

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI**

**Factors Affecting Health and Safety Performance in Mining Projects: Evidence
from Newmont Golden Ridge Limited.**

By

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DECLARATION

I hereby declare that this submission is my own work towards the MSc Project Management and that, to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

Health and safety issues in project management have become very critical for the successful achievement of project objectives and the survival of business firms. Health and safety risks in projects relate to the well-being of users or developers of the project. The study was carried out to assess health and safety practices in mining projects in Ghana, with Newmont Golden Ridge Limited (NGRL) as a case. The population for the study was employees of NGRL and those of its business partners, who were, at the time of conducting the study, present and operating at NGRL's Akyem Mine Project, New Abirem, in the Eastern Region of Ghana. In the sampling process, the researcher stratified the population into two strata: employees of NGRL and employees of business partners of NGRL. A simple random sampling technique was then used to select the research participants proportionally from each stratum to constitute the study sample of 201 units from whom primary data was collected through the use of questionnaire. One of the research questions was to determine the level of performance of NGRL in terms of preventive approach to managing health and safety in its projects. The results showed that NGRL scored a „good’ or a „high’ level of performance in terms of preventive approach to managing health and safety in its project activities. The company, however, had not been able to achieve the goal of „zero harm’ for any year for the period ranging from 2012 to 2017, as first aid accidents cases and other forms of accidents occurred every year. One of the recommendations made was that the company should regularly undertake continuous improvement projects in safety programmes and other project activities to drive it towards the goal of zero harm per year in its project activities. Another recommendation made was that the NGRL train its supervisors on the best approaches for handling reported cases of safety events without subjecting the victims to ill-treatment in the process of investigation.

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DEDICATION

I dedicate this work to Lord Jesus Christ and my family

CHAPTER ONE

INTRODUCTION

The following sections are presented in this chapter: background to the study, problem statement, objectives of the research, research questions, brief literature review, and rational or justification for embarking on the study. The study's scope and limitations, as well as the description of the study organization presented in the chapter one.

1.1 Background to the Study

Today's business and project environment is highly competitive and turbulent. Consequently, organisations which are into business to make profit are relentlessly struggling with new trends including deregulation, technological changes, accelerated product development, increased need for sustainable environment, global competition, and rapid demographic changes. Apparently, there is the need for programmes and policies to be put in place by business organisations to deal with the fast-changing environment in the workplace and the various risks associated with business activities. Every business project has to deal with a number of risks. One of such risks in projects relates to health and safety. According to Pinto (2013), health and safety risks in projects relate to the well-being of users or developers of the project. Health and safety issues in the project management have become very critical for the successful achievement of projects objectives and the survival of business firms. Businesses cannot afford to turn a blind eye to the need to ensure that the projects they undertake incorporate all the necessary factors which promote health and safety at every stage, and as well as ensuring the project environment is safe and conducive. Safety professionals, regulatory bodies and other institutions such as the International Labor Organisation, have persistently held the position that health and safety measures are indispensable for achieving continuity in

industrial production (Cole, 2002). According to Smallwood (1998), traditionally, cost, time and quality have been used as the constraints within which projects have been procured and managed. Nevertheless, cost, time and quality can be compromised directly due to accidents, or indirectly by lack of safety and health. Health and safety at the workplace, therefore, remains an important consideration for all organisations, particularly those engaged in high risk operations such as the mining, logging and construction industries (Amponsah-Tawia and Dartey-Baah, 2012).

Whitner (2001) indicates that as an inter-disciplinary field, safety at the workplace is concerned with ensuring protection for workers against any form of injury or harm. Thus, safety programmes in project management are geared towards creating and maintaining a safe and healthy work environment for project delivery. Whitner (2001) explains that the maintenance of healthy and safe environment in project delivery does not only protect workers, but also customers, suppliers, the public and communities nearby, that is in the project environment.

Whitner (2001) points out that safety risks or hazards comprise aspects of the project work environment with the potential of causing instant and, sometimes, serious harms to a worker, resulting in, for instance, loss of hearing, eyesight, or body part; broken bones, burns, bruises, sprain, and even death.

The ultimate responsibility rests on the shoulders of employers to ensure a work environment that is healthy and safe. The International Labour Organization (1999) specified that it is the employers' responsibility to ensure that employees are protected from any hazards so that there is no threat to their safety. A provision in Section 118 (1) of the Labour Act of Ghana, 2003, Act 651, states that „an employer has a duty to ensure that every worker engaged or employed performs job functions under healthy

conditions that are deemed to be satisfactory and safe'. It is significant to note that in some relatively smaller organisations, the persons responsible for ensuring health and safety of employees are the chief executive officers. In large organisations, special departments or units are created for managing health and safety issues. In Ghana, it is mandatory, according to the Labour Act of 2003, for firms to assign safety officers, where the workforce is up to one thousand.

Providing safety for employees at the workplace, in the view of Osuala (2005), could be seen also as a moral duty. In spite of the legal requirement that workers who suffer in the event of safety occurrences or events must be given monetary compensation, reparations are not capable of bringing the individual back to life when one dies as a result of health and safety lapse or failure. Osuala (2005) points out that totally eliminating causes of accidents, and making counselling services available to the workforce at workplace play a key role in bringing operating costs under control, augmenting productivity levels and preservation consistency in task execution by employees.

International Labour Organisation (ILO) reported in 2011 that due to poor practices and procedures relating to health and safety at the workplace, thousands of workers across the globe go through the bitter experience of losing limbs and parts of their bodies, which often results in disability, temporarily or permanently; or dying. ILO reported in 2011, that over 160 million employees all over the world suffered poor health as a result of illnesses contracted at the workplace. The international body further added that occupation-related accidents and diseases caused the death of more than 1.2 million workers each year. Work-related injuries have far-reaching effects on workers. Even though it is the workers who bear the brunt of such injuries, their families and communities also suffer as well.

Clearly, if the management of a company fails to follow effective health and safety practices, catastrophic safety incidents can occur. It is rather an unfortunate phenomenon that a number of organisations lag behind in strictly establishing and following sound health and safety standards and procedures. It is widely acknowledged that lack of suitable training on embracing and conforming to health and safety measures also hampers an organisation's effectiveness. In an organisation, the issue of health and safety, in fact, has to be every body's concern.

Literature in the field of human resource management has recognized clearly that a business organisation's competitiveness could be achieved through innovative products and effective management of health and safety standards in the work environment. The point here is that a workplace which is safe and sound enhances the abilities of employees to work smoothly and efficiently. There have been a number of empirical studies assessing risks to health and safety in a number of manufacturing organizations, including those in the extractive industry. However, not much research has been carried out on health and safety issues in business organisations in Ghana, particularly in mining in Ghana. This research project is to assess the factors affecting health and safety performance in mining projects in Ghana, with Newmont Golden Ridge Limited (NGRL), at New Abirem in the Eastern Region, as a case. This mining firm has been chosen as the organization to be studied since it is a multi-national mining company which employs modern complex and sophisticated machinery in its project activities.

The company has health and safety management system at the workplace, which if adhered to, should improve safety and health performance at the company and consequently improve upon the company's productivity.

1.2 Problem Statement

Every business firm needs to put in place practical health and safety procedures and practices to tackle the problem of workplace accidents. This hinges on the fact that health and safety improvements are an assurance for improved and uninterrupted labour productivity. The consequences of workplace accidents or safety events consist of death or injuries to workers. As a matter of fact health and safety practices could be seen as integral elements that cannot be left out in strategic positioning of a business organisation. A lot of debate, however, have been generated recently among practitioners and academia in respect of the strategic role health and safety practices play in the affairs of business organisations (Shipton et al., 2005).

Nagy and Cenker (2002) point out that some researchers have found that a significant number of companies do not have systematic procedures and guidelines for managing health and safety. Instead, health and safety practices are carried out on ad hoc basis, a situation which certainly gives room for the occurrence of accidents at the workplace. These safety events, in turn, result in employees being maimed or killed. Different reasons have been assigned to the ad hoc approach to health and safety management found in certain business firms. Some researchers blame the ad hoc strategy to top management's lack of commitment. On the other hand, other people indicate that some firms have not fully appreciated the strategic role of health and safety at the workplace in their business affairs. Some employers may perceive investments in improvement programmes focused at ensuring health and safety in a business organisation as costly.

Nevertheless, failure to maintain health and safety for workers to prevent accidents and other safety incidents at the workplace costs much more and has far-reaching negative consequences for a firm.

Annan (2012) is of the view that incidents of death, injury and as costs of compensation for accident-related loss at the workplace experienced in many industries in Ghana are of concern to the economic growth of the country. The negative implications of substandard work environments and the resultant injuries and illnesses lower labour productivity in the country, and this in the long-run, could hamper the country's economic development. Anna (2012) further indicated that in addressing problems emanating from poor health and safety at the workplace in Ghana, it is estimated to cost as much as 7% of Ghana's gross domestic product. This disturbing situation has many implications for productivity of labour in the long run.

Mining is a critical sector in the economy of Ghana. Mining operations in Ghana, as it pertains to a number of other African countries and other parts of the world, are not without the occurrence of accidents and other health and safety failures. There are plethora of accidents, death and injuries which have bedeviled the mining sector over the years. A recent safety event in mining occurred in Newmont's Ahafo mine. On April 8, 2018, it was reported by major news portals in Ghana including City New Room (CNR) that six construction workers had been killed in an accident at

Newmont's Ahafo gold mine in Ghana, forcing the surface mine to suspend its operations (Source: <https://citinewsroom.com/2018/04/08/newmont-ahafo-accidenta-civil-engineering-failure>). This unfortunate accident at the mining company certainly made it incur cost as a result of halting operations among others. Though mining companies play an important role in the Ghanaian economy, the mining sector has not seen much research in the area of risks to health and safety in mining operations in Ghana, as well as the measures and practices followed by mining firms to address the numerous accidents and their effects on the mining companies. In this sense, there is a research gap regarding

management of risks to health and safety in mining projects in Ghana. It is against this backdrop that the researcher intends assessing health and safety practices followed by mining firms in Ghana, with NGRL, as a case.

1.3 Research Objectives.

The objectives of the research are the following:

- i. To assess the level of performance of NGRL in terms of preventive approach to managing health and safety in its projects;
- ii. To determine the health and safety elements incorporated into the safety programmes of NGRL;
- iii. To determine the factors which affect the performance of health and safety in projects undertaken by NGRL and
- iv. To describe the major causes of accidents in the project delivery activities of NGRL.

1.4 Research Questions

The following research questions are formulated for the study:

- i What is the level of performance of NGRL in terms of preventive approach to managing health and safety in its projects?
- ii What are the health and safety elements incorporated into the safety programmes of NGRL?
- iii What are the major the factors which affect the performance of health and safety in projects undertaken by NGRL?
- iv What are the main causes of accidents in the project delivery activities of NGRL?

1.5 Significance of the Study

As far as mining projects are concerned prioritizing effective management of safety is an indispensable role, especially for mining firms which seek to be competitive and seen as leaders in best practices in mining. Several studies have suggested a number of key mining projects in developed economies have seen improvements in measures for ensuring a high level of health and safety. However, much more needs to be achieved by mining firms in developing economies such as Ghana. This research seeks to deliver current information relating to the performance of mining firms in Ghana regarding preventive measures such organisations have established for attaining a high level of health and safety in the management of their projects, so as to drastically reduce or eliminate accidents and other health and safety incidents in the sector. Reported safety occurrences in organisations are certainly greeted with feeling of worry, shock or fear by large section of the public. Thus a high level of health and safety in the activities of an organisation is a wish of many people and the government as a whole. It will therefore be a useful exercise to conduct this study to find out the extent to which a mining firm is performing to ensure safety in its project undertakings. In this regard, the study will evaluate the performance of NGRL limited in terms of ensuring health and safety in the various projects it delivers in its mining activities. Copies of the study's report will be made available to the management of NGRL. Such knowledge will enable the management of NGRL to better understand the health and safety situation in the management of its projects, especially from the perspective of the employees. This would be vital in helping the company's management to address any shortfall or improve on areas they are seen performing well as far as health and safety is concerned.

