1.6.5 Language of the questionnaire

The questionnaire was structured in the English language and some respondents had challenges in understanding the questionnaire. The researcher had to explain the questionnaires to those who needed help in order for the respondents to give honest and informed data.

1.7 Chapter Summary

The chapter provided a general outline of the health and safety challenges bedevilling the Zimbabwean mining sector. It noted that despite spirited efforts by the mining sector to totally eradicate accidents in the industry through ZERO HARM initiatives, accidents continue to happen resulting in injuries or death to employees. The chapter hinted that this could be due to inadequacies in the effectiveness of safety and health control programmes in the mining sector. The chapter highlighted the research questions and those who would benefit from the study. The chapter also indicated limitations of the investigation.

CHAPTER TWO

REVIEW OF LITERATURE

2.0 Introduction

The Chapter reviewed literature related to safety and health and practices in the mining sector. The principle of safety and health systems including policies, procedures and practices were explained. The causes of the safety and health hazards in the mining sector were highlighted in the chapter. Risks of hazardous processes in the mining industry together with challenges associated with the implementation of safety and health systems in the mining sector were unpacked. Tuckman (1994) asserts that literature review shows what has been done to avoid duplication and pitfalls. The significance of Review of Literature to the researcher was to understand what had already been researched about the topic.

2.1.1 The Concept of Safety and Health

According to Hughes et al, (2008) safety and health considers the working environment in a company and comprises all factors that impact on the safety, health, and well-being of employees. It include environmental hazards, unsafe working conditions or processes, fire, mobile equipment accidents, drug and alcohol abuse, and workplace violence. The safety and health of workers has been the centre piece of the International Labour Organisation (ILO) agenda since its inception in 1919. The Organization recognized that the protection of life and health at work was a fundamental worker's right. This means that the conditions of the working environment should be consistent with the worker's well-being and human dignity. The right to safety and health at work is also enshrined in in the United Nations Declaration of Human Rights (UNDHR) which among other things stresses the worker's right to just and favourable conditions at work.

International Labour Organisation (ILO) and World Health Organisation (WHO) shared and adopted the same definition of occupational health in 1950. Their definition stressed that occupational healthy should aim at the:

- a) Promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations.
- b) Protection of workers in their employment from risks resulting from factors adverse to health.

- c) Placing and maintenance of the worker in an occupational environment adapted to his physiological capabilities.

In line with the above, Hall and Goodale (2007) emphasized that Safety and Health are conditions and factors that affect, or could affect the safety and health of employees whether permanent or temporary in the workplace.

It is also recognized that failure to implement a sound safety and health system in a business can impinge the growth of a business. The economic costs of injuries and deaths in a Mine can hamstrung the business through compensation, lost working time, interruption of production, training, retraining and medical expenses. Exactly the reason the human, social and economic costs of accidents, injuries, diseases and industrial disasters continue to be an issue at national, regional and international levels. This is the reason relentless efforts to prevent, control, reduce or eliminate occupational hazards and risks remain the highest priority on global health and safety systems.

2.1.2 Theoretical Foundation of Safety and Health in the Workplaces

The workplace is an environment where workers are supposed to expend their energy towards achievement of their personal objectives through achievement of organisational objectives. Hall and Goodale (2007) clearly postulated that the employees' health should be free from diseases which results from workers and working place interaction. Konstantinos et al (2010) postulates that inferior working conditions are associated with reduced employee motivation and job satisfaction. Stansfeld et al (1998) argue that job satisfaction may have an indirect influence on worker's health through both physical and psychosocial employment conditions. Generally, health means being physically fit, mentally and emotionally and the ability to work in a certain environment and not the absence of diseases as such.

According to Abraham Maslow's (1943) hierarchy of needs, safety constitutes a basic human need. Kreitner, 2012 asserts that having a safe feeling at work is also an important factor if employers want to satisfy their employees. According to Aswathappa (2000) safety can be referred to as freedom from the incidence or risk of injury or risk of life. To him, employee safety meant protection of workers from the danger of industrial accidents. The absence of injuries from the interaction of the employee and work environment can also be defined as safety according to Lucas (2010).

In terms of this research the foundation of safety and health of workers is grounded in upholding the sanctity and dignity of life. Annah (2014) concurs with ILO that the safety and health of workers is a human right. Alli (2008) asserts that prevention and control of hazards should be an integral part of a safety and health culture in all social and economic activities.

2.1.3 Causes of Safety and Health hazards in Workplaces

Causes of health and safety hazards in the workplace are multifaceted. They range from unsafe working conditions, unsafe behaviours and also absence or poor implementation of a health and safety system. Ultimately, workers are exposed to biological, Chemical, physical, ergonomic or psychosocial hazards. Unsafe working conditions in the mining sector lead to accidents and cause loss and injury to human lives, damage to property and or interruption in production.

2.1.4 Physical Hazards

According to Dejoy (2000) physical hazards are mostly caused by explosions that occur in mines, roof fall, fires, electrocution as well as interaction with mining equipment.

Physical hazards include exposure to extreme temperatures, radiation and high noise levels. Nachimas and Nachimas (2009) concur that in the mining sector noise is generated from cutting and fabrication of steel structures, ventilation, drilling as well as blasting. Pyykko et al (1989) and Robinson (1971) agree that noise related to work is a leading cause of several auditory diseases which can lead to further serious manifestations of the disease.

According to Gottfredson (2004), an exposure of the infra-red has a greater contribution to heat stress.

According to Harvey et al (2001), Load Haul dump operators, Bolter Operators as well as Utility Vehicle operators experience vibration in their bodies whilst operating mining mobile equipment. EASHW (2000) concurs by indicating that vibrations at the workplace affect approximately a quarter of the people that work in industry.

Hannunkari et al also observed that back ache and dermatitis are some of the most common health problems associated with mining activities. Back ache is mainly caused by constrained working environments and manipulation of loads while dermatitis is caused by frequent interaction of the body with machinery oils.

2.1.5 Chemical Hazards

Workers in the mining industry interact with various types of chemicals on a daily basis as they carry out their duties. The chemicals are found in solid, liquid and gaseous form and they pose various types of risks to the workers. Guzzo and Dickson (2000) assert that chemicals are among fatal hazards in the mining industry. According to Haddel and Ojikutu (2005) Silicosis has been subject to considerable investigation in the mining industry. Those who work in the mining sector inhale fumes, dust, vapour or other unhealthy materials due to the poor quality of the air they breathe.

Cyanide is one of the dangerous hazardous chemicals which is used during hydrometallurgical processes according to Hale and Hale (2005).Mercury is also widely used in the mining industry and poses serious harmful effects to human health if it is not properly handled. Collins et al (1989) argues that Carcinogen substances e.g. acrylamide, asbestos, benzene etc. are prevalent in industry and are closely associated with incidence of cancer and other diseases.

Gilmer and Haller (2004) point out that diesel particulate exposures occur in underground mines because of diesel powered mobile equipment used primarily for drilling and haulage. Those who work under such an environment are at a high risk of suffering from cancer.

2.1.6 Biological Hazards

Biological hazards are hazards which are associated with working with animals, people, or infectious plant materials. Hale and Hale (2012) postulate that some biological diseases are very common in mining sectors. Mining areas are normally located in remote areas hence prone to malaria and dengue fever. A study by Dorland (2010) observed that hazards like Laptospirosis and Ankylostomiasis were rampant in mines but have been reduced by the controlling of rats and sanitation improvement in developed countries.

2.1.7 Ergonomic Hazards

Most of the work in the mining industry is extremely physical and it puts a lot of strain on the body. Workers are exposed to improperly adjusted workstations, poor body posture, awkward body movements, repetitive and frequent lifting of loads. EASHW (2000) postulate that repetitive strain injury and tenosynovitis are associated with repetitive body movement when carrying out tasks. Konstantinos et al (2010) argue that musculoskeletal disorders constitute the most severe manifestation of an unsuitable work environment, and are found to affect a

significant portion of the mining workforce. Huselid (2006) notes that although mining has become increasingly mechanized, substantial amounts of manual handling was still being done in the mining sector. He emphasized that overhead work is common underground, during ground support and during the suspension of pipes and electrical cables. He attributed this to be the major cause of shoulder disorders among mining workers.

Mining operations run twenty-four hours a day thereby exposing mine workers to shift work. Shift work causes lack of sleep which results in fatigue and loss of concentration to mine work and exposing them to various types of risks. Eninger (2006), asserts that shift work has been associated with fatigue in the mining industry.

2.1.8 Psychosocial Hazards

Mining employees are exposed to a wide range of psychosocial hazards attributed to the location and nature of Mining tasks. Flippo (2003) argues that it is complicated to eliminate the abuse of drugs in the mining sector. Eninger (2006) noted nevertheless, that there is need for pre-employment tests and also to do the breath and urinary tests after an incident or accident occurs in mining operations be it small scale or large scale.

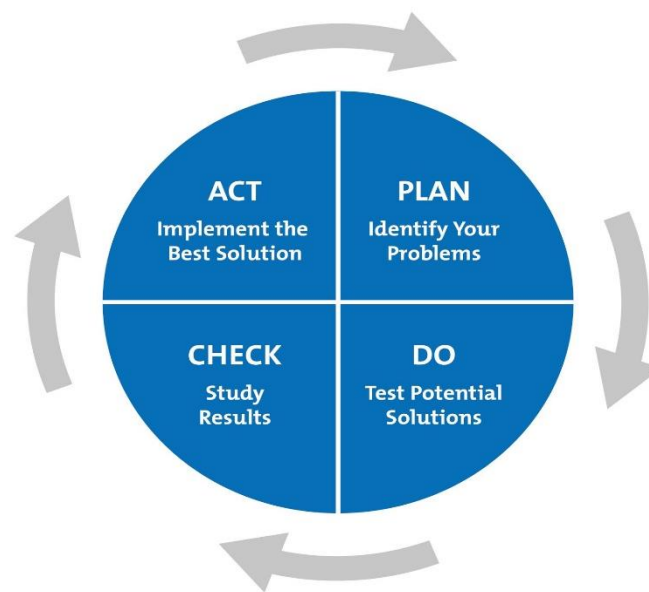
Mining companies are mainly located outside towns because of the nature of their processes and operations. Such areas may not have adequate accommodation forcing workers to stay without their families. Such situations negatively affect the family institution through social vices. The need for specialist skills results in engagement of expatriates. Chen and Hayes assert that such scenarios are highly associated with psychological hazards. Accidents that happen in the mining sector resulting in injuries or even fatalities traumatize workers and their dependents. These injuries also lead to stress to those who witness the incidents and also family members of the affected parties.

2.2 Safety and Health Management System (SHMS)

A safety and health management system is an integral part of any business entity that is meant to ensure the wellbeing of the workers and their working environment. The framework obliges organizations to manage safety and health issues with equal or greater level of priority than other core business processes are managed. According to Whitner (2011) a safety and health management system is a co-ordinated and systemic approach to managing safety and health risks. It provides a systemic way to identify and evaluate hazards before

managing them through appropriate control measures. This is achieved through well set out policies, practices and procedures that guide the workers to achieve high safety standards.

Figure 2.1 Illustration of a Safety and Health System



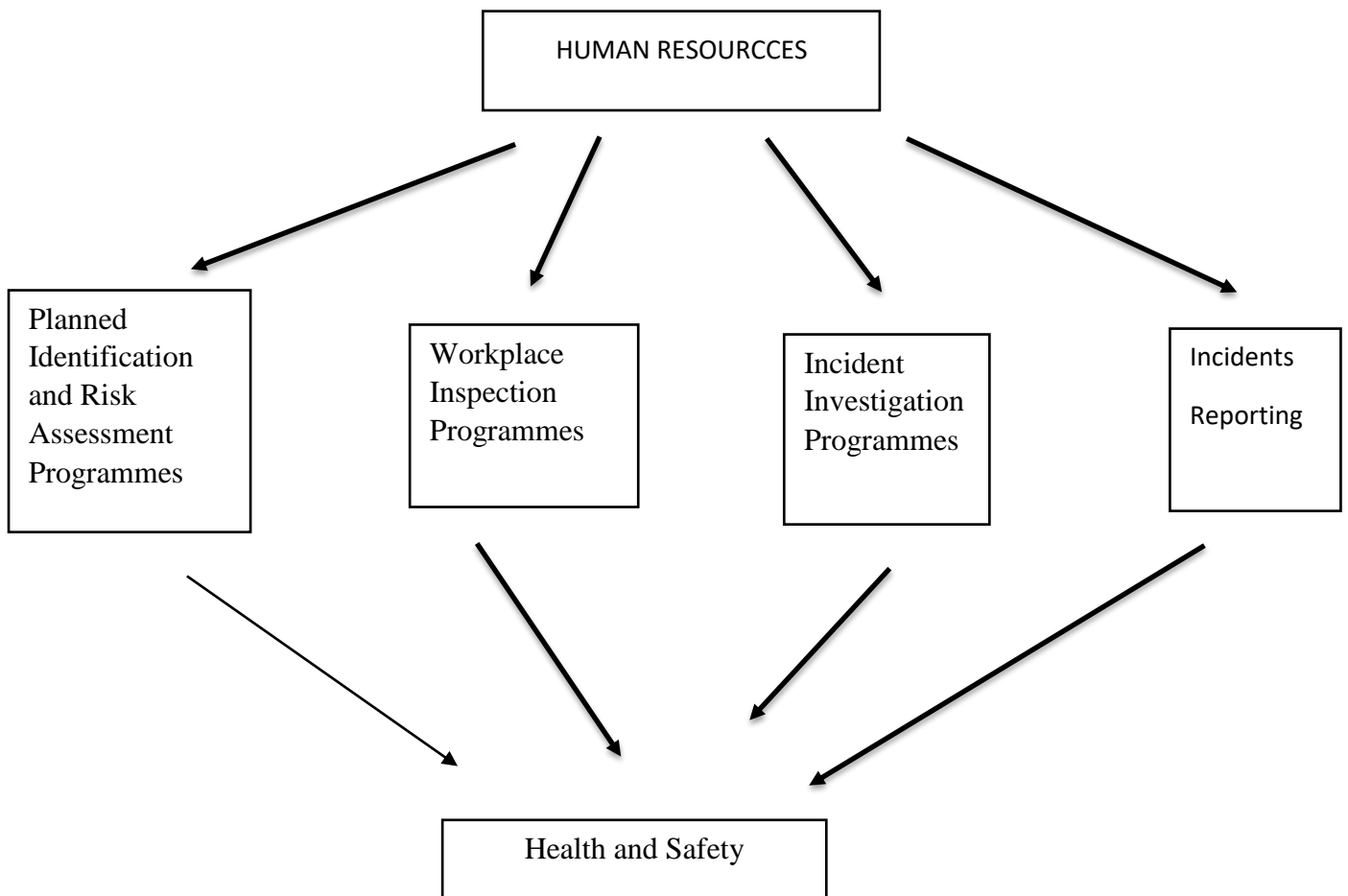
2.2.1 Characteristics of an effective Safety and Health Management System

An effective safety management system reduces the risk of accidents, injuries and fatalities through data driven measurements and improvements. It involves engaging workers and working in partnership with management to make safety a shared responsibility, recognizing the value of cross level team work. A safety management system is organized and structured to ensure organisations are able to achieve and maintain high standards of safety performance. It is proactive, preventive and integrated into the culture of an organization.

2.2.2 Conceptual Framework

Ayodele and Olubayo-Fatiregun (2010) identified and developed a conceptual framework which emphasized that human resource practices influence safety and health. They argued that planned identification and risk assessment programmes, workshop inspection programmes, incident investigation programmes and incidents reporting are the four connected pillars that the human resources influence health and safety programmes.

Figure 2.2 Conceptual framework illustration



2.2.3 Planned Identification and Risk Assessment

Planned identification and risk assessment refer to a programmed initiative to the identification and assessment of all major hazards and work processes according to Ayodele and Olubayo-Fatiregun (2010). This is a risk assessment activity that identifies the risks associated with the task at hand and management of the risks before the work can be executed. The risk assessment process is supposed to be continuous in order to take care of new risks that crop up as the task progresses. Reactive hazard identification mechanisms are also employed in industry that includes workplace inspections, incident investigations, use of injury data and employee hazard report. According to Komaki et al (2008) a majority of companies identify healthy and safety hazards on a more reactive basis. He goes on to say that the companies use methods such as records of incidents or illnesses or injuries; incidents or illness or injuries investigations; inspections; job hazards analysis; regular analysis of procedures of systems of work; reporting of hazards by employees; expert methods among other methods.

2.2.4 Workplace Inspections

Regular and structured workplace inspections are some of the tools that are used in the mining sector to reinforce safety and health system compliance. Dennis and Griffin (2005) stressed that audits emphasize the need for regular schedule workplace inspections which are organised around an inspection checklist and conducted jointly by trained management and employee representatives. Generated records and action plans are properly maintained and used to track and follow up inspections undertaken to determine the effectiveness of corrective actions. According to Eklof (2008) periodic review of the inspection process, forms and checklists should be undertaken in order to continuously improve the system. Inspections should be viewed as an ongoing tool for safety and health hazard identification, risk assessment and as a device for verifying the maintenance of the health and safety standards. Rue (2008) emphasizes that those regular inspections by the supervisor of equipment and availability of protective gear goes a long way in protecting the safety and health of mine workers. Inspections are also primary mechanisms for ongoing hazard identification and control, for checking compliance with rules. Osuala (2005) asserts that the weekly inspection is supplemented by a monthly inspection undertaken by senior managers external to the mining sites. Osuala stressed that formal annual inspection programmes complement the informal inspections undertaken separately by the health Manager and the health and safety representatives.

2.2.5 Incidents Investigations

Incident investigations play a key role in ensuring that a health and safety system functions effectively. According to Alberta (2006) incident investigations should be designed to identify reasons for substandard performance and underlying failures in the safety and health management systems. The investigations should identify whether the cause of the incident is human error or inadequacy of the procedures so that appropriate action plans can be instituted. He stressed that enterprises should have a procedure for incident investigations which is administered by workers trained in incident investigations and current approaches to corrective actions.

The stakeholders involved in incident investigations should include management, health and safety representatives and affected employees. Senior management should be involved in more serious accidents. Team members involved in incident investigations should come up with agreed reports and effective solutions to prevent the incidents from recurring. The team

should be open minded and be guided by the understanding that incidents are generally caused by unsafe conditions, unsafe acts, inadequate or poorly implemented safety and health systems. This is supported by Guldenmund (2010) who notes during his investigations that company investigations were concentrating more on shortfalls of management system rather than human error. Brauger et al (2009) assert that most incidents are caused by systems failure not necessarily human error. Gauthey (2005) argues that incidents investigations should be holistic in nature if they are to be effective. He goes on to say that safety and health specialists should take a vigilant approach during investigations and treat as incomplete any reports focussing on the individual alone. According to Pigwork (2003) investigations that always view human error as the cause of accidents usually produce unreliable results.

Incident investigations could be a sheer waste of resources if their recommendations are not followed up and fully implemented. Pigwork (2003) argues that companies do not have laid down follow up procedures to make sure that accidents have been addressed appropriately.

2.2.6 Incident Reporting

Pigwork (2003) pointed out that companies did not have laid down follow up procedures to make sure that accidents had been addressed appropriately. Gauthey (2005) reveals that in China many companies have safety management systems that have been approved but still they have not implemented them. Gauthey (2005) asserts that mining companies must be concerned about how to implement remedies and recommend the effective remedies to address different incidents. Reports must be made by the Safety, Health and Environment (S.H.E) representatives indicating where there were gaps or where there was high effectiveness of corrective actions. This should be done mostly when major accidents do occur.

2.2.7 Safety Systems that had been in place to manage Hazards

2.2.7.1 Personal Protective Clothing/Equipment

According to ILO it is the responsibility of the employer to provide workers with suitable protective equipment for example clothing and other facilities to protect employees against risk of accidents, injury to health and exposure to adverse conditions. Kreitner (2009) concurs that personal protective equipment is the clothes or materials that are used at workplaces to protect the employees from being injured during execution of their duties. Lucas (2007) says protective clothing includes safety shoes, ear muffs, safety goggles, overalls, hard hats and

safety harnesses. In the mining industry employees are required to put on appropriate protective clothing for a given task failure to which they could be disciplined.

2.2.7.2 Safety Talk

As part of incident and accident prevention strategies in the mining sector, safety or tool box talks are held every morning or at the beginning of every shift. Alberta (2010) describes safety talks as a form of training of employees on safety issues in order to reduce the number of accidents. Employees present safety topics to team members in order to alert them and ensure they remain vigilant to hazards associated with their daily activities.

2.2.7.3 Risk Assessment

Identification of risks and managing the risks before the task is executed is the cornerstone of the mining sector safety and health management system. Denisi and Griffin (2005) assert that risk assessment is a systematic examination of a task, job or process that employees carry out at work for the purpose of identifying the significant hazards, the risks of an employee being harmed and deciding what further control measures must be taken to reduce the risks to an acceptable level. This is supported by Eklof (2008) who emphasizes that in order to reduce disasters there is need to know the existing threats, people who might be affected by the threats and the impact of the threats. A risk assessment document is a live document that should continuously reflect the changing nature of the risks prevailing during task execution processes. Osuala (2011) argues that if there is any changes at the workplace, the risk assessment forms must be changed also to suit new working environment. In the mining sector it is a serious offence that can lead to dismissal for an employee to carry out a task before carrying out an adequate risk assessment.

2.2.7.4 Lock Out and Tag Out

The lock out and tag out procedure is a key procedure that the mining industry employs to ensure that the health and safety of employees is protected from potential energy. According to Lucas (2007) lock out is the control of harmful energy on the machines. Lock out is complete isolation of potential energy on a piece of equipment. The form of energy can be electrical, pneumatic, hydraulic, and/or potential among other forms of energy. The operating position of a machine which could be a valve or switch is locked out by a padlock after confirming that the machine has zero energy. Hippocrate (2010) argues that the energy-isolation device can be a manually operated disconnection of a switch, a circuit breaker, a

line valve or a block. This is done to ensure that no other person can switch on the machine except the one who would have locked the machine.

Tagging out is putting a label on the locked out position bearing the identities of the employee or employees working on the locked out machine. According to Eninger (2013) permission to remove the lock or tag is only granted to the individuals who locked them. Such a system ensures that the safety and health of employees is protected through the prevention of accidental machine start up while people are working on the machine.