It is the intention of the researcher to have the findings of this study published.

Consequently, the recommendations of the study could be considered as an input by the Government of Ghana and the Mineral Commission in developing policy guidelines for promoting and maintaining health and safety in mining projects in t Ghana's mining industry.

One objective of the study is to determine the adequacy of health and safety measures put in place by the NGRL. Hence, the study will provide an avenue for the employer to gain an understanding of workers' assessment of the adequacy of health and safety measures and practices in the organisation. The outcome of this assessment will guide management of the company in taking the right decisions to address management of risks health and safety in the organization.

In the area of safety, particularly at the Ghanaian workplace in general, there are many issues that need to be systematically studied. Therefore, the study's suggestion could serve as springboard for other future researchers to formulate their research topics and questions. Besides, the empirical knowledge that is made available by the study will add to the body of knowledge that already exists in the safety management discipline.

1.6 Scope of the Study

The research is limited to NGRL-Akyem. The company is located at New Abirem in the Birim North Districts of the Eastern Region, Ghana. The employees of NGRL will be chosen as the research participants. Only employees who are still working in the company will constitute the research participants. Employees who have been laid off, or have resigned or retired will not be part of the respondents of the study. Similarly, the personnel of NGRL's Ahafo mine project will be excluded. However, the personnel of

the business partners of NGRL, who are physically located at NGRL's site of operation in the Akyem mine, will form part of the study. The study will also be limited to the health and safety programmes and practices being followed by NGRL.

1.7 Organization of the Study

The study will be structured into five chapters. Chapter One, which serves as the introduction, will be made up of background to the study, statement of the problem, research objectives, research questions, and the significance of the study. The chapter on will also capture the scope of the study, description of the study organization, limitations of the study and ethical considerations. Chapter two will address both the theoretical and empirical review of literature for the study. The methodology will be described in the Chapter Three. This will include the research strategy, research purpose, approach, and study population. The sample and sampling techniques to be used, the data collection instrument, and procedure for collecting and analyzing the data will also be presented in the Chapter Three. Chapter Four will present analysis of results and discuss findings in view of the research questions and the objectives formulated for the study. Chapter Five, which is the final chapter, will present the summary of findings; draw conclusions based on the finding, and make recommendations. Suggestion for further research in the future will also be stated in the chapter Five.

1.8 Ethical Consideration

A number of ethical issues in relations to the study will be considered. First, the researcher will obtain permission from the management of the company before the study commences. All the research participants' consent will also be sought. The researcher will explain to the participant the voluntary nature of participating in the

research. Also, the researcher will cautiously design and examine data collection instruments, that is, the questionnaire, to certain that sure the language used will be devoid of offensive or unacceptable elements. The anonymity and privacy of the respondents will be protected. The researcher will objectively analyse and discuss the results of the study and other author's and researchers' works which are used in the study will be duly acknowledged.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The theoretical and empirical reviews are presented in this chapter, and they relate to the literature on workplace health and safety in mining projects and other sectors in Ghana and other parts of the world.

2.2 Health as a Concept

‘Health’ has been defined in many ways. However, there is a widely recognised definition of health provided by the World Health Organisation (WHO). According to WHO, health is not merely the absence of disease or infirmity, but a state of complete physical, mental and social well-being. This definition acknowledges health as a concept with multi-dimensional nature. In other words, there are several aspects to the health, which any definition of it needs to take into consideration. A person, regarded as healthy, in line with this definition, may be an individual perceived as having a total sound mind within a sound body and in a sound and supportive environment that is free from threats or danger. In criticising the WHO’s definition of health, Huber et al. (2011) were of the view that such a definition of health is barely fit for purpose. The authors argue that there are a few limitations inherent in the definition. First, one of the limitations of the definition relates to the exact meaning of ‘complete’ in connection with the individual’s well-being (Huber et al., 2011). Furthermore, the authors point out that the definition of health given by WHO inadvertently contributes to ‘medicalization’ of society. Also, Huber et al. (2011) indicate that emphasizing complete health, most of the time, would make most people not considered as healthy. However, the authors make a suggestion that the capacity for adaptation and self management should be emphasized, taking into

consideration the social, physical and emotional challenges of an individual's well-being. Obviously, the definition of health by WHO has stood firmly against the various criticisms it has attracted, and has remained functional and widely recognised for many years.

2.3 Safety as a Concept

According to the Merriam Dictionary (online), safety refers to a state in which there is relative freedom from danger, risk, or threat of injury or harm to an individual or assets by means of accident or by intentional behaviour. Nolan (2011) defines safety as a state of individual or a group of persons or a property being relatively free from damage, danger, or injury. The definitions of safety provided by the Merriam Dictionary and Nolan (2011) indicate that the meaning of safety is relative, and this suggests safety depends on the context within which it is defined. Taylor (2004) adds that safety has to do with an individual's perception of risk, and could be understood as a state of mind whereby an individual acknowledges the existence of potential injury constantly, or condition within which the limits of threat of injury or harm is considered tolerable or acceptable. Abraham Maslow, an American sociologist, considered safety as one of the basic requirements or needs of every person.

The International Labour Organisation (ILO) in 2003 came out with the position that safety in an organization, includes but not limited to merely wearing of safety clothing or helmets. ILO explained that safety is underpinned by system of beliefs or philosophy which relentlessly identifies and eliminates work hazards, and discourages work behaviours or habits which expose persons to the risks of being injured.

Despite the fact that „health’ and „safety’ are different terminologies, the two expressions are very much intertwined or interrelated, and constitute a pivotal aspect of every activity undertaken by human, especially in the world of mining project management.

2.4 Health and Safety at the Workplace

Health and safety at the workplace, otherwise known as occupational health and safety (OHS) has been defined by a joint committee of ILO WHO in 1995. According to the joint committee, health and safety embraces all activities focused on promoting and maintaining the utmost or highest level or degree of mental, physical and social wellbeing of employees in every occupation setting (Alli, 2008). Another definition of health and safety was provided by ILO in 2003. According to this definition, health and safety is termed as the outcome of adequately protecting workers from injury, disease, and sickness associated with any form of work.

Hesapro (2013) states that the European Union has comprehensively defined health and safety at the workplace, and this definition goes further than avoidance of accidents and prevention of illnesses at the workplace. It also encompasses every aspect of workers’ well-being. In order to achieve a high level of health and safety in the project management process, all persons, including employers as well as project personnel are obliged to work cooperatively and actively as part of parts of programmes for improving effective health and safety practice. Guidotti (2011) indicated that in order to achieve an enhanced health and safety performance in the work setting, health and safety needs to be seen as multi-disciplinary, which combines knowledge from several fields.

Erickson (1996), in expanding the contextual use of „health and safety’ explained that ‘safety’ denotes a concern for the occurrence of physical injuries to a person which include such incidents such as abrasions, crushing of limbs, burns, punctures and cuts.

On the other hand, the word „health’, in the author’s view, concerns physiological injuries and refers typically to sicknesses and other debilitating conditions arising from exposure to biological agents which are poisonous or harmful to health. The allinclusive view of employees’ safety in the modern day encompasses these dimensions: physiological, psychological, and psychosocial aspect of the person in relation being exposed to hazards in the work environment (Erickson 1996). Erickson proposed that the welfare of the worker should target actual integration of the total life experience of a person.

An effective safety programme, in the view of Annan (2011) should initially change the perception both of personnel in an organisation that safety is simply about elimination of injury. However, the organisational culture, structure, and processes should to be integrated into a safety programme as such organisational elements play an indispensable role in the attitudes and perceptions workers develop.

2.5 State of Safety at the workplace in Ghana

Ghana, like many other African countries, records safety events in several industries. Such events result sometimes in injuries or death of many persons. In this year, 2018, a number of fire outbreaks, for example have been recorded in a number of industrial organisations and other places such as markets and households. As far as mining projects in Ghana are concerned, the issue of health and safety is very critical as mining project activities are not insulated completely against the unfortunate incidents of safety events.

Currently, the rate of safety events' injury in the workplace in Ghana is estimated at 12.6 per 1000 in the urbanized areas and 43.8 per 1000 in the rural setting (Ametepe, 2011). Ranked as the sixth important morbidity case in Ghanaians, this injury accounts for 2.3 per cent of the total cases of morbidity in the country (Ghana Health Service, 2010). The Ghana Health Service further indicates that among the working group, the predominant causes of deaths are accident. For people with ages from fifteen to forty-four years, workplace accidents or domestic accidents occur less frequently for females than for males. Workplace injuries contribute to a much higher death rate; long-term, impairment and disability, and more expensive treatment (Ametepe, 2011). The cost of occupational injury to the State is estimated to be 7% of the total GDP (Ghana News Agency (2012) reported that occupational injury costs incurred by the State is valued at 7% of the gross domestic product.

Ghana Labour Act does not specify the agency or body with the responsibility to anticipate, monitor, evaluate, control and prevent hazards workers in the country are exposed to at the workplace. Furthermore, there is absence of policy guidelines for ensuring the safety and health of workers (Ghana Health Service, 2005). The mining sector in Ghana has been given some attention with the enactment of the Minerals and Mining (Health, Safety and Technical) Regulations, in 2012. This mining framework came as a replacement for the 1970 Mining Regulations, L.I. 665, which many safety practitioners and specialists regarded as having numerous weaknesses.

Other legal frameworks bodies which indirectly outline some guidelines for maintaining health and safety in the country at the workplace are the Workers Compensations Law 1987 (PNDC 187), the Factories, Offices and Shops Act, 1970 (Act 328), the Radiation

Protection Board, the National Road Safety Commission and the Environmental Protection Agency.

2.6 Health and Safety Legal Framework for Mining Projects in Ghana

The Minerals and Mining Regulations, 2012 (L.I.2182) is the present framework enacted by the Government of Ghana to address various health and safety issues in mining projects and operations in Ghana. The current mining regulations put a lot of responsibility on mine managers to ensure safety in their mine projects. It is provided in Section 40 of the Minerals and Mining Regulations, 2012 that „where these Regulations require the performance of a function, or impose a duty in relation to work in a mine and does not specify the person to perform that function or discharge that duty, the manager is responsible for the performance of that function or discharge of that duty’. Mine managers are required by the Regulations to ensure that the regulations are complied with. The Regulations expect mine project managers or mine inspectors to give any lawful orders in the interest of safety, health and environmental protection at the mine. It is stated as requirement of mine managers to make provision for the safety and health; take proper disciplinary actions against mine project personnel in respect of health, safety and protection of the mine environment.

The issue of well-trained human resource has been found to have a lot positive effect on health and safety performance (Alli, 2008). In recognition of this, the mining regulations stress the need for mine managers to engage persons with the requisite competence to undertake specific mine tasks or functions; provide training for the persons employed at a mine to ensure health and safety.

2.7 Health and Safety at the workplace: Rights and Responsibilities

According to Alli (2008), the principles of health and safety at the workplace provide that employers, workers, government and other relevant stakeholders have important, but mutually complementary roles to make sure the safety and health of workers achieved in addition to promoting these to the highest level. It is increasingly being recognised that life and health protection at workplace is a fundamental right of the worker. Article 23 of the Universal Declaration of Human Rights by the United Nations in 1948 provides that ‘Everyone has the right to work; to free choice of employment; to just and favourable conditions of work’. The United Nations International Covenant on Economic, Social and Cultural Rights, 1976, reaffirms this rights by indicating that the signatories to the covenant are respect the right of everyone to enjoy, among other things, just and favourable, safe and healthy conditions of work (Alli, 2008).

Further, Alli (2008) stressed that it is the additional obligation of employers to have comprehensive knowledge of workplace hazards to which they need to demonstrate much commitment to establishing and managing various processes in support of promotion of safety and health at work through training to equip employees with the required knowledge and skills on preventing accidents at the workplace. In a similar vein, employers are have the responsibility of creating opportunities for employees’ self-development and fulfilment as an essential part of work. In 1991 ILO developed regulations on safety and health in opencast mines, which require miners to take reasonable care for their health and safety and that of other people who may be affected by the miners’ actions or inactions (Alli, 2008).