2.2.7.5 Periodic Medical Screening

It is a requirement in the mining industry that new employees undergo medical examination to determine their level of fitness and annual examinations thereafter. Iwundu (2011) concurs that before employees start working for a mining company and given a contract employees undergo medical screening to ensure fitness for work. According to Nachimas and Nachimas (2010) periodic medical examinations are done to identify miners who have early evidence of the development of a respiratory disease.

At Mimosa mine the health and safety of employees is always under surveillance in line with their ZERO HARM policy. Their integrated business policy emphasizes that their operations should not harm their employees and community. Employees are medically screened annually and the type of screening is determined by one's occupation and working environment.

2.2.7.6 Environmental Monitoring in Undergrounds Mines

Underground mining poses a wide range of hazards to employees which is the reason why the working environment is consistently monitored to ensure employee safety. Hao et al (2008) argues that factors such as gases, heat, dust, water and high humidity need to be monitored in mines. Kucuker (2006) also stresses that gases in mines can poison workers or displace the oxygen in the mine causing asphyxiation. Dust lead to lung cancer and heat causes occupational diseases for example stroke. Fall of the ground is another major hazard that employees who work in the mines are exposed to. The Mining environment is therefore constantly monitored to ensure that the health and safety of mining employees is protected.

2.2.7.7 Challenges of Good Safety and Health Practices in the Mining Sector

Gavin and Matherly (1997) classified challenges which may be associated with Health and Safety practices in three main and overlapping aspects i.e. the people, the process and

technology. They argued that people's problems are wide and multifaceted. They range from the risk of employee's emotional or psychological stress, reduction of loyalty, loss of expertise to lack of commitment among employees to provide and be brother's keeper to minimize injuries. According to Malhorta (2004) lack of cooperation among workers themselves contribute among other things to mining accidents.

The process comprises of two categories i.e. failure by the mine to follow relevant government laws and or failure by mines to adequately craft and implement their health and safety policies and procedures. Mansfield (2001) found out that many companies embark on Safety and Health practices without any formal methodologies and guidance. Dejoy et al (2000) concur when they that unqualified safety officers employed to manage safety and health issues contribute to industrial accidents causing needless injuries and sometimes loss of life.

Mining companies in Zimbabwe have got Safety, Health and Environmental (SHE) policies. The implementation of the policies is sometimes hamstrung by the paucity of resources. Ingalls (2002) identified that it is expensive to provide safety materials at the workplaces and this limits management to fully implement high safety standards thereby exposing employees to unsafe working environments.

It is also argued that controlling and monitoring of mining safety and health systems by the government leaves a lot to be desired. Government's foot traffic in mining activities should be improved so that there is real time enforcement and compliance of health and safety regulations.

2.3 Chapter Summary

The chapter highlighted the related literature on safety and health practices in the mining sector that included the concepts, theoretical foundations and systems of Safety and Health employed in the mining sector. It reviewed major causes of safety and health hazards in the mining industry that included physical, ergonomic and chemical hazards. Critical pillars of a sound safety and health management system were explained that included incidents reporting, safety talks and workplace inspections. The roles that the employer and employee plays in ensuring that the safety and health of employees are upheld were put across. Challenges in implementing a good safety and health programme in the mining sector were explained.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The chapter examined different methods used in the collection and analysis of data in order to adequately address the research questions. Silverman (2005) defines research methodology as the approach used when studying a particular phenomenon. The research method used in this study was qualitative, while the research design was a descriptive case study. The research was based on a case study of Mimosa Mine as the researcher could not visit sizable numbers of Zimbabwean mines due to a wide range of limitations. The chapter highlighted data presentation, analysis techniques and ethics involved in the research.

3.1 Research design

Creswell (2009) defines research design as a set of strategies through which decisions from a broader theory are shifted to specific methods. Edmond and Kennedy (2012), define a research design as the actual lay out indicating timeframes within which data would be collected and analysed. According to Punch (2005), the purpose of a research design is to endorse that data collected meets objectives of the study through linking questions to data.

A case study design which was descriptive was chosen in this investigation to evaluate the effectiveness of health and safety control programmes in the mining sector. Hartley (2005) argues that a case study provides a way in which a phenomenon can be studied in its natural setting. The decision was informed by the problem under investigation. A case study approach described and interpreted what the situation was, focused on ongoing processes and existing conditions, their effect and magnitude.

Positivism and constructivism philosophical approaches were used in the investigation as dictated by the research problem. This entailed the use of qualitative and quantitative research methods. According to Creswell (2009) qualitative research is concerned with probing reasons that people have pertaining to a social problem. It involves open ended questionnaires and interviews.

On the other hand quantitative research is concerned with numeric data and statistical analysis to determine how variables are related according to National Council for Osteopathic Research (NCOR) (2014). Quantitative approach is calculative, it maintains consistence as a

result its results are reproducible. According to Saunders et al (2010), a quantitative research is referred to as a numerical manipulation and representation of data for the purpose of having a better description and explanation of that data. Quantitative research enables the researcher to follow accurately the original set of research goals, arriving at more objective conclusions, and, determining the issues of causality. Quantitative research instruments used include close ended questionnaires. The use of the mentioned methods in the investigation increased the likelihood of producing accurate and valid results.

3.2 Population and Sample

Identifying the appropriate population and choosing the right sample plays a critical role in any research process that seeks to produce accurate, relevant and valid research results.

3.2.1 Population

According to McLeod (2014), target population is a group of people within which a sample can be done. Cooper and Schindler (2003) define a target population as a universe of objects whose attributes are to be investigated. Ngulube (2005) asserts that defining the study population is one of the major milestones in a research design that ensures that research objectives are met. The targeted population of the investigation was 1500 Mimoso employees at the mine. Those targeted for interviews were SHE Officers, Foremen, Engineers and Managers.

3.2.2 Sampling Techniques

Abbott (2007) defines a sample as a small sub group chosen from a large population, which is a set of elements drawn from and analysed to estimate the characteristics of a given group. McLeod (2014) simplified the definition of a sample when he described it as a group of participants involved in an investigation or research. Mugo (2010) defines sampling as the act, process or technique of choosing an appropriate sample, or a representative part of a population for the purpose of analysing the characteristics of a given population. A sample is therefore a part of the whole population which is actually investigated and whose characteristics will be generalized to the whole population. According to ILO (2009), random sampling is one of the most accurate as each member has an equal possibility of being incorporated within the frame thus it offers a chance to everybody to reduce bias.

According to Flower (2009) when dealing with a large population a 10-20% sample is acceptable as a representation of the whole population. Mimosa employees are approximately 1 500 and the researcher chose 10% of the population as his sample thus coming up with a sample of 150 people.

Table 3.1 Sample Size

Department	Number of people from department
Assets Management	10
Material Handling	18
Mining	12
Plant	12
Supply Chain	8
SHE	10
Projects and Planning	14
Finance and Administration	4
Human Resources	12
Transport Services	8
Estates	7
Mobile Equipment	14
Geo-Survey	6
Medical Services	6
Loss Control	9
Total	150

Source: Field Survey (2018)

Purposive sampling technique was employed to select participants for the interviews. The technique is more representative as it is based upon knowledge possessed according to ILO (2009).

3.3 Instrumentation

The investigation made use of primary and secondary sources of data to achieve its objectives. Primary (first-hand) information was obtained from questionnaires and interviews whilst secondary information was gathered from document analysis and from the internet.

3.3.1 Questionnaires

Data was collected using open and close ended questionnaires in this investigation. Questionnaires are a structured way of collecting primary data that allows the respondents to respond conveniently and at their own pace. Questionnaires were used because they gave respondents room to complete them at their own time. The idea was to allow respondents to give objective responses in order to increase data reliability and validity.

During my investigation I observed that open-ended questions enabled respondents to answer questions in their own words. Saunders et al (2003) asserts that open-ended questions enable the researcher to gain insights into areas which might be difficult to clarify since the respondents are able to express their opinions.

The research also employed close ended questions mainly because they were simple to answer as choices were provided for on the questionnaire. The respondents were provided with numbers and or predetermined descriptions and were asked to choose the one that best described their attitudes. The research mainly used yes or no responses thus not only easy to answer but also easy to analyse. The questionnaires were administered to sampled mine employees.

3.3.2 Pilot Testing

Questionnaires were first administered to selected employees who were not going to participate in the investigation. Errors and queries identified on the return of the questionnaires were corrected as a way of improving the quality of the questionnaires. Consequently, pilot testing improved the quality of the research instrument.

3.3.3 Interviews

Another primary source of data collection that the researcher used during investigation was the interview. The interview guides had several questions structured in a manner that would assist in getting to the bottom of the problem. Creswell (2009) argues that interviews enable informants to present historical information which can be compared with present scenarios. SHE Officers, Foremen, Operators, Miners and Artisans were interviewed as they were the workers who work in high risk areas.

Table 3.2 Informants Table

Key Informant	Rationale for selection
Engineers	<ul style="list-style-type: none">• They were responsible for engineering activities across the mine which happens to be one of the high risk portfolios on the mine.• They were responsible for the departmental budget.
SHE Officers	<ul style="list-style-type: none">• They are responsible for implementation of SHE Systems
Foreman	<ul style="list-style-type: none">• They were in charge of supervising maintenance work which is one of the high risk areas.• They provided resources including protective clothing to their subordinates
Mine Captains	<ul style="list-style-type: none">• They were in charge of underground operations i.e blasting, hoisting and operations of underground mobile equipment.• They supervised and provided resources including protective clothing to their subordinates
Artisans	<ul style="list-style-type: none">• They were responsible for carrying out maintenance work on the equipment on the mine including high risk tasks.

Source: Field Survey (2018)

The researcher visited various departments and interviewed the respondents in the table above. The objective of the interviews were to get hands on data from the people whose activities involved implementation of safety and health control programmes on a daily basis.

Engineers were interviewed because their subordinates interacted with hazardous machinery every day. SHE Officers were interviewed for the reason that they were in charge of the implementation of SHE systems across the mine. The Foremen and Mine Captains handled safety and health issues from their subordinates regularly the major reason the researcher interviewed them during the investigation. The Artisans were also interviewed because they carried out high risk tasks during the maintenance of mining equipment.

3.4 Ethical considerations

Ethics are moral principles and values that influence the way a researcher or group of researchers conduct their activities according to Ghauri and Gronhaug (2005). The researcher was therefore guided by the ethical principles of research during the investigation. Informed consent, confidentiality, anonymity and voluntary participation were among the key pillars of the research process. The respondents were informed that their participation was voluntary and they could pull out anytime they wished to do so.

3.4.1 Informed consent

Research participants were fully informed about the purpose, methods and intended uses of the research. Their rights, risks and potential benefits from the research were also spelt out to them. Research participants were made aware of their right to refuse or withdraw from the investigation at any stage of the research and that their participation was on voluntary basis.

3.4.2 Anonymity

Anonymity is the process of not disclosing the identity of the participants or the author of a particular view or opinion according to Griyer (2002). Consequently, the questionnaires that were distributed to the respondents did not require the respondents to write their personal details. The respondents were informed that this was meant to protect their identities.

3.4.3 Confidentiality/Privacy

The respondents were informed that the information they provided was for the purpose of the research only and would not be divulged to anyone. Participants were also assured that no information about their participation would be revealed without their authorization. The respondents were also assured that data collection tools were to be kept under lock and key. As a result the respondents gave the solicited data freely and confidently.

3.4.4 Protection from Harm

According to **Kazdin (2003)** assert that protection from harm is the cornerstone of ethical conduct during a research process. The researcher strived to promote good and prevent harm to his respondents during the research process. The respondents were assured that authority had been granted from management for the research so their participation would not be a form of misconduct.

3.4.5 Honesty

In order to enhance the validity and integrity of the research outcome, the researcher guarded against falsifying or misrepresenting data and information gathered during the research process.

3.5 Data Collection procedures

Armed with a letter of affirmation from the department of Adult Education the researcher sought clearance from Mimosa management to carry out his research. The researcher made appointments with key interviewees and self-administered the questionnaires. Respondents were informed that the results of questionnaire survey were purely for academic purposes.

3.6 Data Analysis Plan

The researcher employed various data presentation methods in his investigation. Pie Charts, Tables and Graphs were used to present the gathered data. The graphs enabled the researcher to easily compare and contrast data from the respondents. According to Creswell (2009) data analysis and presentation is an important facet of the research process thus approaches used had to be highly developed and focused on the problem.

3.6.1 Quantitative Analysis

Quantitative analysis is generally regarded as the interpretation of data from questionnaires in numerical terms. Quantitative analysis of the questionnaires was carried out mainly because it facilitated drawing of meaningful results from the quantitative data.

3.6.2 Reliability and Validity Considerations

Jack and Clarke (1998) assert that reliability refers to the repeatability, stability or internal consistency of a questionnaire. Thiart (2001) says the main concerns with validity are whether the measured data is relevant and precise, and the second is the extent to which we

can generalize from those results. To ensure that the investigation exhibited reliability and validity, triangulation was employed in the investigation.

3.6.3 Triangulation

To increase the validity of the research methods the researcher used triangulation. According to Stake (1995) triangulation includes, “data triangulation (using data from different sources), theory triangulation (use of several theories), methodical triangulation (using multiple samples and sources)”The investigation made use of methodical triangulation through utilization of both qualitative and quantitative approaches. Olsen (2004) asserts that the major reason for mixing these methods is to validate the data gathered so much so that various views are combined. Yin (2003) concurs when he says that the major strength of triangulation is that it provides the researcher with a window to use different sources of evidence to validate the research findings. The researcher used structured and unstructured questions to reduce bias and also observations to complement the questions in an effort to increase validity of the findings.

3.7 Chapter Summary

The chapter adopted a qualitative research method and a descriptive case study design in the investigation. The staff compliment of Mimosa Mine was approximately 1500 at the time of the investigation and the sample size which was taken was 150. The research instruments used were observations, questionnaires and interviews. Random and purposive sampling techniques were used to get the sample. Ethical considerations of anonymity, confidentiality, informed consent among others were observed during the investigation in order to get reliable and valid data.

CHAPTER 4

DATA ANALYSIS PRESENTATION AND DISCUSSION

4.0 Introduction

The chapter analysed, presented and discussed the results of the field survey in line with the research questions. The data was collected through observations, interviews and questionnaires and was presented and interpreted quantitatively and qualitatively. A total of 150 questionnaires were administered to the respondents and 126 were returned thereby giving an 84% response rate. Zikmund et al (2014) says a 70% response rate is viewed to be ideal for a small population. Consequently the assertion validates my investigation.

4.1 Response Rate by Department

The researcher distributed his questionnaires across the departments to make his investigation more representative. Below is a table that shows the sample size, responses and the response rate.

Table 4.1 Response Rate by Department

N=150

Department	Sample size	Responses	Response rate (%)
Assets Management	10	8	80
Material Handling	18	16	88,89
Mining	12	10	83,33
Plant	12	11	91,67
Supply Chain	8	7	87,5
SHE	10	10	100
Projects and Planning	14	11	78,57
Finance and Administration	4	3	75
Human Resources	12	12	100

Transport Services	8	5	62,5
Estates	7	5	71,42
Mobile Equipment	14	11	78,57
Geo-Survey	6	5	83,33
Medical Services	6	6	100
Loss Control	9	6	66,67
Total	150	126	84

Source: Field Survey (2018)

The table above shows that 150 questionnaires were distributed to the respondents and 126 were completed and returned. This represented an 84 % response rate, a percentage that reasonably validates the findings of the investigation into the effectiveness of safety and health programmes in the mining sector. Those who did not return the questionnaires indicated that it was due to work pressure. This was not surprising to the researcher as he witnessed the level of production pressure that employees in the mining sector were exposed to.

4.1.1 Analysis of Biographical Data

4.1.2 Age of Respondents

Age plays a critical role in employees' perspective of safety and health as a result the researcher categorized the respondents into five age groups. The objective was to get various views of the age groups so as to validate the results of the investigation. Below is a table that is representing the age groups.

Table 4.2 Age of Respondents

N=126

Age Group	Number of Respondents	%
21-25	9	7,1
26-30	30	23,8
31-35	33	26,2
36-40	37	29,4
41 and Above	17	13,5
Total	126	100

Source: Field Survey (2018)

The table above shows that the least number of respondents were from the 21-25 age group which had a total of 7,1% respondents. This could be attributed to the state of the national economy which is not expanding hence is failing to absorb young people into the mining industry. The majority of the respondents were from the 26-40 age groups which constituted 79,4% of the respondents. Mining tasks are strenuous hence these age groups still have the energy and capacity to carry out a wide range of mining tasks. Because of the hazardous nature of the mining environment and strenuous tasks associated with mining industry the above 41 years age group had 13,5% respondents. The researcher was not surprised by this as during his observations he met very few white haired or visibly old employees.

4. 1.3 Gender of Respondents

Safety and Health control programmes sometimes affect men and women differently. The table below shows respondents by sex.

Table 4.3 Gender of Respondents

Age Group	Male	Female
21-25	9	4
26-30	24	5
31-35	27	4
36-40	30	3
41 and Above	18	2
Total	108	18
%	85,7	14,3

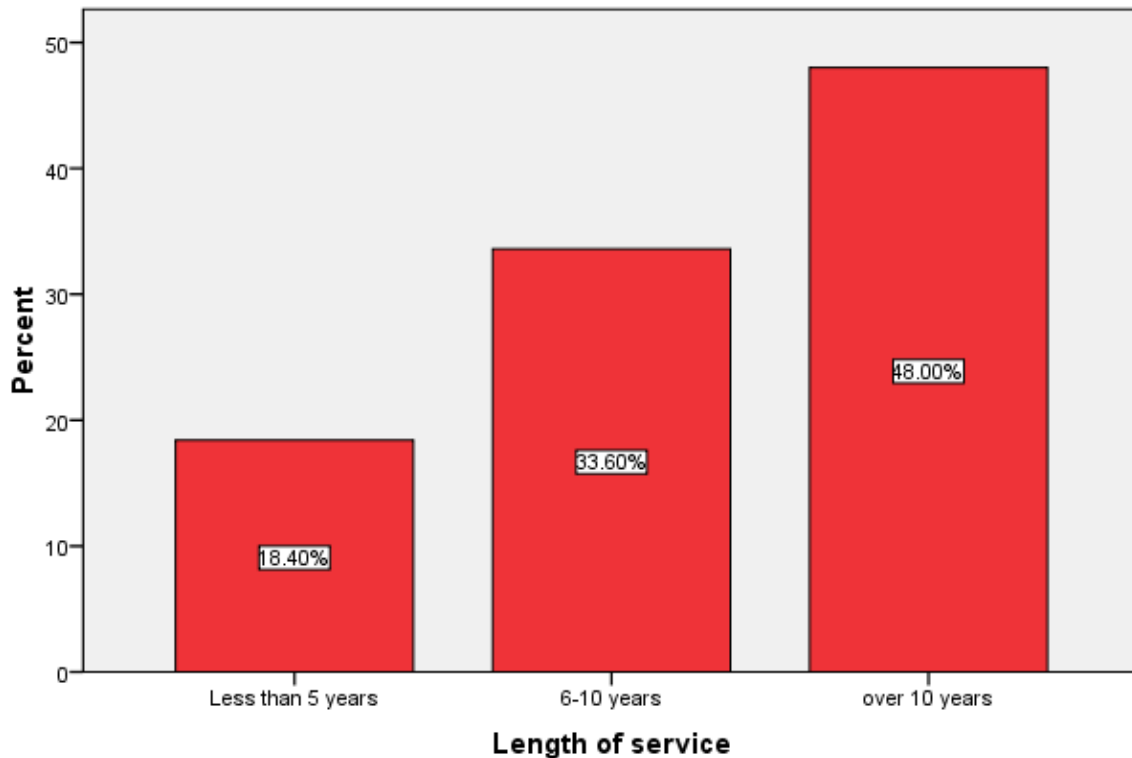
Source: Field Survey (2018)

The table above indicates that 85,7 % of the respondents were men whilst women were a paltry 14.3%. The research vividly shows that the investigation was balanced as it got views from both men and women. The researcher noticed that most of the women respondents were from soft skills professions i.e. Human Resources, Accounts and Estates, very few were from hard skills professions i.e. Mining and Engineering a sign that women still avoid professions that demand a lot of physical involvement. During the interview with the Mine Captain, the researcher was informed that the number of women in blue collar jobs was actually improving when compared with the previous years when there were none. He indicated that a lot of female students from Universities and School of Mines were now coming for hard skills attachment programmes unlike previous years.

4.1.4 Length of service

Issues of organisational culture can positively or negatively affect the implementation of safety and health control programmes. Directly linked to this is the length of service of employees in the same organization. The table below shows the categories of length of service of the respondents.