2.8 Elements Workplace Health and Safety Programmes

Gillespie and Lusaki (2008) states that in many countries, there exists a form of health and safety programme required under occupational health and safety legal frameworks. However, since there are different organisations, different safety programmes are also developed for meeting their individual organisational needs. The authors proposed that a health and safety programme need to encompass certain basic elements, as shown in Table 2.1 in the next section.

Table 2.1: Basic Elements of Health and Safety Programme

1	Health and safety rules
2	Joint Workplace Health and Safety Committee
3	Individual responsibility
4	Employee orientation and Training
5	Reporting and investigating accidents
6	Workplace inspections
7	Correctly defined work and Emergency procedures
8	Health and safety promotion
9	Planned Task Observation
10	Workplace Audit
11	Medical and first aid

Source: Gillespie and Lusaki (2008)

2.8.1 Health and Safety Rules

In order to make explicit information to be accessible to all supervisors or managers and other employees, a company or an enterprise needs have a detailed documentation on all rules and regulations for attaining the optimum level of workplace safety and health, and make documents all persons who matter. Safety rules and regulations need to be based on national laws on health and safety, international conventions of health and safety, internationally recognised standards such as ISO 18001, Occupational Safety and Health

Administration (OSHA) rules and industry-specific standards such as Ghana's Mining and Mineral Regulations 2012, L.I. 2128. For controlling operations, ISO 18001:2007 requires that a company puts in place plans, procedures, and instructions, such as checklists as appropriate, for key activities which have tremendous safety implications for employees.

2.8.2 Joint Workplace Health and Safety Committee

Alli (2008) reported that a study conducted by Reilly, Paci and Holl (1995) found that companies having joint consultative committees, with employee representatives appointed by unions, had much lower rate of occurrence of workplace injuries than those where the top management unilaterally made decisions on safety and health programmes or arrangements. The best practice currently is for a company to establish joint safety and health committees which includes of worker representatives. Such joint committees promote active participation of workers in safety and health activities relating projects and operations of an enterprise. In addition, the joint occupational health and safety committees are a valuable avenue all interests in work setting to discuss safety issues, plan and take concerted actions to improve safety situation in a company.

2.8.3 Individual responsibility

A safety programme should lay emphasis on the need for everyone in a company to seriously prioritise the need to achieve optimum level of safety and health. Reese (2008) suggests that any person who downplays observance of safety and health regulations and procedures should be made to face the consequences. In this way, project managers, supervisors, as well as employees, are required to be part of solutions for safety and health challenges rather than being the cause of preventable safety events, and accidents

at the project site. Alli (2008) makes the point that management and their subordinates need to collaborate in providing support for finding the best solutions to safety and health issues, while at the same time, appreciating the efforts of persons excelling in safety and health responsibilities. Alli (2008) recommends that health and safety policy of a company should clearly detail the duty workers and charge them to work together in executing guidelines for safety and health at the workplace.

2.8.4 Employee orientation and Training

Roland (2013) reports that as regards the issue of safety in seasoned or experienced workers are at risk on a daily basis, and it is particularly necessary for new employees to be given much more attention for health and safety. Roland (2013) found that new hire construction workers experience work-related injuries more workers who workers with long service in the company. In this sense, any new employee coming into an organization for the first time will require a comprehensive orientation and training in health and safety. Reese (2008) found that proper training of every person involved delivering a task in an organisation, facilitates successful integration of improvements into health and safety performance at the workplace. Thus, orientation and continual training of personnel in a company in safety and health need not only be part of job training but must be integrated with the daily work routines at the project site, with continuous improvement as a focus.

2.8.5 Reporting and Investigating Accidents

Armstrong (2009) reported that many work-related accidents remain unreported by managers, supervisors or workers. As a result, a significant number of accidents at work are not subjected to investigation. In this way, causes of such unreported cases of

accidents or safety events are unknown, and the concern is that such accidents are subject to recurrence. It is an imperative for an company to establish the appropriate structures and procedures for prompt and easy reporting and investigation of all forms of accidents, whether they are fatal or not fatal. at the workplace, whether they are fatal or non-fatal. Junnel (2014) reported that workers have the tendency to hide or not report minor cases. Steemson (2006) indicated that one of the responsibilities of regulatory authority is to ensure the establishment and application of procedures are established and followed for the notification of occurrence of accidents, injuries and diseases at the workplace.

2.8.6 Workplace Inspection

Roland (2013) found that enforcing legal provisions for health and safety at the work environment helps prevent serious safety events from occurring. A good health and safety programme should involve regular inspection to be carried out to ensure that employees consistently comply with safety rules and regulations, and ensure sound work environment. Steemson (2006) states that work place inspection is required to be conducted regularly by inspectors, safety managers or supervisors, both external and internal.

2.8.7 Correctly defined work and Emergency procedures

Well defined work procedures, according to Alli (2008) are important elements of a well-designed safety programme. The author explains that adequate knowledge about how each task is performed is necessary for employees to avoid using or inappropriate means of performing tasks, a situation which could lead to the likely occurrence of safety events. Health and Safety Executive (2013) stated that emergency procedures inform every worker about „what to do’ and „how to do it’ in the event of an emergency situation.

Explicit emergency situation procedures ensure that everyone is able to handle or clear from danger that is happening or just about to happen without any difficulty or complication. For example, in case of fire outbreak at the workplace, all persons present should have prior knowledge about the steps to follow and what they are need to do in that instance. Therefore, a comprehensive assessment of situations have which can be considered as emergency need to be carried out so that emergency plans could be created.

2.8.8 Health Promotion

Alli (2008) expressed the view that in order for an organisation to achieve a workforce that is healthy, contented and motivated, it is not enough to prevent workplace accidents, however, promoting the health workforce should also be taken into account. Health promotion in the workplace may be regarded as part of corporate strategy with its concentration on prevention of ill-health at work (accidents, injuries, work-related diseases, stress, and job or occupation-linked diseases) and workers' well-being. Traditionally, occupational health and safety initiatives have focused on biological chemical, and physical exposures or hazards, disorders, diseases, and injuries related work, with psychosocial risks at work are still mostly neglected and their causes and consequences still inadequately understood specifically as it is the case in the context of many developing countries (WHO, 2007). The current trend is that health promotion should be seen as an important part of safety programmes. Health promotion deals with lifestyles of workers, such as diet, exercise, drinking and smoking habits, so that workers can live a socially and economically productive. Steemson (2006) recommends health education that is designed to promote good lifestyles and discourage those which are harmful to health need to be made part of workplace occupational health and safety programme.

2.8.9 Planned Task Observation (PTO)

Planned Task observation is systematic observation of the various task are performed. Guidotti (2011) states that planned task observation is an indispensable element of a comprehensive programme of health and safety in a company, and is to determine what is working well or not working well as well as what changes are needed to be made to be able to achieve goals that have been set.

2.8.10 Audit of the Workplace

Alli (2008) is of the view that it is important for an organisation to identify and assess the factors which contribute to hazards in the work environment and set priorities regarding what hazard has to be address first. The work place audit also entails determining the reasons why hazards exist at the workplace and the suitable intervention techniques and preventive mechanisms collectively needed to decrease or eliminate the hazards existing at the workplace. Alli (2008) explains that consequences of hazards at the workplace could remain latent for several years. In this sense, it is necessary for a project organisation to identify health risks early before they lead to incurable illnesses. The author further highlighted methods that could be used in the identification of work hazards and the health problems which accompany them categorised as biological monitoring, environmental assessment, epidemiological approaches and medical surveillance.

2.8.11 Medical and First Aid

First aid has become a common requirement in many settings. Medical aid and first aid are needed as part of an occupational health and safety programme. Reese (2008) reported that certain organisation which have recognized medical aid as apriority make

sure that medical facilities and services provided near them in order for them to meet the medical needs of the organisation. In the context health and safety at the workplace, first aid refers to the immediate measures followed at the site of an accident by individuals who may not be physicians or medical professionals but who have gone through some training in first aid. First aid enables victims of safety events to have access to the needed equipment and supplies until professional medical care arrives to be in charge of the safety event situation.

2.8.12 Mining and Health and Safety

Mining projects and their associated activities constitute a play a pivotal role in the global economy (Amposah-Tawia and Dartey-Baah, 2012). In Ghana, estimated that the sector's contribution to the nation's exports is exceeds 40% of the total. The mining also contributes significantly to the gross domestic product of the economy (Awudi, 2002). Though mining projects play a critical role in the economies of Ghana as well as many other countries, the sector is widely known to be highly prone to accidents and other safety pitfalls. Therefore, the issue of safety in mining projects, therefore, has become a global concern over the years for governments and other relevant bodies. Donoghue (2004) makes an assertion that the mining is among the top business activities which are prone to accident and health hazards. Donoghue (2004) further pointed out that conditions that expose mine workers to health hazards are in different form, for example, injuries. The author emphasized that abuse of alcohol and drug by mine workers has been a grave issue in mining. However, in the view of the author, many major mining projects have developed and implemented strategies in their operations for checking abuse of alcohol and drug by mine employees.

Health and safety challenges in mining affect both workers of mining projects as well as the surrounding communities. Awudi (2002) reported about the poor health status residents of villages and towns around mining projects in Ghana. For instance, the Awudi (2002) reported that upper respiratory tract infection, an infectious disease, was common in Obuase, a major mining area in Ghana.

2.9 The Business Case for Ensuring Health and Safety at the Workplace in General

It is the position of WHO (2010) that it is necessary to maintain a healthy, safe workplace because such a condition makes a significant contribution to the success of a business enterprise. One of the arguments in favour of a sound and safe workplace considers the hard facts of economics and money. A larger proportion of enterprises in the private sector operate to make profit. Besides, non-profit oriented organisations also look forward to successfully achieving their organisational objectives. It is imperative for all of these kinds of establishments to ensure safe and healthy workplace for their workers to enable them to realize their goals. The enormous economic costs that come safety events at the workplace, retard growth, and affect a firm's profitability and strategic positioning (Burton, 2010). Presented in Figure 2.1 is a summary of the arguments for the business case for having safe and healthy workplace.