Figure 4:1 Length of Service



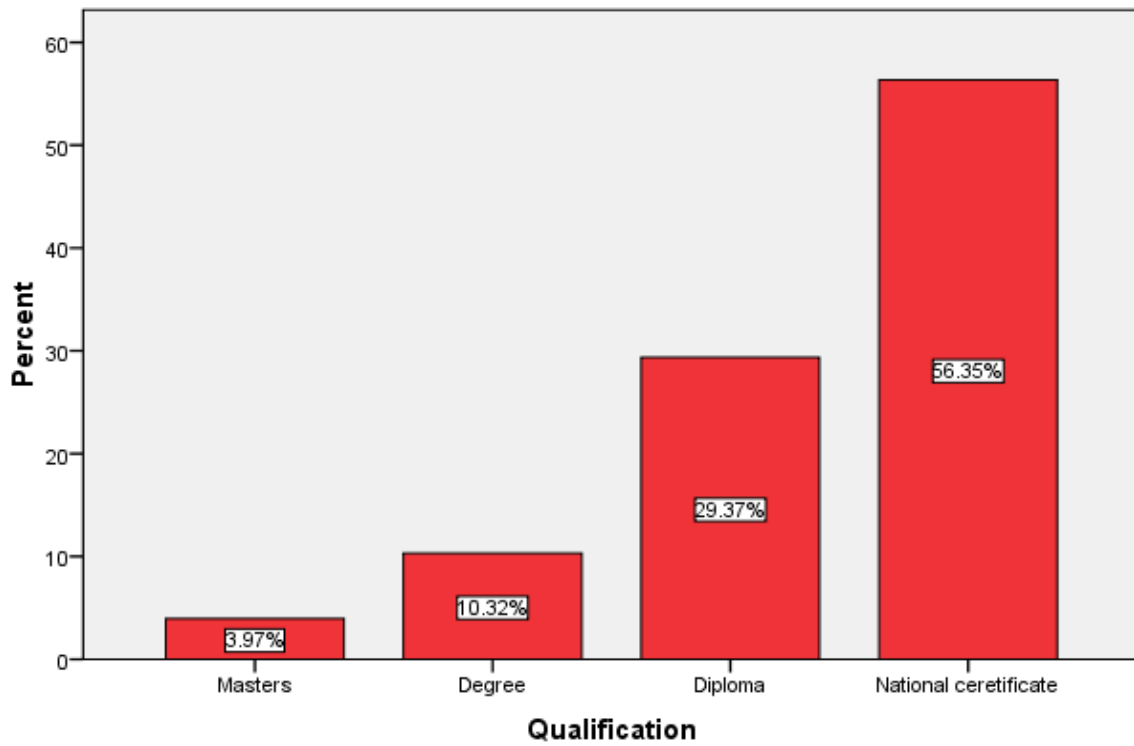
Source: Field Survey (2018)

The table indicate that the majority i.e. 48 % of the respondents had worked for the organisation for more than 10 years while 18.4% had served the organization for less than five years. This shows that the investigation took aboard views of those who had few years in the organization and those who had stayed longer in the organization in order to get balanced views. Most of the respondents had more than 6 years' service hence their responses were presumed to be informed and representative of their situation by the researcher.

4.1.5 Qualifications

Level of education plays a key role in appreciating and understanding safety and health control programmes in any institution. The level of education of the respondents was as tabulated in the table below.

Figure 4:2 Qualifications



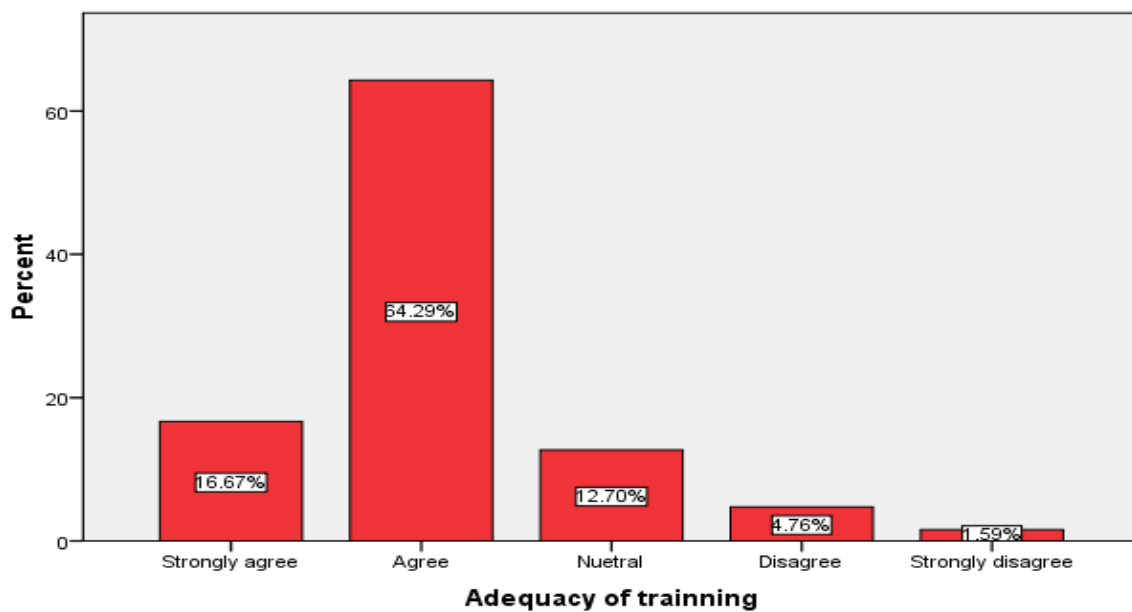
Source: Field Survey (2018)

The table above shows that 56,35% respondents had the National Certificate qualification while those with Diplomas were 29,37 %.The National Certificate category houses the Artisans, Laboratory Technicians, Operators etc. The SHE officer indicated that the category consisted of workers who drove and were at the heart of the production processes in the mining sector and are exposed to various types of mining hazards. The respondents with Degrees were 10,32% while the qualification which had the least respondents was the Master's Degree which had 3,97%.It can be implied that the respondents, by virtue of their qualifications and nature of work had the capacity to provide reliable information that could lead to a valid judgement on the effectiveness of safety and health programmes in the mining sector.

4.1.6 Provision of adequate training on Safety and health related issues

Training plays a critical role in any behavioural change initiative. The questionnaires had a part that required respondents' views on the adequacy of training in their organisation. Below is a table of their perspectives.

Figure 4:3 Adequacy of safety and health training



Source: Field Survey (2018)

From the survey 16,67% strongly agreed that the organisation offered adequate training in safety and health whilst also 64,29% respondents agreed with the same perspective. The researcher witnessed various types of safety and health training programmes being carried out in different departments during his investigation.

A total of 16, 67% of the total respondents were neutral. This did not surprise the researcher as people are naturally suspicious of any information gathering process. Particularly at such a time when the economy is not sound and people fear for their jobs. Only 1,59% strongly disagreed with the view that the organisation was offering adequate training in safety and health.

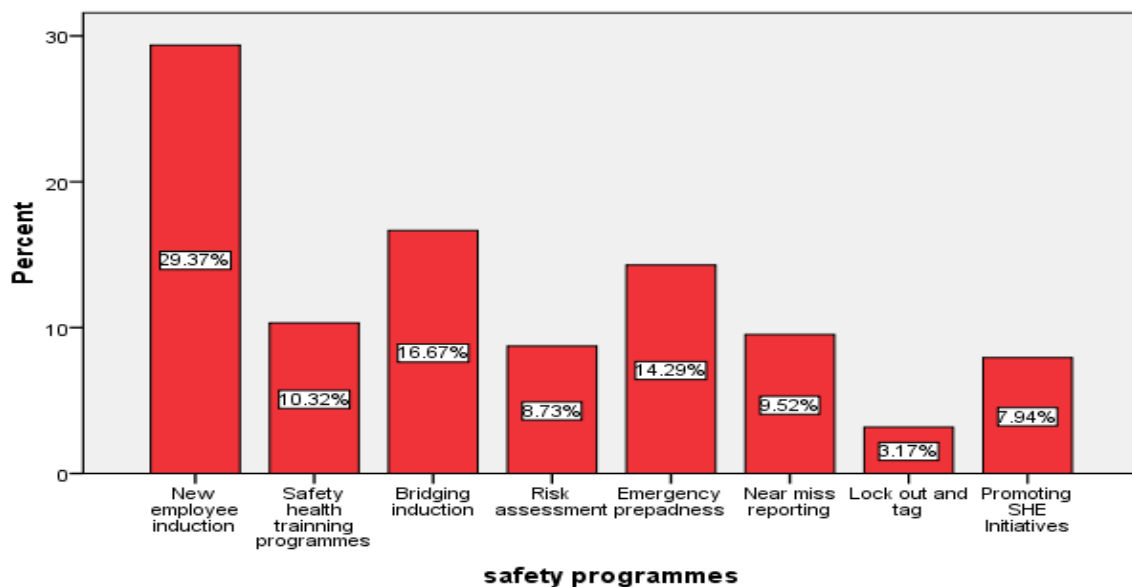
A total of 4, 76% of the total respondents disagreed that their organization was doing enough in terms of safety and health control training programmes. In an interview with an Artisan he

bemoaned the level of production pressure associated with the mining industry. They indicated that safety and health skills acquired during training programmes are sometimes seriously challenged by the level of work pressure prevailing in the mining industry.

4.1.7 Safety and Healthy Control programs in place.

The organization embarked on the ZERO HARM programmes in 2015 which emphasized on the promotion of safety and health of employees and protection of the environment. During the survey the respondents revealed a wide range of training programmes that complemented the ZERO HARM initiative which are shown in the table below.

Figure 4:4 Safety and Health programmes



Source: Field Survey (2018)

4.1.8 New Employee Induction

During the survey 29, 37% (fig 4.4) respondents revealed that new employee induction was an integral part of their safety and health control programmes. The Induction enabled the new employees to gain appropriate information about the company and also for the new employees to be assimilated into the organization’s culture and goals. The emphasis of the induction programme was on safety and health issues so that the new team members were safely integrated into the organization.

4.1.9 Safety and Health Training programmes

The organisation carried out a wide range of safety and healthy training programmes that were meant to promote the safety and health of employees. Figure 4.4 indicates that 10,32% of the respondents indicated that the organization rolled out a wide range of safety and health control programmes. During the survey the researcher observed a class of employees undergoing firefighting training.

4.1.10 Bridging Induction

Bridging induction is a very important safety and health training programme according to 16,67% of the respondents (fig 4.4). The SHE officer indicated that bridging induction was meant to refresh employees coming from leave on key Safety and Health issues so that they would remain vigilant as they went back to their work areas. The researcher observed some of these induction training programmes at various stages as he moved around the organization carrying out his investigation.

4.1.11 Risk Assessment

In contrast to Komaki et al (2008) argument that most companies do not have laid down approaches of assessing and identifying hazards 8,73%(fig 4.4) of respondents viewed risk assessment as a key safety and health programme at the organization. During an interview with the Engineer he highlighted that all employees were trained on how to carry out risk assessments before and during the execution of every task. Denisi and Griffin (2005) concurred when they described risk assessment as a systematic examination of a task, job or process that employees carried out at work for the purpose of identifying the significant hazards, the risk of an employee being harmed and deciding what further control measures could be taken to reduce the risk to an acceptable level. One of the Supervisors stressed that risk assessment training was an integral part of the organisation's safety and health programmes which capacitates employees with skills in the identification and controlling of hazards. The researcher read a SHE motto which was on one of the notice boards which read, "No Risk Assessment no work." This was a clear indication of the importance of risk assessment in the mining industry.

4.1.12 Emergency Preparedness

Emergency preparedness programmes were seen as crucial safety and health training programmes by 14,29% (fig 4.4) respondents. During the investigation the researcher

witnessed a number of emergency mock drills that were meant to remind employees on how to react in cases of emergency. In an interview with the mine captain, it was emphasized that all the employees were trained on departmental and organisational emergency procedures. The objective was to equip every employee with skills to escape to safe zones and to be able to serve lives in cases of emergencies.

4.1.13 Near Miss reporting and tailgating

Near miss reporting and Tailgating were highlighted as important safety and health programmes by 9,52% (fig 4.4) of the respondents. The engineer revealed that the organisation carried out awareness training programmes across the mine on all reported near misses. This concurs with Mbuvi et al (2015) who assert that near misses are unusual observations and “improvement opportunities” that proffer free lessons towards accident prevention. Alberta (2006) goes further to stress that incident investigations should be designed to identify reasons for substandard performance and underlying failures in the safety and health management system. In an interview with the SHE Officer during the investigation, it was revealed that near miss awareness training programmes helped employees to learn from mistakes and helped them to be alert and take proactive postures to prevent accidents.

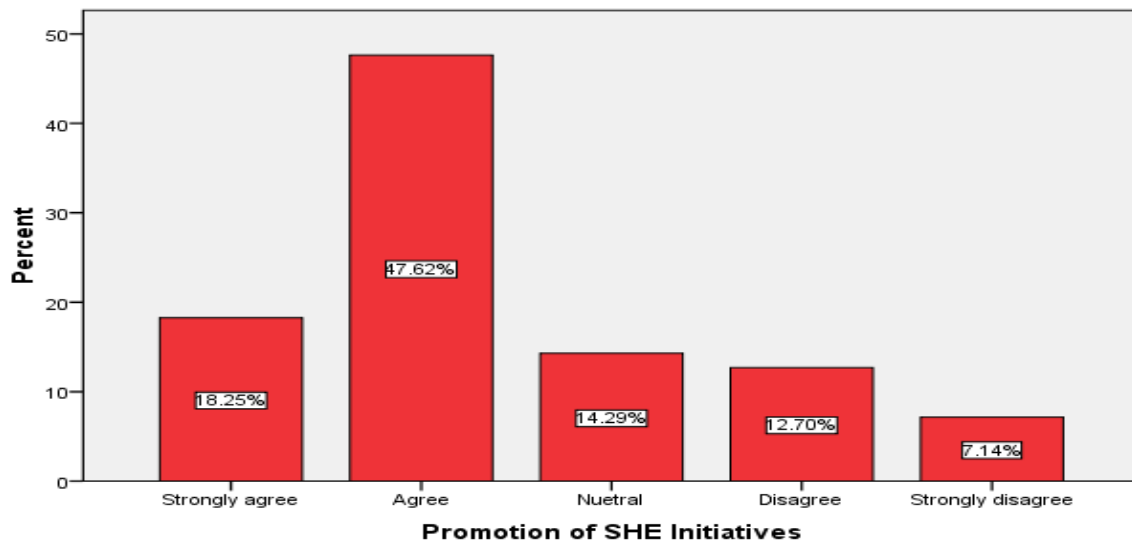
4.1.14 Lock Out and Tag

The least respondents constituting 3,17% of the respondents (fig 4.4) felt that lock out and tag could not be left out of the key safety and health programmes. One of the Artisans indicated that all the employees were trained on the lock out and tag procedures and refresher trainings were carried out periodically. This was in line with Lucas (2007) assertion that lock out is the control of harmful energy on the machines and that was achieved through complete isolation of potential energy on a piece of equipment. In an interview with the Engineer, it was categorically stated that breach of the lock out and tag procedure was a serious safety and health offence.

4.1.15 Promotion of Safety and Health Initiatives

The respondents who highlighted that the organisation was indeed running several initiatives that promote safety and health were 7,94%.Part of the questionnaires solicited for information about the provision of safety and health support systems in the organisation to the respondents and below is a table showing the results.

Figure 4.5 Promotion of SHE initiatives



Source: Field Survey (2018)

The table above shows that 47,62% of the respondents agreed that the organisation was providing adequate materials to promote safety and health control programmes in the organisation during the time of the investigation. The total percentage of those who strongly agreed (18,25%) and those who agreed (47,62%) gave 65,87%. This implied that most of the respondents were satisfied with the level of material support that the organisation was investing towards the promotion of Safety and Health control programmes. The respondents who were neutral were 14,29% and those who disagreed were 12,70%. Those who strongly disagreed were 7.14%. The researcher observed several SHE initiatives which were being undertaken by the organization and was not surprised by the majority of respondents who indicated that the company was carrying out a lot of initiatives to promote safety and health. Some of the initiatives that the researcher observed during the investigation were as follows;

4.1.16 SHE Department

The researcher observed a functioning Safety, health and Environmental department which was made up of SHE Clerks, Officers, Head of Sections and Mangers. The researcher was informed by a SHE officer during an interview that the main purpose of the SHE department was to advise, assist and audit the SHE systems of the organisation to enhance effectiveness. He went further to highlight that the main role of the department was to achieve and maintain ZERO HARM within the organisation through monitoring and regulating safety, health and environmental control programmes.

4.1.17 Medical Services

The researcher saw a fully equipped mine hospital that was manned by a team of occupational, wellness and ordinary nurses headed by a Medical Doctor. Equipment at the Medical Centre included a fleet of Ambulances, X-ray equipment and other pieces of machines associated with a state of the art healthcare facility. Employees easily accessed treatment when they fell sick or got injured. Employees also went through periodic medical examinations to check their health status. One Supervisor who was at the clinic during my investigation, revealed to me that a lot of employee lives were saved by periodic medical examinations due to early detection of ailments such as Diabetes and Tuberculosis which were then promptly treated. He gave an example of an employee who came for his periodic medical examinations and was immediately detained due to an advanced diabetes ailment.

HIV and AIDS Awareness programmes

The researcher's investigation coincided with an HIV and AIDS awareness programme which was being run on site. One of the Mine Captains who was present revealed that the organisation realised that mining communities were among the areas highly exposed to HIV transmission. He further indicated that the organisation provided HIV Testing and Counselling services to its employees and those found positive were immediately put on ARV drugs. The researcher was also informed that the organization had Peer Educators who championed HIV and AIDS issues at departmental level and reported to the Medical Services department.

Counselling Programmes

Mining employees and their families sometimes went through various types of pressures. The pressures could be family, financial, and social and or work related and this impacted negatively on the safety and health of employees. The Engineer revealed that the organisation invited professional counsellors to the mine every first week of the month to offer counselling services to employees and their dependants. One of the SHE Officers observed that this initiative was the main reason why the organization had not recorded any suicides at its premises.

Annual Sports Day

The SHE officer revealed that the organisation had set aside one day a year where employees were encouraged to participate in a multiplicity of sporting disciplines that would be taking

place. She said that the objective was to encourage employees to exercise so that they protected themselves from diseases like high blood pressure, diabetes, obesity among others that are caused by lifestyles. The Annual Sports Day Theme for 2017 was “ Healthy Mind Exercise “

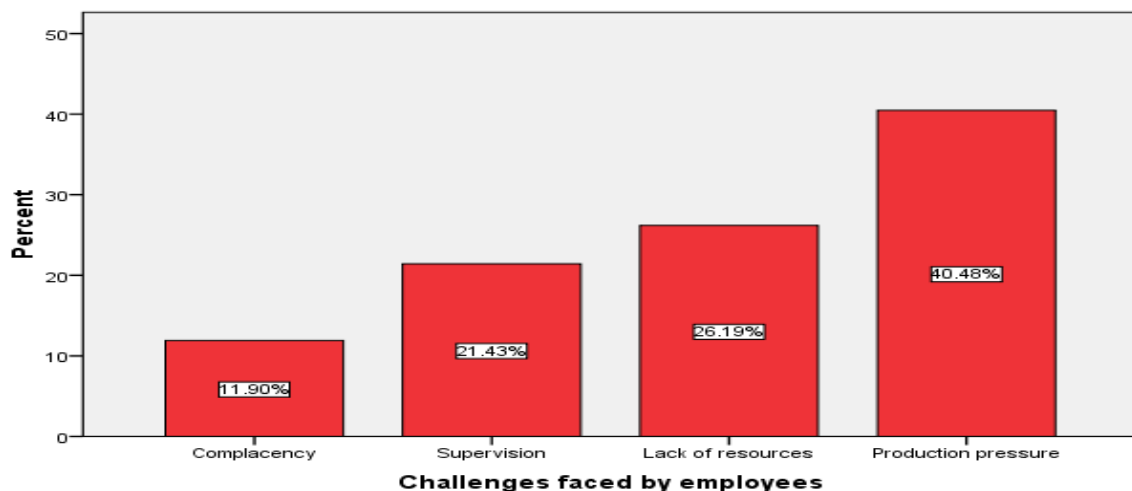
4.1.18 Provision of Personal Protective Equipment (PPE)

During the investigation it was clear that the Organisation was carrying out its personal protective equipment responsibility according to international standards. ILO says that it is the responsibility of the employer to provide workers with suitable protective equipment for example safety clothing and other facilities to protect employees against the risk of accidents, injury to health and exposure to adverse conditions. What the researcher observed was in line with Lucas (2007) assertion that protective clothing includes safety shoes, ear muffs, safety goggles, overalls, hard hats, safety and harnesses.

4.1.19 Challenges associated with promotion of Safety and Health Control Systems by employees when carrying out tasks

The implementation part of any programme plays a major role in insuring that the programme fails or succeeds. The Artisans, She Officers, Mine Captains and other blue collar professionals play a pivotal role in the success of any safety and Health control programme in the mining sector. Below is a table of respondents on the challenges faced by employees when implementing safety and health control programmes.

Figure 4:6 Challenges faced by employees



Source: Field Survey (2018)

The table shows that 11,90% of the respondents viewed complacency as one of the causes of failure to effective implementation of safety and health control programmes. Supervisory issues were also cited as contributing to 21,43% while the paucity of resources contributed 26,19% to challenges associated with the implementation of Safety and Health Control programmes according to the survey. The table shows that production pressure was the major obstacle to the promotion of safety and health control programmes according to 40,48% of the respondents. This was not surprising to the researcher as mining business the world over, is based on pushing large volumes and most of that pressure is born by those who work at the coal face.

4.1.20 Complacency

The respondents who felt that complacency was a challenge in safe execution of tasks were 11, 90%. In an interview with one of the Engineers it was revealed that complacency was a common challenge in their working environment due to workers getting used to routine tasks and working in the same environment for a prolonged time. He reiterated that workers tend to overlook the role played by following of procedures in the safe execution of tasks. This concurs with Jones (2012) observation that complacency caused workers to be over confident and slack which caused accidents and incidents within organizations. During an interview with one of the SHE officers he stressed that most of their incidents and accidents were caused by failures to follow Standard Operating Procedures (SOP) yet the promotion of safety and health control systems was largely based on procedures.

4.1.21 Poor Supervision

Employees who felt that poor supervision was a stumbling block in the safe execution of their tasks were 21, 43%. In an interview with one of the Artisans he bemoaned the lack of supervisory skills by some of their supervisors. He said they didn't want to take responsibility and accountability for risk tasks and to lead by example" When you ask for guidance from some of the supervisors they say make a plan, you are a qualified person and when that plan results in an accident they literally nail you on the cross" .It was revealed that the behaviour of some of the Supervisors was in sharp contrast to Munson (2006) who emphasizes that supervision should be a process of providing direction to supervisees.

4.1.22 Lack of Resources

About 26,19% of the respondents testified that appropriate and adequate provision of resources for the execution of tasks cannot be over emphasized in the promotion of safety and

healthy control programmes. Although their current company was providing enough resources for carrying out tasks, they stressed that other mining companies were experiencing serious challenges. One of the interviewed Electricians said that equipment which was not properly maintained with the correct spares and lack of appropriate protective clothing for employees made the promotion of safety and health promotion ineffective.

4.1.23 Production Pressure

Interviewed Foremen highlighted that availability targets for their machinery were too high and that put them and their subordinates under extreme pressure very often. This wasn't surprising as 40,48% of the respondents felt that they were exposed to excessive work pressure during the survey. This was in line with Hughes and Ferrett (2011) observations that pressure of production or performance standards can be an obstacle to safety and health. One of the Artisans said, "when you are exposed to excessive production pressure you are bound to make short cuts thereby compromising the safety and quality of work". He went on to say that production pressure was a real challenge in the promotion of safety and health programmes as the focus would be on ensuring that the equipment ran but at the expense of safety and health.