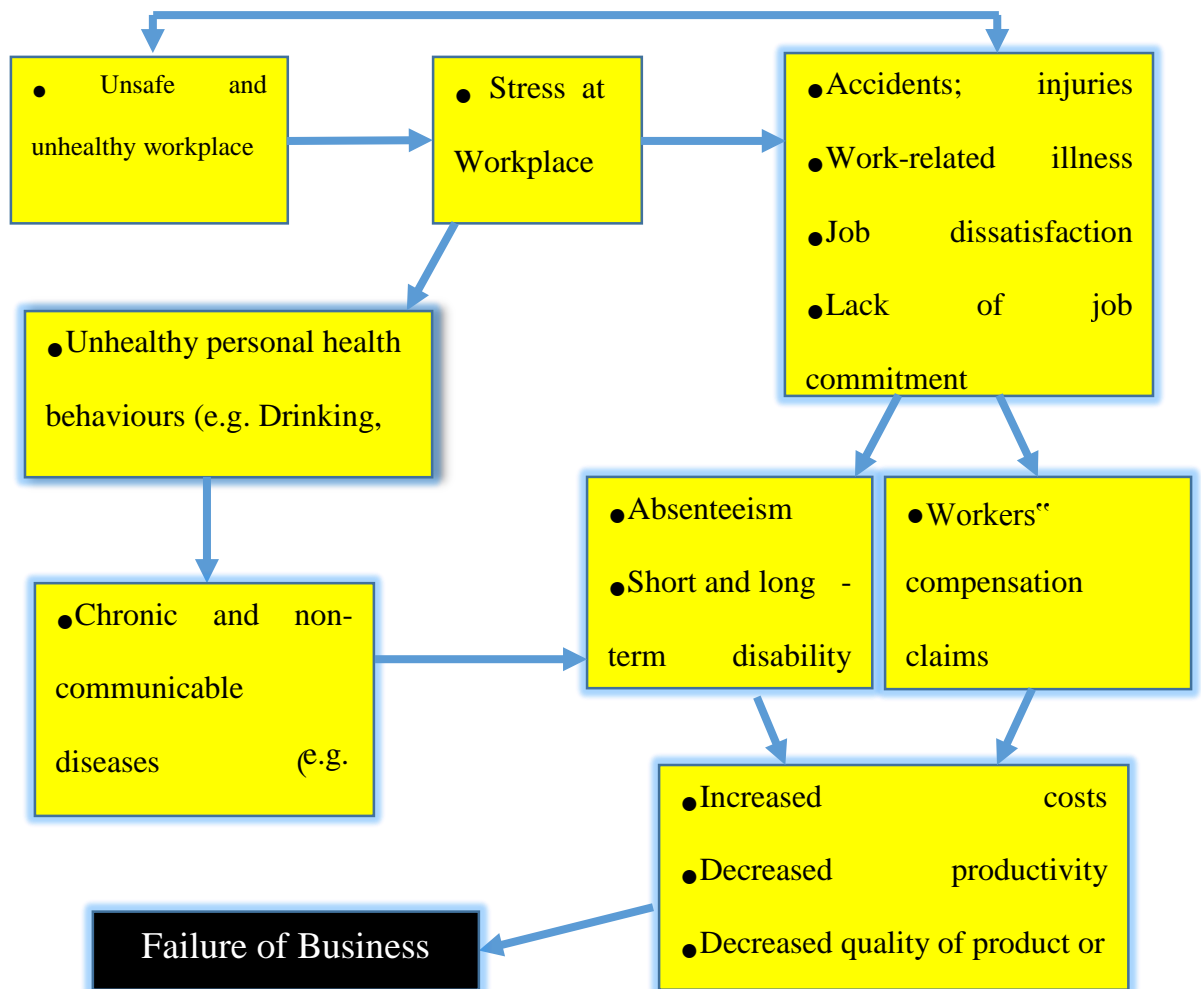


Figure 2.1: Making a Case for Incorporating Health and Safety in Business Processes

(Source: Burton, 2010)

British Safety Council (2014) gave a report that the cost of injury and poor health documented in the Great Britain was 13.8 billion pounds in a year. The British Safety Council (2014) described this cost as waste of human and financial resources.

Many countries have legal frameworks which, to some extent, bind employers to ensure protection of their employees from hazards at the workplace. Consequently, obeying the law means employers or directors of business entity are avoiding negative sanctions such as fines or imprisonment, which go with non-compliance (WHO, 2010). In Ghana, for

instance, Part XV, Section 118(1) of the Labour Act 2003, Act 651, charges employers to respect worker's rights to work under safe, healthy and satisfactory conditions. Among other requirements, an employer, in subsection 118(2d) of the Act, is expected to take steps to prevent contamination of the workplaces by, and protect the workers from, noxious substances, toxic gases, vapours, fumes, dust, mists and other materials or substances likely to cause risk to health or safety. An employer who, without reasonable excuse, fails to discharge any of this and other obligations commits an offence and is liable on summary conviction to a fine not exceeding 1000 penalty units or to imprisonment for a term not exceeding 1000 penalty units or to imprisonment for a term not exceeding 3 years or to both.

Another reason for ensuring health and safe environment at the workplace to protect a business from interruption in its operations. In cases where management of a business entity downplays the need to maintain healthy and safe condition at the workplace, business could be interrupted, and from a shareholder point of view, this is unsatisfactory. Workplace Safety and Insurance Board (2010) indicated that organizations which demonstrate sense of responsibility are up to the task of assessing their activities to have thorough knowledge of the hazards in their work and, implement safety measures for eliminating or controlling identified hazards. Workplace Safety and Insurance Board (2010) point out that such firms recognize that failure to make eliminate of control hazards and their accompanying safety events, could attract regulatory authorities to intervene with orders to stop work fines.

2.10 Hazards in Mining Projects

Donoghue (2004) defines „hazard’ as the potential of any machine, equipment, process, chemical and biological material, or physical element to cause impairment or harm people, or damage to the environment or property. Donoghue (2004) also was of the view that mining is considered as a very old economic activity, and is recognized to be laborious activity which is predisposed to a number of diseases and injury. Exploration, development, operation, decommissioning of a mine and rehabilitation of land constitutes the life cycle of a mining project (Donoghue, 2004). Donoghue (2004) indicated there are numerous hazards identified with mining project, which the author classified as chemical, physical, ergonomic, and biological hazards.

2.10.1 Chemical Hazards

European Association of Safety and Health at Work (2005) observed that using data available in the European Union (EU), a substantial section of Europe’s workforce handle lethal substances at work, or expose themselves to inhaling dust, fumes, vapour, or the toxic substances.

Mining makes use of a variety of chemicals, and the kind of chemical applied, is determined by the type of mineral. Chemical hazards related to mining comprise crystalline silica, which has long been considered a high-level hazard (Doneghue, 2008). The author observed that in developing countries, tuberculosis and silicosis have a link with exposure to silicon. Cowie and Mabena (1991) confirmed that if a person exposed to crystalline silica for a long time, such a person can suffer from chronic obstructive pulmonary disease. In addition, *particulate* matter discharge from diesel used by mobile equipment for haulage and drilling constitutes a common source of health hazards the mines, which can be put one at risk of cancer of the lungs. Cyanide and mercury are also

common chemicals used mining, for example gold. In dissolving metals for example gold and copper in hydrometallurgical processes, cyanide use plays an important part (Boffetta, et al., 2001). Toxicity come about from breath in mercury vapour (Donoghue, 1998). Reese (2008) concluded that chemical hazards come from too much air-borne concentration of gases, vapours, mists, solids particles from dusts or fumes. These materials can be hazards in inhalation or create skin irritation or be toxic when absorbed through the skin.

2.10.2 Physical Hazards

Explosions, rock fall, moving equipment, fire outbreaks, falling objects, electrocution, and entrapment are some of the physical hazards in mining. These physical hazards have the potential to cause accidents and, the resulting injuries range from trivial to fatal (National Institute of Occupational Health and Safety, 2012). Besides these, noise emanating from cutting drilling, blasting, material handling, ore processing or crushing, and other activities a mine present risks to the health of affected persons. The noise pollution from these processes is found be a significant contributory factor to hearing impairment or loss.

2.10.3 Psychosocial Hazards

Psychosocial hazards are consequents of severe and fatal traumatic injuries happening in mining, which usually affect significantly the morale of the worker (Narini, 2009).

Sometimes managers and employees develop post-traumatic stress disorders. Reese (2008) asserted that some managers may hold themselves personally responsible for injuries to workers, even in situations negligence is found not to be the cause.

2.10.4 Ergonomic Hazards

Ergonomic hazards in mining include cumulative trauma disorders, which usually lead to disability, are some of the ergonomic hazards. Work done underground most of the times entails overhead work in the course of making provision for ground support and suspending pipes and cables, and this can result in shoulder disorders in workers.

Where shift work system is followed, sleep deficits and fatigue, are risks to worker's health. Reese (2008) pointed out that tools or work areas with poor design are also forms of ergonomic hazards also include. Furthermore, improper lifting or reaching; motions repeated in awkward positions as well as poor visual conditions can result in accidents or illness, such as repetitive stress disease and visual impairment (Reese, 2008).

2.10.5 Biological Hazards

Mining locations in developing countries, according to Hale and Hale (2005), are rife with biological diseases. For example, incidence of malaria fever and *dengue*, both tropical diseases are found to be common in some remote mining areas. Haddel and Ojikutu (2005), in a study, found ankylostomiasis and leptospirosis are commonly encountered in mines. However, rats' eradication in such places and improvement in sanitation, in the view of the authors, have greatly aided in controlling such hazards very well in the developed countries. Several other diseases are associated with mining work and the most regularly recorded mining diseases are respiratory diseases for example pneumoconiosis, asbestosis, silicosis, emphysema, and bronchitis, and musculoskeletal disorders.

A critical problem of disease and illness in mining projects is reporting. There is a disproportional relationship found between cases of reported and unreported illness and diseases. The reported cases of mining induced diseases and illnesses can be likened to the tip of iceberg (Scott and Grayson, 2001). Scott and Grayson (2001) stressed that both reporting and effective medical attention to treatment of the disease illness connected to mining, have some deficiencies, and need to be addressed very well.

2.11 Factors Underlying Workplace Accidents: General Overview

Accident are uncontrolled or unplanned events in which the action or reaction of a substance an object, a person or radiation ends in injury to a personal or the probability thereof (Heinrich et al., 1980). Several variables have been recognized as accounting for occurrence of occupation-related, and these have been classified as personal and environmental factors, or as internal and external factors (Gyekye, 2010).

2.11.1 Internal Causal Factors of Workplace Accidents

Personal or internal causal factors of workplace accidents are attributed to the personal characteristics of the worker, which results in accidents. James and Arroba (2009) stated that fatigue and stress are known to be responsible for the occurrence of a number of workplace accidents workers experience. Stress and fatigue conditions could stem from working for long periods, pressure from supervisors and heavy workloads.

The focus on personal causal factors suggests that the general atmosphere and safety culture of organizations play an essential part in decreasing of stress and fatigue effects. Dobson et al. (1999) reported a positive correlation between workplace accidents and job stress. In addition, Norris (2000) stated that one key predictor of future accidents for workers is job stress.

2.11.1.1 Unsafe Acts

Unsafe acts refer to human actions which depart from hazard control procedure for performing job tasks for which the worker is well-informed or has received training, and which leads to unnecessary exposures to hazards. Unsafe acts take place when a worker deliberately disregards, or is not aware of, safe work practice or a standard operating procedure intended for worker protection and accidents prevention (Shannon, Mayr and Haines, 2005). Zakari, Mansor and Abdullah (2012), in providing background to industrial accidents, reported that a research carried out in the 1920s, made a classification of about 75,000 industrial accidents. The conclusion drawn from that study, according to the authors, was that in those years, more than eighty-eight per cent of industrial accident stemmed from unsafe acts of workers, with only 10 per cent of the accidents attributed to unsafe environments. Only 2% of the accidents were simply force majeure, unavoidable event or were acts of God.

Combine strenuous working positions and heavy physical work may combine to create early fatigue and exhaustion (Clerc, 2005). In turn, this can reduce worker vigilance and intensifications reaction time, very critical factors when work processes are tied to the rhythm and pace of machines. DuPont (1991) claimed that unsafe acts were responsible for nearly all injuries. The posture of these authors regarding unsafe acts point to the need for managers of mining projects to pay a more than enough attention to mine workers and their actions in performing tasks at the mines to ensure they are work in a safe way.

2.11.2 External Causes of Workplace Accidents

Other factors responsible for accidents at the workplace are described as external. Payne (2011) indicate that claims for accidents relating to defective or dangerous machinery, equipment, or tools are very prevalent in Britain. Mechanical handling is very

common in multinational mining projects, and manual-handling is diminishing. This trend nevertheless, presents other hazards (Payne, 2011), and indicated that injuries related to equipment may not be so prevalent in mining, yet their severity is very high when they do occur. Ellis (2003) points out that fall from vehicle, a knock down by a moving vehicle, a crush from falling object from a vehicle, vehicles overturning, were common kinds of accidents. Use of faulty equipment is one of the common causes of accidents in many occupational settings including mining (Clerc, 2005).

2.11.2.1 Design of Workplace

A lot of material features of workplace, if not suitably adapted to physical and mental capacities of workers, could turn into safety risks. Favergo (2009) stated that organisational factors have significant effect on frequency with which accidents occur at a workplace. Disjointed and repetitive tasks, piecemeal work and short cycle times could combine with protracted and irregular working hours; and inadequate relaxation to create conditions that make workers prone to accidents. The author reveals that what is termed as „danger money’ is endemic in certain companies, where employees strive to increase their wages by sacrificing their safety for carrying out unsafe tasks, and where extra compensation for performing such risky tasks is deemed very high in relation to their wages or salaries, such workers disregard safety warnings in the name of monetary gain.

Miller (2009) suggested that the lighting levels in mining sites that are very essential for mobile equipment drivers to see properly and be able to identify obstructions, pedestrians or hazards as rapidly as possible. In mining and construction projects, Booth (2001) made a suggestion that noise levels at the workplace should be regulated to create a conducive workplace, including providing signals for traffic control in workstations to ease flow of

transportation activities. Using signs and high visibility lines to show edges of ramps, for instance, is considered helpful giving advance warning to operator of mobile equipment.

2.11.2.2 Procedures for Health and Safety Training

The quality of training of personnel in health and safety is a determinant of the rate at which accidents occur in a company. The Minerals and Mining (Health, Safety and Technical) Regulations of Ghana charges the manager of a mine to appoint persons competent to have the responsible of examining, inspecting the mines for issues bothering on health and safety of people in the mines. Steemson (2006) emphasized the point that existing evidence indicates that accidents resulting from transportation activities in companies are associated with poor training. Steemson (2006) findings from a few case studies showed that adequate training was absent, there was increase in the employee injuries recorded in accidents involving lift trucks. Regular training on safety for employee, was found to produce yielded steady result of maintaining worker safety (Shannon et al., 1997).

Most of the analysis of causes of accidents, in the view of Favergo (2009), has ‘human factors’ as the focus. The author contends that even though causative factors of accidents stem from to the personal variables, for instance, carelessness, lack of experience, youthful attitudes and behaviour, are some explanations for the occurrence of accidents which blame ‘personal factors’ appear to be overstated. In a similar vein, Masson (2009) share the view that accidents frequently occur due to a combination of causes, and often comprise a multifaceted connection between human and machines.

ILO supports the position that accidents are chiefly the product of hazardous layout, poorly-designed work tasks, or the use of ‘don’t fix it when it is not broken’ approach to maintenance rather than workers disposed to accidents (Steemson, 2006; Mobley, 2004).

Steemson (2000) Favergo (2009) are in support the position that workplace accidents may stem from human or external factors, or a combination of these.

Table 2.2: Factors affecting Workers’ Physical and Mental Well-being

Posture, movement, or heavy loads
Noise or Vibration
Violence
Harassment
Physical Health
Mental Well-being
Risk of accidents
Chemicals, fumes, dusts, gases or smoke
Work-overload

Source: European Statistics (2009)

European Statistics (2009), in support of this view, has developed a list of factors which could have harmful effects on mental and physical well-being of workers developed by identify some factors which are capable of having adverse effect on physical and mental well-being of employees as shown in Table 2.2.

2.12 Conceptual Framework

The conceptual framework developed for this study is focused on showing the association between Health and Safety performance on one hand, and ‘Management Commitment to Health and Safety programme’, ‘Health and Safety Regulations Enforcement’, ‘Commitment and participation of Employees in Health and Safety’, ‘Education and Training of Employees in Health and Safety’, ‘Workplace Design’ and ‘Enforcement of Health and Safety Regulations’ on the other.

Independent Variables

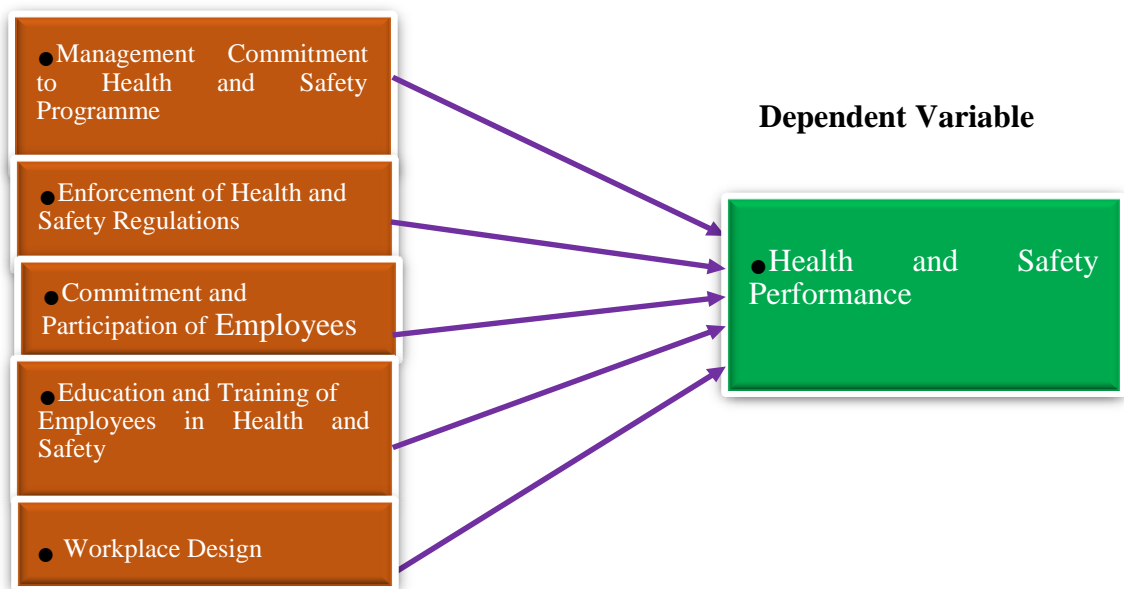


Figure 2.2: Conceptual Framework

(Source: Adapted from EAHSW, 2012)

European Agency of Health and Safety at Work (EAHSW) developed a conceptual model that showed the link between Health and Safety performance and a number of organisational variables.

The conceptual framework developed by the EAHSW (2000) presented ‘management activities’, ‘investment’, and ‘training’ as having effect on ‘measures of safety and

health', which are expressed as 'company performance' and 'safety and health performance' For the conceptual framework developed for this study, the researcher combined 'management activities and 'investment under 'Management commitment' while 'training' is redefined as 'Education and Training of Employees in Health and Safety'. 'Design of the workplace'. The researcher introduced 'Commitment of Employees to Health and Safety' and 'Enforcement of Health and Safety Regulations. The introduction of these variable were grounded on the knowledge derived from the literature review on works on health and safety at the workplace.

2.12.1 Commitment of Management to Health and Safety

Management or Leadership, in n every company has a critical role to play in realising the objectives of a company, including those set for health and safety. Leadership does not only do provide the direction for a company, but also serve as the pivot around which all company activities revolve. EAHSW (2000) postulates that Management can lead the way to prevention or elimination of health and safety risks at the workplace through their acceptance of health and safety as a company's core value, which is communicated to all workers in the organisation. Good safety performance is known to have a strong relationship with the management style and that management's use of excessive pressure on workmen to meet targets while sacrificing their safety resulted in increased injuries. Smith (2003) argues that management commitment should be considered as a major factor which determines the extent to an organisation comply with OSH regulations in the construction industry.

EAHSW (2000) recommends that management should demonstrate integrity in leading by example with their relentless compliance with all health and safety regulations. Nyarko and Asumeng (2015) came out with a finding that value Management place on

safety independently did not predict workers' safety behaviours in relation to participation or compliance with health and safety regulations. Nyarko and Asumeng (2015) clarified that leadership or management merely make new policies, with minimal direct enforcement of such policies where work really gets done, that is, at the lower level. According to Nyarko and Asumeng (2015) management's formal safety declaration of procedures and rules for is not enough to guarantee workers' safety related behaviours and attitudes.

2.12.2 Health and Safety Regulations Enforcement

Alli (2008) stated that apart from having the suitable rules and regulations established at for workplace, acceptable ways of enforcement are necessary to guarantee safety and good health workers'. The author stressed that real-world application of labour laws a lot of countries has been without problems. Therefore, it advised by the author that governments should consider in important to take the appropriate steps towards establishing effective inspection systems to for ensuring compliance with health and safety regulations by organisations, including those in mining and other extractive industries. Apart from external inspection by national regulatory authorities, a company needs to institute internal procedures and structures for enforcing health and safety rules at the workplace for prevention of accidents and poor condition of health of workers.

2.12.3 Participation of Workers/Employees

An essential element that supports prevention workplace-related accidents is Cooperation between workers or their representatives and management of a company. Alli (2008) points out that workers' participation in decisions-making and programmes pertaining to workplace safety and health is fundamental in respect of workers right and

duty. In this sense, the total involvement of workers in any health and safety programmes designed for the workplace would guarantee that such programmes produce the desired results including sustainable and acceptable level of safety and health at a reasonable cost.

2.12.4 Education and Training in Health and Safety

Continuous integration of improvements into work process is indispensable. This is can be attained if all persons in an organization are part of the process of education or training. Hence, education and training plays a critical role in efforts to maintain safe and healthy work environment (Alli 2008). A study by Roland (2013) revealed that construction managers indicated that workers are unwilling to wear safety protective clothing, a challenge which is attributed to personal attitudes of workers towards safety protective clothing and equipment. In the study management of the organizations studied were found not to have attached enough importance to the training of workers on the need to use protective safety clothing and equipment. To promote acquisition relevant knowledge and technical skills in workplace safety and health, directors/managers, supervisors and all workers require appropriate training in safety and health in their business operations.

2.13 Hypotheses

This section presents the hypotheses formulated for this research:

1. Employees' Commitment and Participation in Health and Safety Activities;
2. Education and Training in Health and Safety has a positive relationship with health and safety performance;

3. Enforcement of Health and Safety Rules has a positive relationship with health and safety performance;
4. Management Commitment to Health and Safety Programme has a positive relationship with health and safety performance;
5. Design of the Workplace has a positive relationship with health and safety performance.

2.14 Challenges of Organizational Implementation of Health and Safety Programmes

It is a necessary business practice for organisations, regardless of motives or size, it is crucial for and best practice for an organisation to have a system or programme in place for managing health and safety. However, some common challenges have been identified with implementation of actual implementation of a safety and health programme by an organisation. Smith (2003) indicated that high costs of implementing a comprehensive safety and health programme have been found to be a major problem many organisations face. Mbuya and Lema (2004) point out that in most developing nations, health and safety consideration in the delivery of construction projects is not given priority, and safety measures deployment during construction is considered a burden. Safety and health is a subject of discussion in project site management meetings as a priority, however, in reality safety and health has a low priority to time and budget discussions (Mbuya and Lema, 2004). The implication of this challenge is that a company that views health and safety programme as costly would be reluctant to commit enough financial and other resources in an effective health and safety programme for their organisation.

Guitodo (2011) recommended that the choice to make allocation of resources for health and safety programme development should be evaluated vis-à-vis the system's capability for eliminating or minimising human cost of fatalities and injuries, and the financial costs of safety events of various kinds, especially those that are very severe or fatal.

Absence of clear health and safety regulations could sometimes hamper effective implementation of safety programme (Smith, 2003). However, Guitodo (2013) indicated that in view of globalisation, there are many safety and health regulations for a large number of industries, which could be adopted by companies or firms in countries or locations where such regulations are not well-structured.

Alli (2008) argues that cultural beliefs and values pertaining to a particular community greatly shape the way the people behave. Thus, the author concludes certain cultural beliefs and values have been observed to hinder successful implementation of a safety programme in an organisation.

2.15 Health and Safety Performance

Various criteria have been used by different researchers and safety professionals for determining health and safety performance in an organisation, one of such criteria is the use of financial measures expressed as cost savings (Smith, 2003). Health and safety performance has also been determined by the rate at which workplace accidents and injuries take place in an organisation. Smith (2003) indicated that the problem associated is also criteria is that since not all safety events are reported, except for tragic ones, that might not give an accurate picture of the how an organisation is performing on health and safety. Despite these difficulties, the rate of occurrence of safety events or accidents and the associated financial cost have greatly formed part of health and safety outcome

reporting. For example, ILO (2005) reported that nearly 2.2 million people lose their lives across the globe on yearly basis due to injuries and ill health at the workplace. ILO (2005) stated that the cost of this loss is almost 4% of product of the world's economic output, which is around 1.5 trillion pounds. Besides, a reported by Health and Safety Executive (2013) shows that in Great Britain, that country incurs the cost of 13.8 billion pounds for injuries accidents and poor health at the workplace.

A study by Agbenorku et al. (2010) in Ghana found that workers are exposed to high levels of injuries, diseases and risk especially in the mining and printing industries. It was reported that for the year 2009, Ghana's construction industry recorded 902 cases of accidents and this comprised 845 non-fatal accidents and 57 fatal accidents in 2000 (A Agbenorku et al., 2010).