4.1.24 Challenges faced by Mining Companies in the promotion of Safety and Health Control programmes

Mining Companies faces a wide range of challenges in their quest to promote safety and health control programmes in their organizations. The table below highlights some of the challenges;

Table 4:4 Challenges faced by Mining Companies

H=126

Challenge	Frequency	Percentage
Lack of Resources	14	11,1
Management commitment	22	17,5
Employee attitude (failure to follow procedures.)	63	50
Lack of Employee Engagement	27	21,4

Total	126	100
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Source: Field Survey (2018)

Table 4:5 shows that 50% of the respondents felt that the major obstacle to the promotion of safety and health programmes in the mining sector was employee attitudes. This was followed by lack of employee engagement which was 21,4%. Management commitment was 17,5% while lack of resources was the least and had 11,1% responses. The survey showed that attitude of employees played a pivotal part in the successful promotion of safety and health control programmes in the organization.

4.1.25 Lack of Employee engagement

Employees who felt that their views were not taken into consideration in the promotion of safety and health control programmes were 21, 4%. They felt that the safety and health control programmes mostly took a top down approach in their implementation. Yet Grey (2012) argues that the key to action is participation, a shared intent, positive working relationships and inclusivity. Robson (2002) asserts that those people who participated in programme formulation generally became more aware of their current practices and gaps between their beliefs and practices. Hughes and Ferret (2011) warned that the importance of discussing the proposed safety and health system with those who will work under it and those who will have to supervise its operations cannot be emphasized enough. In an interview with one of the Fitters he said, “.... involvement in any activity brings with it commitment, ownership, collaboration and most importantly learning.....”

4.1.26 Management commitment

The respondents who felt management commitment played a key role in the promotion of safety and health control programmes were 17,5%. During the investigation the researcher observed Engineers and Supervisors asking for risk assessments from subordinates who were carrying out tasks and signing them. Interviewed Artisans indicated that commitment of management to safety and health programmes motivated them do follow procedures as leaders would be leading by example.

4.1.27 Employee Attitude

A majority of the respondents 50% (table 4.5) felt that employee attitudes were the major obstacle to the success of the implementation of safety and health control programmes. This was in line with Nayager’s (2015) study which he carried out in Durban which noted that a

majority of incidents and accidents were due to gross negligence or inattentiveness to hazards. This was also supported by Kusena and Zhou(2014) who noted that some supervisors and employees failed to observe safety precautions and the prime effects of such acts were accidents. The interview with the Engineer revealed that most of their incidents and accidents were caused by poor attitudes of employees towards safety and health programmes. He said, "What is mind boggling is that our SHE system empowers employees not to carry out unsafe work but employees continue to flagrantly violate this important rule."

The researcher was not surprised by the above observation as it was in line with Jansen and Brents' (2005) assertion that employee behaviour should be the centre of attention because it is the prime factor that simultaneously combines other factors to cause an injury.

4.1.28 Lack of Resources

Generally safety and Health control programmes need to be supported by a lot of resources to be effective. Resources are required for training, personal protective equipment (ppe), labour among other resources. By calculation a total of 88,9% (table 4.4) respondents felt that the resources to support the promotion of safety and health control programmes were adequate. In an interview with the SHE Officer, the researcher was informed that the organization placed greater priority in the provision of resources to activities in line with the promotion of safety and healthy control programmes. This was not surprising to the researcher as all the employees he met were putting on complete personal protective equipment. This was in sharp contrast to the Chinese company he had visited the previous week where employees were working without safety shoes, overalls, helmets and leather gloves.

4.1.29 How Safety and Health control programmes can be improved in the Mining Sector

The questionnaire had a portion that solicited for views from the respondents about opportunities for improving safety and health control programmes in their organization. The views of the respondents are overleaf.

Table 4:5 Engagement of Workers in Safety and Health programmes

N=126

Level of Engagement	Frequency	Percentage
Strong Engagement	11	8,7
Moderate Engagement	17	13,5
Partial Engagement	70	55,6
Zero Engagement	28	22,2
Total	126	100

Source: Field Survey (2018)

The table above shows that the majority of the respondents felt that the organisation was not doing enough to engage employees when formulating safety and healthy control programmes. This is supported by 55,6% employees who indicated that their engagement was partial and 22,2% respondents who indicated that the level of engagement was nil in so far as formulation of safety and health programmes was concerned. Only 13,5% respondents felt they were moderately engaged whilst 8,7% indicated that they were engaged at some point. The interview with one of the Supervisors revealed that safety and health control programmes generally took a top down rather than a bottom up approach and naturally such an approach may remain foreign to those expected to implement it.

4.1.30 Provision of incentives to promote safety and health control programmes

The Researcher solicited for the respondent's views on the level of incentives that they got in the promotion of safety and healthy control systems. Below are the results of the survey.

Table 4:6 Levels of Incentives

N=126

Level of Provision of Incentives	Frequency	Percentage
Very good	13	10,3

Satisfactory	53	42,1
Poor	50	39,7
Very poor	10	7,9
Total	126	100

Source: Field Survey (2018)

The table shows that 10,3% of the respondents felt that the incentives were very good, while 42, 1 % were of the view that the incentives were satisfactory. In contrast 39,7% of the respondents argued that the incentives were poor while 7,9% felt that the incentives were very poor. The researcher investigated why 42,1% of the respondents felt the incentives were satisfactory and discovered that there was a strong belief that incentives could be improved. The 47,6% who felt that the incentives were poor to very poor argued that

the monthly safety bonus threshold could be improved to make it more meaningful. Another interviewed Artisan indicated that incentives for milestones achieved in the promotion of safety and health should be made clear to employees not to wait for management decisions every time they achieved some targets. He said, ” Clearly spelt out targets motivate employees to achieve better than shrouded targets.”

4.2 Discussion

Research Questions

4.2.1 How adequate are Safety and Healthy control programs in the Mining Sector?

In trying to find out the effectiveness of Safety and Healthy Control programmes in the Zimbabwean Mining sector the researcher started by solicitation for data on the adequacy of Safety and Healthy Control programmes at Mimosa Mine. The researcher was surprised to find out that the organization had a wide range of Safety and Healthy control programme in place. The researcher was surprised because his initial impression was that accidents were caused by lack of Safety and Health control programmes only.

Promotion of Safety and Health Control programmes

A total of 65,87% respondents (table 4:5) felt that the organization was indeed promoting Safety and Health initiatives. This was excluding 14,29% respondents who were neutral. The revelation by the majority of the respondents that the organization was implementing a wide

range of Safety and Health control programmes made the researcher realize that prevention of accidents in the mines was a complicated process that needed multifaceted approaches.

Employee Induction.

Employee inductions were indicated as one of the key Safety and Health Control programmes by 29,37 respondents.(figure 4:4).The inductions were done at different levels depending on whether one was a new employee, a visitor or was coming from leave. The SHE Officer indicated in an interview that inductions bring inductees to the same level of safety consciousness with others so that they don't become vulnerable to accidents. The researcher started to wonder within his mind why workers were being involved in accidents when the organization had such key fundamental Safety and Health control programme.

Safety and Healthy Training programmes

The respondents indicated that a wide range of training programmes were being rolled out by the organization. The programmes included risk assessment, lock out and tag, emergency preparedness among other Safety and Health training programmes. In an interview with one of the Artisans he indicated that the training programmes were being implemented by SHE officers whom he claimed were not qualified trainers. He further indicated that adults were complicated people who needed to be trained by professional individuals for learning to take place. He suggested that SHE Officers should have a training qualification or the role of training SHE programmes should be passed on to the training departments.

4.2.2 What are the challenges faced by the Mimosa Mine in implementing Safety and Healthy control programs?

The respondents revealed that they experienced a wide range of challenges that impinge on the effectiveness of Safety and Health control programmes implementation. They sighted complacency, supervisory issues and lack of resources in some situations as obstacles to prevention of accidents in the mines. Their major worry was production pressure as indicated by 40.48 % of the respondents. One of the interviewed Artisans indicated that the notion that the mining industry remunerates their employees generously was a fallacy. He indicated that people were not examining the amount of work they do that deserved far much more money than what they were getting. The Mine Captains agreed with the Artisans that Safety and Healthy control programmes were very difficult to implement under the levels of pressure they work. He indicated that they travel long distances underground on foot and they were

supposed to be knowledgeable about safety and health issues of their subordinates works at different parts of the underground sections. It became clear to the researcher that work pressure was a real issue in the mining sector.

4.2.3 How can Safety and Healthy control programs are improved in the mining sector?

Attitudes and engagement issues came out very clearly as obstacles to the prevention of accidents in the mining sector.

Attitudes

Employees who felt that their views were not taken into consideration in the promotion of safety and health control programmes were 21, 4%. They felt that the safety and health control programmes mostly took a top down approach in their implementation. Yet Grey (2012) argues that the key to action is participation, a shared intent, positive working relationships and inclusivity. Robson (2002) asserts that those people who participated in programme formulation generally became more aware of their current practices and gaps between their beliefs and practices. Hughes and Ferret (2011) warned that the importance of discussing the proposed safety and health system with those who will work under it and those who will have to supervise its operations cannot be emphasized enough. In an interview with one of the Fitters he said, “... involvement in any activity brings with it commitment, ownership, collaboration and most importantly learning.....”

Lack of engagement of employees.

Employees who felt that their views were not taken into consideration in the promotion of safety and health control programmes were 21, 4%. They felt that the safety and health control programmes mostly took a top down approach in their implementation. Yet Grey (2012) argues that the key to action is participation, a shared intent, positive working relationships and inclusivity. Robson (2002) asserts that those people who participated in programme formulation generally became more aware of their current practices and gaps between their beliefs and practices. Hughes and Ferret (2011) warned that the importance of discussing the proposed safety and health system with those who will work under it and those who will have to supervise its operations cannot be emphasized enough. In an interview with one of the Fitters he said, “... involvement in any activity brings with it commitment, ownership, collaboration and most importantly learning.....”

Experiences

Interesting things

The research process provided some interesting situations to that researcher that are written below.

Completion of the research project

The completion of the research project which coincided with the completion of the three year Bachelor of Adult Education Degree programme brought a lot of excitement and relief to the researcher. The excitement emanated from a deep sense of achievement and potential research and professional opportunities ahead upon successful completion of the degree programme.

Skills gained

The researcher was also happy with the human skills and knowledge that he gained during his interaction with the respondents during the investigation. The relief came from completion of the research project as it was an extremely demanding activity.

Co-operation from respondents

The researcher was also happy with the level of co-operation he got from some of the SHE Officers and the Engineers during the interviews. They believed ZERO HARM in mining operations was very possible as long as workers adhered to procedures.

Interaction with different professionals

The interaction with different respondents from different professions, department and operations was also interesting to the researcher whose background was from the educational field. He gained some insight into how the various professions worked together in order to achieve their organizational goals.

Underground visit

The researcher also managed to travel 2 kilometres underground for his interviews the Mine Captains. Going underground was a rare experience and exciting to the researcher. A lot of people will not get such type of experience in their lifetime.