Thisigold (2014) studied the mining sector found that the rate of fatal injuries in mining projects is decreasing in South Africa. Since 2001, fatal injuries occurrence in South Africa's mining sector has reduced considerably. Despite this positive outlook, in South Africa, it can be said that the current health and safety performance level of mining companies in general, in terms could be improve further towards the achievement of the goal of 'zero' fatalities.

Figure 2.3 represents the trend in fatal injuries record from 2001 to 2013 in South Africa. Fatal injuries in mining projects in South Africa, from 2001 to 2013 reduced considerably from 182 to 31 fatalities on annual basis. South Africa Chamber of Mines, however, reported that the number of fatalities in the gold mining sector in that country was 77 in 2015. Thisigold (2014) reports that the two main causes for most of the injuries recorded were caused— transportation/ machinery related accidents and falls of ground.

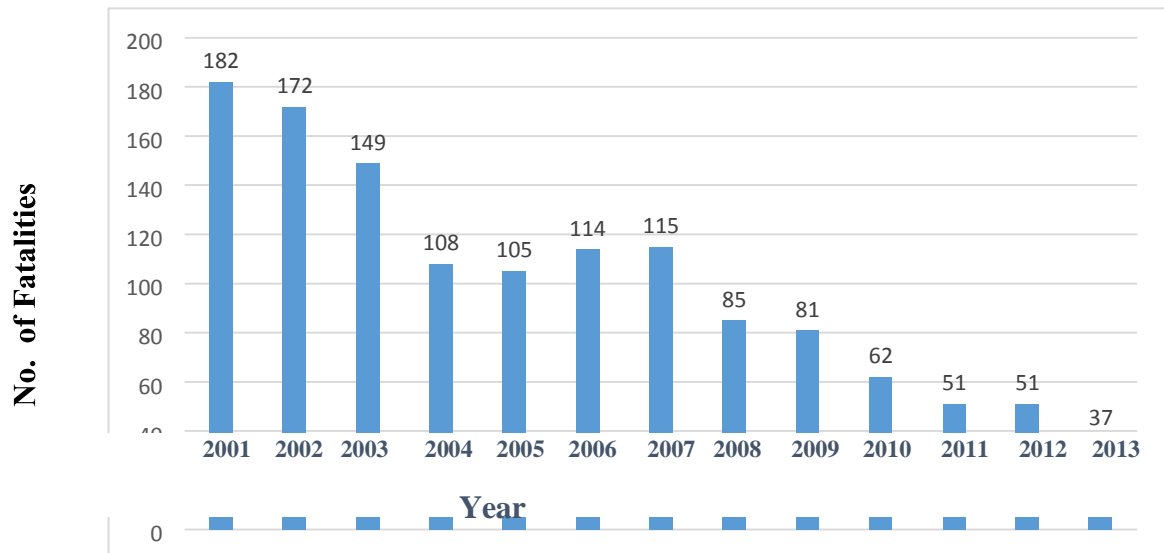


Figure 2.3: Gold Mining Industry Fatalities: South Africa

(Source: www.thisisgold.co.za)

A study by Nzuve (2012) in a number of organisations in Kenya found that the performance of health and safety function in terms of preventive approach to health and safety management in most of the organisations involved in the study was low. Nzuve (2012) attributed this low performance to insufficient or erratic inspection of workplaces by the relevant bodies or persons. Besides, Osiamoje and Idubor (2013) found that most firms in the extractive industry in Nigeria had a programme of health and safety in place, however, there was still a high number of accidents and other safety events, a situation the researchers found was largely due to ineffective enforcement by company managers and regulatory institutions in that country. Okeola (2009) suggested despite the minimal level of enforcement of safety regulations the company level, safety managers should be empowered to enforce health and safety regulations.

Atakora (2012) embarked on a study on gold miners at Obuasi Municipality of the Ashanti Region, Ghana, with sample of 150 respondents. One of the findings of the study was that miners' working experience appeared as the most significant factor which

determined the extent to which the miners suffered injuries. A survey which involved 1603 respondents from public and private organisations in Malta was conducted in 2013 by Government of that country. The survey found that 73% of the participants stated that their company had a safety and health policy while 27% stated their companies had no policy on health and safety. Most of the respondents of the survey rated the performance of the safety function in their companies as „very good’ since there were few cases of accidents happening in their organisations. This positive outcome, according to the survey, stemmed from the employees’ commitment to safety. The respondents in the same survey were also asked to state whether they had had some medical examinations of their health conducted by their employers before employment and while in employment. For pre-employment, 61% of the respondents stated that no medical tests had been conducted by the employer before they started work. Annan (2011) found that lack of experience and information limits improvements in healthy and safe performance in many construction organisations in Kenya.

2.16 Conclusion

The various works review so far consider health and safety as an important function in an organisation that need a lot more attention, even though some companies relegate this key function to the background in favour of cost savings in the short term. This situation, however, affects an organisation’s profitability as well as its image in the eye of various stakeholders, including the communities in which they operate. There is consensus that health and safety performance of an organisation needs to be subjected to continuous improvement, and must be a top-most concern of all organisations, particularly for mining companies, whose operations are deemed rife with many hazards.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Description of the research design is presented in this chapter, the research purpose, the methods and the tools employed in collecting the data needed to answer the research questions as well as realizing the objective of the study. The description of the population of the study, the sample and the sampling techniques also form part of the study. Other sections contained in the chapter are the methods for data analysis and presentation, validity and reliability testing of data, and description of the company studied.

3.2 Research Purpose

Saunders et al. (2009) explain that there is three-fold description of research purpose that is often used in literature of research methods, and these are exploratory, descriptive and explanatory. Saunders et al. (2009) indicate that in the same way research questions can be both explanatory and descriptive, so a research project could have more than one purpose. The purpose of this study was both descriptive and explanatory. The study sought to describe the level of health and safety performance of NGRL in its project in terms of preventive approach to health and safety management. Furthermore, the study was intended to describe the various elements incorporated into the safety programmes of NGRL. The study was also aimed at explaining the factors which affect the performance of safety in projects undertaken by NGRL.

3.3 Research Approach

Saunders et al. (2009) explain that there are two research approaches: Deductive and Inductive. The deductive approach was used for this study. This was based on the

grounds that the researcher had formulated a number of hypotheses about relationships between some variables about which data were subsequently gathered, analyzed for the purposed of testing the hypotheses.

3.4 Research Strategy

The survey strategy was used for the study, with sample survey as the specific type of survey that was used. Saunders et al. (2009) indicate that survey strategy usually goes with the deductive approach. Saunders et al (2009) explain that this strategy is most commonly used for answering questions such as „what,’ „who’, „where,’ „how much’ and „how many’. The survey strategy mainly uses questionnaires or interviews which are standardized or contain uniform items for systematically gathering data about organizations; person, their thoughts preferences, and behaviour patterns (Bhattecherjee, 2012).

Questionnaire was the tool employed for collecting quantitative data from the respondents in the study. Survey according to Bhattecherjee. (2012) could also be adopted for explanatory and descriptive study especially where individual persons are the units of analysis. The survey strategy enabled the researcher to collect quantitative data from a number of employees of NGRL, who constituted the population for the study. This approach offered the researcher the opportunity to gather enough data within the constraints of time, cost, and effort.

A number of challenges, however, are present with the survey strategy. For instance, Babbie, (2005) indicates that where sample survey is used, selecting a correct sample is challenging because it has to follow very rigorous processes or procedures to make sure the sample truly represents the population. Another challenge with the survey strategy is

known to be influenced by factors, such as recall bias, sampling bias, non-response, and social desirability bias. This placed much responsibility on the researcher who had to follow systematic procedure to control the influence of these biases on the research outcome.

3.5 Time Horizon

Research into a particular problem or phenomenon, according to Saunders et al. (2009), could be carried out at only one point in time, that is, cross-sectional; or repeated at different times, that is time series. For this study, time-horizon was cross sectional. In other words, data were gathered from the research participants in the same location with the same period. Easterby (2008) adds that surveys are often cross sectional studies.

3.6 Population

The employees or workers of NGRL constituted the population of the study. Forming part of the study population were all employees of business partner companies, who were during the period of the research, stationed and conducting business activities at the project site of NGRL- Akyem.

The distribution of the population, with 418 elements, is shown in Table 3.1.

Table 3.1: Study Population Distribution

Population Sub-Category	Number
Employees of Business Partner Company	122
NGRL Employees	296
Total Population	418

The population to be studied contains 418 elements with these strata: NGRL employees and employees of business partners of NGRL.

3.7 Sample and Sampling Techniques

Probability sampling techniques was followed in choosing the sample from the population. The researcher wanted to give each employee of the organization an equal chance of being selected as part of the sample. In probability samples, all elements within the research population have a specifiable chance of being selected (Dawson, 2002). The author further indicates the probability type of samples used if a researcher intends to predict, explain or generalise to the whole research population.

To be specific, both stratified sampling and simple random sampling were used. In using the stratified sampling technique, the researcher, after obtaining the list of all the employees in the company as the sample frame, stratified it into two major groups. The first stratum was made up of employees of NGRL and the second was the employees of business partners of NGRL. Microsoft Office 2013 Excel Spreadsheet was used to generate a random sample from each stratum. The researcher then formed the actual sample by combining the samples generated randomly for each stratum. The stratum's size in the study sample was proportional to its distribution size in the study population.

This was to ensure that both the company's workers and the workers of its business partners were well represented. Put together, the samples from the two strata constituted the total study sample from which data was collected.

A sample was employed instead of using the entire population for the research. Studying the entire population would have been much more difficult and consumed much more resources, energy and particularly, time.

3.8 Determining the Sample Size

The sample size used for the study was calculated with the aid of Raosoft® Sample Size Calculator, which was accessed online at <https://www.raosoft.com/samplesize.html> [Date Accessed: 12th August, 2018]. This sample size calculator has been found to give accurate sample size estimation. Meysamie et al. (2014) conducted a study on the reliability of a number of online sample size calculators.

The results of the study showed that Raosoft® Sample Size Calculator is one of the online sample calculators that give accurate estimates of a sample size. Besides, Kachwala (2014) also describes Raosoft® Sample Size Calculator as one of the major online sample size calculators that generate comparatively accurate results. According to Competitive Advantage Consultancy (2013) one of the advantages of Raosoft® Sample Size Calculator is that it provides alternative scenarios on sample sized estimates or results, indicating what they would be if the parameters such as the margin of error for calculating the samples were to increase or decrease.

With a population of 418 units, confidence level of 0.95, margin of error of 0.05, and response distribution of 0.5, Raosoft® Sample Size Calculator recommended 201 as the sample size. This was the sample size obtained from the study population.

3.9 Sources of Data: Primary and Secondary

The data for the study was obtained from primary and secondary sources. The primary data was collected from the sample that was selected for the study. Health and safety reports on project activities of NGRL, as well as its business partners served as a source of data.

3.10 Instrument for Data Collection

Questionnaire, developed by the researcher, was used as the data collection instrument. Only one set of the data collection instrument was used to collect data from employees of NGRL and the business partner employees making up the sample. There were two sections to the questionnaire: Section A and Section B. Section A gathered background information about respondents, while Section B addressed the research questions. The questionnaire consisted of closed-ended items which required respondents to rate their responses on a modified Likert scale of 1 to 5, from „Strongly disagree’ to „Strongly agree’ and from „Very low’ to „Very High’, and from „Poor to „Very Good’. In addition, there were a few open-ended items included, which gave opportunity for the respondents to provide their own comments or explanations to items on the questionnaire. This helped the study to capture other pieces of further information for answering the research questions.

3.11 Data Collection Procedure

The researcher informed the authorities of NGRL and the business partner companies before the study began. The research participants were informed about the study and their consent was sought before the questionnaires were administered to them.

Researcher himself administered the questionnaires in person to the respondents. The researcher visited the various departments where the respondents were working. Besides, the researcher took advantage of breakfast and lunch periods to also give out the questionnaires to the respondents who by the nature of their work schedule, were not accessible in the exact locations where they worked. In respect of the limited time within which the study had to be completed, the respondents were allowed five days for completing and returning the questionnaires. A drop-in box was placed at the company’s

entrance for those respondents who finished filling the questionnaire and wanted to submit them earlier than the five-day deadline. The researcher included his telephone number with the questionnaire so that any respondent who wanted to have some clarification on any portion of the questionnaire was able to do so easily and promptly. Besides, the researcher took the telephone numbers of each respondent issued with the questionnaire for purposes of contacting the respondents about the completion and submission of the questionnaire.

3.12 Data Presentation and Analysis

Schindler and Cooper (2003) explained that data analysis process involves reducing accumulated data to a convenient size, generating summaries, examining the summaries for patterns and using statistical techniques. The data analysis process also entails providing interpretation of research findings in the light of research questions and hypotheses, if there are any.

The data presentation and analysis began with editing of the data that had been collected in order to ensure that the data presented in the questionnaires are accurate and complete. In the process of editing, the researcher thoroughly examined each questionnaires completed and made sure any errors or discrepancies were sorted out. Kothari (2004) points out that data editing process entails examining raw data, especially in survey studies in surveys, to identify omissions and errors for correction when possible. The researcher assigned serial numbers to questionnaires so that no questionnaire had the data on it entered more than once, or was skipped accidentally. The Variable Editor and the Data Editor in the Statistical Package for Social Science (SPSS), version 6.0, was used to code the variables and enter the data on the questionnaires.

The results of the study were presented in frequency tables, percentages and bar charts. Regression analysis was run to assess the relationship between health and safety Performance as a dependent variable, and the independent variables — ‘Enforcement of Health and Safety Regulations’, Management Commitment’, Employee Participation’, ‘Education and Training’ and ‘Design of the Workplace.’

3.13 Validity and Reliability

Validity and reliability, in the view of Babbie (2005), are significant ingredients for consideration in any empirical research. To ensure validity and reliability of data collection instrument, the researcher carried out pre-testing of the data collection instrument on at least 40 employees of Newmont Golden Ridge Ltd., who did not form part of the study sample. The researcher informed the pre-testing participants about the piloting nature of that exercise, and thus asked them to make comments about the questionnaire in terms of clarity, appropriateness of language or errors present. The researcher subjected the questionnaire to scrutiny for addressing issues that would affect its validity and reliability, and made the necessary corrections.

Using the data collected from the pre-testing, the researcher \estimated the Cronbach’s Alpha to determine the internal consistency of the data collection instrument. Laerd (2014) reports that the commonly used measure of internal consistency (‘reliability’) is the Cronbach’s Alpha, particularly when there are multiple Likert-scale items or questions in a survey/questionnaire. The data gathered from 40 employees in the pilot study yielded a Cronbach’s Alpha of 0.82., and this indicated that the questionnaire had a high level of internal constituency.

Table 3.2: Reliability Analysis

Cronbach's Alpha	Number of Items (N)
.82.1	40

Saunders et al. (2009) state that reliability of research results also depends largely on data collection techniques or analysis procedures. The authors further explained that unless data collection and analysis are systematically carried out, reliability of the results could be compromised. In view of this, the researcher ensured that after the data had been collected, all the processes that generated the final results were followed carefully.

3.14 Study Organisation

Newmont is considered as one of the companies leading in the production of gold in world (<https://www.newmont.com/home/default.aspx>). The Company was formed in 1921, and since 1925, it has been traded publicly. It has its headquarters in the city of Colorado, United States. Newmont's workforce is about 28,000 employees, including contractors, and the greater part of them work at the Corporation's projects in the United States, New Zealand, Indonesia, Australia, Peru, and Ghana. The Ghana subsidiaries of Newmont Corporation are located at Abirem, in the Eastern Region and Kenyasi in the Brong Ahafo Region. The organization that was the focus of the study was Newmont Golden Ridge Limited („NGRL’), one of the Ghana subsidiary of Newmont Mining Corporation, located in the Eastern Region of Ghana, specifically at Abirem. NGRL started its project in 2005. One of the business partners of the company is All Terrain Services (ATS), a company that provides catering and housekeeping service to NGRL.

CHAPTER FOUR

PRESENTATION OF DATA ANALYSIS AND DISCUSSION

4.1 Introduction

The analysis of data collected for the study is presented in this chapter. The data was collected from 201 respondents who constituted the study sample. The chapter also presents some secondary data obtained from the study organisation. Furthermore, discussion of the research findings in the light of the research objectives and the hypotheses is presented in this chapter.

4.2 Background Information of Respondents

This section present the background information to the respondents of the study, which is shown in Table 4.1.

From Table 4.1, it is shown that out of 201 respondents, 142 of them, representing 70.6%, worked directly with the Newmont Golden Ridge Limited (NGRL). On the other hand, 59 of the 201 respondents were employees of business partner organisations of NGRL.

In terms of level of education, most of the respondents had attained tertiary level of education. Out of 201 respondents, 167 representing 83.1%, indicated a tertiary level of education. Besides, 15.9% of the respondents numbering 32, stated that their level of education is up to the level of secondary education. Only two of the respondents representing 1% of the respondents had junior high school or middle school as the level of education they had attained. This may suggest that a greater more than 90% of the employees of NGRL and its business partner organisations had at least a secondary level of education.

Table 4.1 also shows the number of years the respondents indicated they had worked with their organisation. Forty-five of the respondents representing 22.4% indicated that they had worked with the organisation for a period of one year or less. Most of the respondents (60.1%), numbering 122 out of 201, indicated that they had worked with their organisation between one to five years. Another 25 constituting 12.4% out of a total of 201, stated that they had spent between six to ten years working with their organisation. Only 8 respondents representing 4% of the total, have spent 11 to 15 years working with their organisation. Similarly, only 1 respondent, accounting for 0.5% of the total number of respondents, stated having worked the organisation for 16 or more.

Table 4.1: Background Information of Respondents

	Frequency	Percent	Cumulative Percent
Work Organisation			
Newmont	142	70.6	70.6
Business Partner Organisation	59	29.4	100.0
Total	201	100.0	
Level of Education			
J.H.S./Middle School	2	1.0	1.0
Secondary	32	15.9	16.9
Tertiary	167	83.1	100.0
Total	201	100	
Work Experience			
Less one year	45	22.4	22.4
1-5years	122	60.7	83.1
6-10 years	25	12.4	95.5
11-15 years	8	4.0	99.5
16-20 Years	1	0.5	100.0
Total	201	100.0	

Source: Author's Field Survey, 2018

It is clear from the table that majority of the respondents, representing more than 83% of the total had worked with the organisation for one year or even more. This suggests that most of the employees of the NGRL and its business partner organisations have worked long enough in the company and thus may have adequate knowledge or information about health and safety practices and programmes of NGRL and its business partners.

4.3 Research Questions

This section presents the results and findings of the study in relation to the research questions and hypotheses formulated for the study.

4.3.1 Research Question 1

What is the level of performance of NGRL in terms of preventive approach to managing health and safety in its projects?

Table 4.2: Health and Safety Performance of Newmont Golden Ridge

Response	Frequency	Percent	Cumulative Percent	Mean
Not Sure	12	6.0	6.0	4.5
Good	75	37.3	43.3	
Very Good	114	56.7	100.0	
Total	201	100.0		

Source: Author's Field Survey, 2018

Presented in Table 4.3 is some information on safety and health condition at NGRL. For a period of six years, beginning 2012 to 2017, one hundred and fourteen (114) recorded cases of safety events at NGRL, including business partners. Eighty-two (82) of the total number of safety events were classified as 'first-aid cases whereas 20 were categorized as 'medical treatment accidents' (MTA). There were a total of 8 'lost time accidents', in

which employees stayed away from work for some period. Furthermore, there were 3 restricted work accidents recorded for the six-year period. In this type of accident, the employees involved had some restrictions in the number of tasks or amount of work done. It is important to note that a fatal injury was recorded by Newmont in 2014, this resulted in the death of one of the employees. The fatal injury was attributed to negligence on the part the employee working on a unit in the processing plant at the moment the incident occurred.

Table 4.3: Newmont (Akyem) Safety Events Report from 2012 to 2017

	Fatal Injuries	Lost Time Accidents (LTA)	Restricted Work Accidents (RWA)	Medical Treatment Accidents (MTA)	First Aid Cases	Total Property Damage Costs (\$)
Jan. 2011-Dec.2013						
Newmont	0	0	0	1	4	50,571
Business Partners	0	2	0	7	52	89,336
Sub-total	0	2	0	8	56	13,9907
Jan. 2014-Dec. 2015						
Newmont	1	2	2	4	5	282,222
Business Partners	0	0	1	5	8	17,817
Sub-total	1	2	3	9	13	300039
Jan. 2016- Dec. 2017						
Newmont	0	3	02	2	4	667,534
Business Partners	0	1	0	1	9	101,285
Sub-total	0	4	0	3	13	769,819
GRAND TOTAL	1	8	3	20	82	1,209,765

Source: NGRL (Akyem), 2017

From Table 4.3, it is shown that business partners of NGRL recorded a higher number of first-aid cases more than NGRL. Over the six-year period, contractors or business partners of NGRL recorded 69 first aid cases while NGRL recorded 13 cases of this type of safety events. However, from 2014 to 2015, first aid cases dropped from 56 for the year 2012/2013 to 12 for 2014/2015-year period. It can also be seen in the table that both NGRL and its business partner recorded safety events categorised as ‘restricted work accidents’ and ‘medical treatment accidents’. The results indicate that safety events had relatively been declining over the six-year period. This result supports the view of Hanns (2009) that the rate at which fatal injuries occur in the mining sector has seen significant decrease over the years.

4.3.2 Research Question 2

What are the health and safety elements incorporated into the safety programmes of NGRL?

In answering this question, respondents were asked to indicate the extent to which they agreed or disagreed to a number of statements about health and safety elements that are considered an important part of a health and safety programme. The respondents rated each of the statements on health and safety elements on a scale of 1 to 5, from ‘strongly disagree’ to ‘strongly agree’ where: 1=strongly disagree, 2=disagree, 3=not Sure, 4=agree, 5= strongly agree. The results obtained for their responses are presented in Table 4.4 using the mean scores as the basis for ranking each of the statements about the health and safety elements.

Table 4.4: Elements of NGRL's Health and Safety Programme

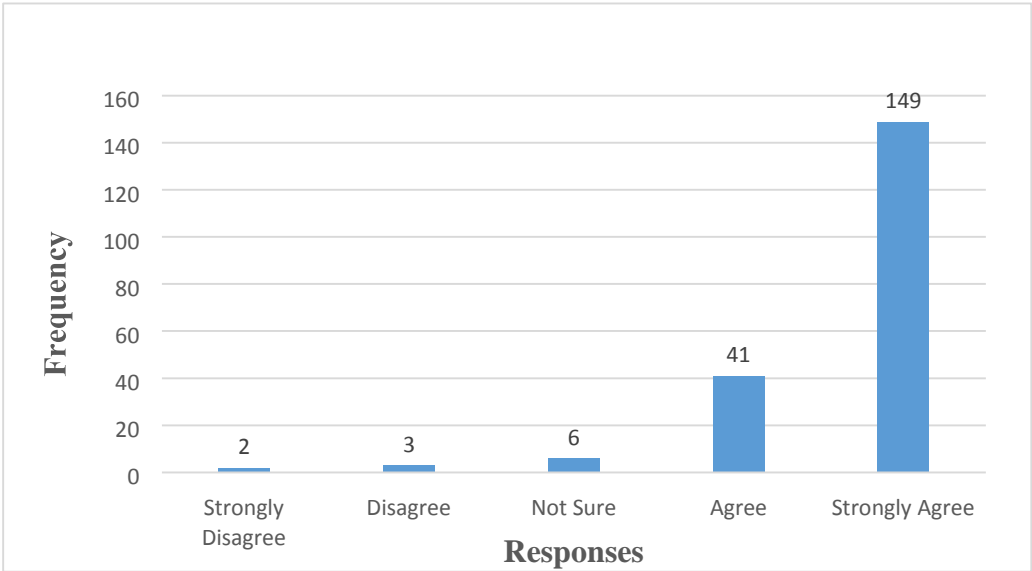
Safety Element	Mean	Rank
Effective communication of accident investigation reports to employees	4.65	1st
Existence of Adequate Safety Rules	4.63	2nd
Adequate level of employee commitment and participation in health and safety activities	4.52	3rd
Smooth procedures reporting injuries	4.51	4th
Existence of Joint Health and Safety Committee	4.50	5th
First aid services available at project site	4.45	6th
Prompt investigation of accidents and other safety events	4.45	6th
Orientation and Regular training in health and safety	4.45	6th
Wearing of personal protective equipment (PPE)	4.39	9th
Employees are under compulsion to adhere to safety rules and regulations.	4.38	10 th
Periodic medical check-ups for health-related illnesses	4.34	11 th
Appropriate sanction for ignoring safety precautions	4.29	12 th
There is regular workplace inspection	4.19	13 th
Supervisors conduct job hazard analysis	4.15	14 th
Existence of register of identified hazards	2.50	15 th
There are clearly defined emergency procedures at the project site	2.01	16 th
Average Mean Score	4.15	