Challenges

The researcher encountered various challenges during his investigation.

Time

The researcher was a father, worker, student and entrepreneur during the time of his research and faced challenges in trying to balance all the responsibilities. The wife and my only son always asked about when the programme was going to be completed as they felt the programme was denying them fatherly quality time.

Finance

The research was not sponsored as a result a lot of financial resources were required for airtime, photocopying and printing of the questionnaires from the researcher. Transport costs were also incurred during visits to the Supervisor for the guidance and assessment of the research project.

Polarized society

Some of the respondents were initially suspicious about the research. They thought it was a witch hunt to sniff out those who were not happy with the Safety and Health System in place. They only co-operated after assurance from the researcher that it was an educational research and management had approved it.

Confidentiality

Big organizations have got some level of confidentiality that they maintain that makes it very difficult for research projects to be carried out in their organizations. This researcher's request to carry out a research had to go through a number of Offices before it was finally approved.

Benefits for reading the research

Reading this research would offer some insight to the readers into several issues surrounding Safety and Health in the mining sector.

Government

The research could be used by government to formulate policies that augment the existing once to strengthen Safety and Health practices in the mining sector. In the research it was pointed out that pressure of work was one of the causes of accidents, the government could closely examine the manning levels and working hours being implemented in the mining sector

SHE Students

These readers could benefit from gaining knowledge on mining hazards and how they could be controlled. The students could also acquire information on the Safety and Health control programmes being employed in the mining industry. From the research students could identify opportunities for more research into the Safety and Health field.

Mining Sector

The research could assist the mining sector management in appreciating that success of Safety and Health control programmes depends on balancing a wide range of variables that include provision of adequate resources, incentives, management commitment, and employee engagement among other variables.

Mine Workers

The research could help Mining workers to take responsibility for their own safety through employing positive attitudes towards Safety and Health issues. They could also benefit from understanding the hazards they face as they execute their tasks and how best the hazards could be controlled.

4.3 Chapter Summary

The chapter analysed, presented and discussed data gathered through observations, interviews, and questionnaires from the respondents. The researcher made use of the gathered information from the case study to evaluate the effectiveness of safety and health control programmes in the mining sector. The researcher found out that the effectiveness of safety and health control programmes was affected by a wide range of variables that included availability of resources, employee attitudes, implementation methods of Safety and Health control programmes and management commitment. The researcher analysed the data using descriptive statistics.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

5.0 Introduction

The chapter gave the summary of the investigation. It highlighted the conclusion of the investigation and proffered recommendations. The recommendations were based on the gaps identified by the investigation into the effectiveness of safety and health control programmes in the mining sector using Mimosa Mine as a case study.

5.1 Summary

Mining operations face a multiplicity of hazards the world over that put the safety and health of mine workers at great risk despite a lot of resources being ploughed into safety and health systems in the Mining industry. Workers are injured, maimed or die due to incidents and accidents that happen in mines. The investigation wanted to find out the effectiveness of safety and health control programmes in the mining sector using Mimosa Mine as a case study. Research questions were centred on the adequacy, challenges and opportunities for improvement of the safety and health control programmes in the mining industry. The government, mining companies, mining employees and the researcher would benefit immensely from the investigation. Although the investigation faced a number of limitations that included lack of financial resources, time, polarized society, the researcher ensured that did not affect the quality of the results.

Literature was reviewed in order not to duplicate work done by other researchers on the same or similar problems and also to identify gaps to be researched on in the field of safety and health. The main challenge encountered was that most of the literature was written by foreigners. It had some ethnocentric limitations hence could not reflect the total Zimbabwean context. The concept of safety and health was explained and its roots were clearly linked to the work of Maslow (1943) and the International Labour Organization (ILO). It was emphasized that the ILO had been championing the protection of safety standards, health and human dignity on workers since 1919. Types of hazards in the mining sector were discussed and the safety and health management systems in place to manage them were explained.

The research method used in this study was qualitative while the research design was a descriptive case study. The method was chosen because the researcher wanted to study the problem in its natural setting. The population that was targeted was 1500 Mimosa workers. In

order to get representative data, a sample of 150 employees from different trades and different sections of the mine was used. Questionnaires and interviews were used as research instruments and through random and purposive sampling techniques a sample was drawn. The investigation was guided by ethical considerations that included informed consent, confidentiality, anonymity and voluntary participation.

The investigation found out that the mining sector was ploughing in a lot of resources into safety and health controls programmes. Regardless of these positive initiatives employees continued to be involved in accidents and incidents. The ineffectiveness of safety and health control systems to achieve ZERO harm was largely based on the management and employee attitudes towards safety and health. The majority of the respondents indicated that management was not doing enough in the provision of resources, incentives, appropriate loading of employees and engagement of employees in the formulation and implementing of safety and health control programmes. On the part of the employees, it was found out that they had negative attitudes towards safety and health through failure to follow laid down procedures which were in place.

5.2 Conclusions

The research noted that international, regional and local mining companies were aware of the hazardous nature of their operations. The major reason why most of them subscribed to various safety and healthy international standards i.e ISO 9001,OHSAS 18001,ISO 14001 among other Safety and Health standards. The mining sector was putting a lot of efforts to prevent accidents but they seemed to be fighting a losing battle as accidents continued to happen resulting in injuries, disability and death of mine workers. In Zimbabwean mining sector near misses close to Kamandama disaster magnitude were recorded despite the ZERO HARM thrust, a clear sign that our mining industry's safety and health control programmes were still ineffective.

Literature reviewed indicated that Safety and Health control programmes had always been on the World Health Organization (WHO) and International Labour Organization (ILO) agenda since their inception. Their focus had been protection of worker's safety, health and life. A lot of mining hazards were identified and Safety and Health management systems were put in place to try and prevent mining accidents. The Safety and Health systems continue to be improved. Literature reviewed indicated that information on Safety and Health Control programmes was available that the mining sector could use to prevent accidents. The

challenge with the literature reviewed was that it was not written by Zimbabweans and may not reflect the total context of Zimbabwean mining sector

Mimosa mine was used as a case study to investigate the effectiveness of Safety and Health Control programmes in the Zimbabwean Mining Sector. Questionnaires and interviews were used to solicit data from the respondents. During the investigation it was observed that most of the respondents had worked for a number of Mines before joining Mimosa Mine. Some of the workers had come from Shabani, Mutorashanga, Zimasco, Metallon Gold and Wanke mines. During the interviews they compared Safety and Health practices from the mines they came from and what was happening at Mimosa mine. The researcher concluded that the investigation would be representative of the safety and health control programmes in the Mining sector because of the different mining backgrounds of the respondents.

In conclusion, the researcher noted that the safety and health control programmes in the mining sector were not effective despite the amount of resources the mining sector was investing in safety and health programmes. The programmes were not effective because workers continued to be involved in mine accidents resulting in their physical and mental wellbeing being compromised. Failure by management and employees to play their respective roles in making safety and health control programmes effective was the major obstacle.

5.3 Recommendations

Based on the research findings the researcher recommends the following as pivotal in making safety and health control programmes effective.

- ✓ Management of mining companies should channel more resources towards the implementation of safety and health control programmes in order to achieve ZERO accidents. Provision of adequate resources would ensure the availability of appropriate spares for machinery, technology and personal protective equipment thereby reducing the risk of injury to employees.
- ✓ Management should show its commitment to the achievement of Zero accidents through exemplary leadership. This includes setting up realistic targets in line with manpower levels so that employees are not exposed to excessive workloads that inevitably compromise their safety.
- ✓ Management should continue to improve incentives for good safety and health performance by employees so that they enjoy the value of working safely. Emphasis

should be on positive motivation rather than negative motivation that naturally breeds resentment and resistance.

- ✓ Employees should be engaged from the formulation to the evaluation stages of safety and health programmes. Imposing safety and health programmes on them may not receive the key buy- in that necessitates successful implementation. Imposed programmes run a great risk of being regarded by employees as foreign despite their importance.
- ✓ Attitude plays a pivotal role in the success of any initiative. Behavioural change programmes should be total in the sense that the employees should acquire knowledge, skills and appropriate attitudes to prevent accidents. For this to happen, safety and health trainers should be trained in andragogy in order to be able to equip the trainees with the above mentioned skills. Having the technical skill only is not enough as behaviour change programmes are complicated.
- ✓ The Ministry of Mines should step up its supervisory role in the monitoring of the Safety and Health control programmes in mining companies. The Ministry should station a Ministry of Mines Officer at every Mine who oversees the implementation of Safety and Health Control programmes on a daily basis and reports to the Provincial Mines Inspector. The current setup where a Mines Inspector would be stationed at the provincial offices and visits mines periodically or is called when a serious accident occur does not adequately support implementation of Safety and Healthy Control programmes in the mining sector.

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3. My company provides a safe work place

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. My company provides adequate materials to enable employees to work safely.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Employees follow safety procedures all the time when carrying out tasks.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The questions below are designed to seek for information on the challenges associated with the promotion of health and safety control programs in the mining sector.

1. What are the safety and health challenges you encounter when carrying out your tasks

2. What are the challenges associated with the promotion of safety and health control programmes in the mining sector

Lack of resources	<input type="checkbox"/>
Lack of management commitment	<input type="checkbox"/>
Employee attitude towards Safety programmes	<input type="checkbox"/>
Lack of employee engagement	<input type="checkbox"/>

3. Does the organisation have adequate and competent personnel to promote safety and health practices?

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Influencing workers to change their culture and behaviour towards health and safety in the organisation is a challenge?

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The questions below are designed to test for opportunities to improve the safety and health control systems in the mining sector.

1. a) Does your employer engage employees when formulating and implementing safety and health programs.

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

b) If yes what is the level of engagement ?

Strong engaged	Moderately engaged	Partial engagement
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

c) If Not what are the reasons

Lack of commitment	Lack of incentives	Management style
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Are there incentives to motivate employees to follow and apply safety and health programmes during execution of tasks? If yes list them

.....
.....
.....
.....

If not what could be the reasons

.....
.....

3. How frequently are safety and health issues reviewed in your organization?

Daily	Weekly	Monthly	Quarterly
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Is management committed to the implementation of safety and health control programmes in the organisation? If you agree what is the level of agreement?

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 2: Interview Guide for Managers and Engineers

My name is Chida Mundiri. I am a Midlands State University Bachelor of Adult Education final year student. I am researching on the effectiveness of safety and healthy control programmes in the mining sector using company x as a case study. Your honest completion of the questionnaire will help in improving safety and health programmes in the mining sector.

1. What safety and healthy control programmes do you have?

2. How adequate is the budget for implementing safety and health control programs?
3. To what extent are employees involved in formulating and implementing safety and healthy control programmes in their work areas?
4. What are your challenges in implementing health and safety control systems?

Interview guide for supervisors

1. What is your comment on the level of resources that are provided to implement health and safety programmes in your section?
2. How do you implement and monitor health and safety control programmes in your department?
3. To what extent are your subordinates committed to the success of safety and healthy control programs?
4. What challenges do you face when implementing safety programmes in your department?

Interview guide for SHE officers

1. Are you a qualified trainer?
2. What is your role in the supervision and monitoring of safety and health control programmes?
3. How many departments do you cover and number of employees you supervise?
4. What challenges do you face in implementing safety and healthy control systems?