Source: Author's Field Survey, 2018

From Table 4.4, it is shown that respondents agreed to 15 out of the 17 statements related to the health and safety elements in the health and safety systems at the company. The statement that there is „Effective communication of accident investigation reports to employees’ recorded the highest mean score of 4.65. This mean score indicates that most of the statements agreed to that statement, which is ranked first among all the other safety elements. The next safety element that has the second highest mean score is there is „Existence of adequate health and safety rules’, which had a mean score of 4.63. A significant number of the respondents also agreed that there is „Adequate level of

employee commitment and participation in health and safety activities. The mean scores for other safety elements to which respondents agreed existed as part of the health and safety systems of NGRL are also presented in Table 4.4. However, it is shown that most of the respondents were either not sure or disagreed that there was a register of identified hazards in the project site. The statement that there is „Existence of register of identified hazards received a mean score of 2.5 which indicates that most of the responds did not agree to the statement. Similarly, most of the respondents did not agree that there were clearly defined emergency procedures at the project site, as the mean score for the statement „There are clearly defined emergency procedures at the project site recorded a mean score of 2.01. An average mean score of 4.15 suggest that most of the respondents were of the view that most of the health and safety elements presented to them were part of the health and safety systems in the company. This finding supports the view of

Figure 4.1: Communicating Accident Investigation Reports to Workers



Source: Author’s Field Survey, 2018

Figure 4.1 further provides information about the respondents' views on the extent to which they agreed that there was communication of accident investigation reports to workers. From the figure, it is shown that most of the respondents 190 out of 201 agreed that reports on accidents investigations were communicated to workers to serve as lesson for preventing the occurrence of similar accidents.

Table 4.5 shows the results of the responses to the statement „There is a joint health and safety committee’. The table indicates that most of the respondents agreed that there was a joint health and safety committee in place at the company, and the number of the respondents who shared this view was 177 out of a total of 201. This represents 88% of the respondents.

Table 4.5: Existence of Joint Health and Safety Committee

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.0	1.0
Disagree	17	8.5	9.5
Not Sure	5	2.5	11.9
Agree	31	15.4	27.4
Strongly Agree	146	72.6	100.0
Total	201	100.0	

Source: Author's Field Survey, 2018

Reilly, Paci and Holl (1995) found that companies having joint consultative committees, with employee representatives appointed by unions, had much lower rate of occurrence of workplace injuries than those where the top management unilaterally made decisions on safety and health programmes or arrangements. The results suggest that NGRL is adhering to a best practice in the industry. Reilly, Paci and Holl (1995) indicate that it is a good practice for a company to establish joint health and safety committees which

include worker representatives. In the authors' view, such joint committees promote active participation of workers in safety and health activities relating to projects and operations of an enterprise. In addition, the joint occupational health and safety committees are a valuable avenue for all who are interested in work setting to discuss safety issues, plan and take concerted actions to improve safety situation in a company. The joint health and safety committee may be considered as one of the factors that has enabled NGRL and its business partners to minimize occurrence of safety incidents in the company.

Table 4.6 provides information on respondents' views on the existence of orientation and training of employees on health and safety in the company. The results as shown in Table 4.6, indicates that most of the respondents agreed that adequate orientation and training on health and safety are provided for employees at the company.

Table 4.6: Orientation and Training in Health and Safety

	Frequency	Valid Percent	Cumulative Percent
Disagree	7	3.5	3.5
Not Sure	11	5.5	9.0
Agree	67	33.3	42.3
Strongly Agree	116	57.7	100.0
Total	201	100.0	

Source: Author's Field Survey

Out of 201 respondents, 183 representing 91% of the total indicated that there were programmes of orientation and training of employees on health and safety. The results may suggest the company prioritizes providing training and orientation for employees on health and safety as a means of minimizing safety incidents. Roland (2013) states that, as regards the issue of safety, seasoned or experienced workers are at risk on a daily

basis, and it is particularly necessary for new employees to be given much more attention for health and safety.

4.3.3 Research Question 3

What are the major factors which affect the performance of health and safety in projects undertaken by NGRL?

In answering this question, respondents with a list of factors were asked to rate their evaluation of these factors in terms of their effect on health and safety performance of NGRL. The rating was done on a modified Likert scale of 1to5, where 1=Very Poor, 2=Poor, 3=Not Sure,4= Good, and 5= Very Good.

The factors which are considered to have influence on the safety performance of NGRL are presented in a rank order in Table 4.7. The mean scores recorded for the factors formed the basis for the ranking.

Table 4.7: Factors affecting Safety performance of NGRL

Factor	Mean Score	Rank
Adequacy of material resources support for health and safety	4.8	1st
Attitude and behaviour of workers to health and safety	4.7	2nd
Adequacy of Human Resources for Managing Safety	4.7	2nd
Value on Health and Safety as a Strategic Function	4.4	4th
Management attitude to Safety needs of all Units in the Company	4.4	4th
Effectiveness of Operation and preventive Maintenance of Machinery and Equipment	4.1	6th
Effective Dissemination of Health and Safety Information	3.8	7th
Average Mean Score	4.4	

Source: Author's Field Survey, 2018

Table 4.7 indicates that most of the respondents rated six of the factors as having ‘good’ effect on the health and safety performance of NGRL. A mean score of 4.8 was recorded for the factor, ‘Adequacy of material resources support for health and safety’. This suggests the greater number of the respondents thought NGRL make adequate allocation of resources for health and safety. A mean score of 4.7 was recorded for two factors: ‘attitude and behaviour of workers to health and safety’ and adequate human resources for managing safety. The scores indicates that most of the respondents rated at least each of the two factors as having ‘good’ impact on the safety performance of the company. Similarly, most of the respondents believed that the company valued health and safety as a strategic function. A mean score of 4.4 was recorded for the factor that ‘Value on health and safety as a strategic function’. Effective operations and preventive approach to maintenance has been viewed has a critical factor of improved health and safety performance. In respect of this factor, most of the respondents indicated rated the effectiveness of operation and preventive maintenance of the company as „good’.

However, most of the respondents did not see dissemination of health and safety information as having a ‘good’ effect on safety performance. A mean score of 3.8 was recorded for the statement, ‘effective dissemination of health and safety information’. Some of the respondents indicated that they did not feel comfortable to report certain minor safety incidents or near misses so as to avoid disciplinary action from the superiors.

The average mean score of 4.4 indicates that most of the workers thought nearly all the factors listed in Table 4.7 were seen as making a good contribution to the health and safety performance of the company.

4.3.4 Research Question 4

What are the main causes of accidents in the project delivery activities of NGRL?

In answering this question, the research participants were asked to rate a number of accident causes items on a scale of 1 to 5, from ‘Very Low’ to ‘Very High’ where ‘Very Low’=1, ‘Low’ =2, ‘Not Sure’=3, ‘High’=4, and ‘Very High’=5 Table 4.8 displays ranked causes of accidents at the company from most important to the least important. In the respondents’ assessment, unsafe conditions at work place came up as the most significant cause of accidents the project delivery activities of the company.

Table 4.8: Causes of Accidents in the NGRL’s Akyem Project

Cause	Mean Score
Unsafe condition at work place	2.46
Unsafe acts of personnel	2.39
Stress and fatigue among workers	2.25
Failure of equipment	2.14
Workers’ inexperience	2.10
Workers’ negligence	2.06
Substandard design of workplace	2.02
Unqualified employees	1.95
Workers competing in an unhealthy way among themselves	1.92
Worker complacency	1.91
Obligation to meet targets that are unrealistic	1.82
Natural occurrence	1.16

Source: Author’s Field Survey, 2018

A mean score of 2.46 was recorded for ‘unsafe conditions at work place’. ‘Unsafe Acts of personnel’ and ‘Stress and Fatigue among workers’ were the second and third most significant causes of accidents in the project activities of the company. ‘Failure of

Equipment’ [mean score: 2.14]; Workers’ Inexperience’ [mean score: 2.10], ‘Workers’ Negligence’ [2.06] and ‘Substandard design of Workplace’ [mean score: 2.02] followed in that order in terms of being significant causes of accidents at the project of NGRL. Natural occurrences or disasters was rated as the least important cause of accident at the company.

The mean scores of the presented in Table 4.8 indicate that most of the respondents rated most of the causal factors of accidents as „low’. The „low’ rating of most of the accident causes at NGRL indicate the company had been able to put in place some measures to address various causes of accident in its project. The results to a large extent is in support of the view of Thisigold (2014) that accidents in mining projects in South Africa were due to a wide range of causes. The two main causes of most injuries were related to unsafe condition at the mine (falls of ground) and-machinery or equipment. This study found unsafe condition at work as a major cause of accidents in the project delivery processes of NGRL.

4.4 Regression Analysis

Presented in Table 4.9 is the regression analysis for predicting the relationship between health and safety performance and the following predictor variables: ‘Employees’ Commitment and Participation in Health and Safety Activities’; ‘Education and Training in Health and Safety’; ‘Enforcement of Health and Safety Rules’; ‘Management Commitment to Health and Safety Programme;’ and ‘Design of the Workplace.’

Table 4.9: Regression Analysis

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.623	.431		1.445	.150
Employees' Commitment and Participation in Health and Safety Activities	.128	.062	.135	2.060	.041
Education and Training in Health and Safety	.255	.064	.291	3.974	.000
Enforcement of Health and Safety Rules	.199	.064	.214	3.134	.002
Management Commitment to Health and Safety Programme	.000	.051	.001	.018	.986
Design of the Workplace	.288	.063	.268	4.584	.000

a. Dependent Variable: Health and Safety Performance of Newmont Golden Ridge

The results shown in the Table 4.9 indicate that with all variables set to zero, 1 percent increase in 'Employees' Commitment and participation in Health and Safety Activities' would bring about 0.128 percent increase in health and safety performance. Similarly, with all predictor variable set to zero, 1 percent increase in 'Education and Training in Health and Safety performance' would result in 0.255 percent increase in the dependent variable, Health and Safety performance. Also if „Enforcement of health and safety rules' increases by 1 percent, safety performance will increase by 0.199 percent, given that all other variables go zero. Besides, 1 percent increase in „Management commitment of

health and safety programme' will not bring about any increase in the dependent variable, given that all variable are set to zero. Finally, the dependent variable will increase by 0.288 with 1 percent increase in „Design of the workplace'. The co-efficient of determination (R^2) of the regression model is 0.387 or 38.7%. This means that the model can explain only 38.87% of the overall variation in the predicted variable. The model summary is presented in Appendix ii.

4.5 Validating the Hypotheses

The following hypothesis were formulated for the study:

Hypothesis 1: Employees' Commitment and Participation in Health and Safety Activities;

Hypothesis 2: Education and Training in Health and Safety has a positive relationship with health and safety performance;

Hypothesis 3: Enforcement of Health and Safety Rules has a positive relationship with health and safety performance;

Hypothesis 4: Management Commitment to Health and Safety Programme has a positive relationship with health and safety performance;

Hypothesis 5: Design of the Workplace has a positive relationship with health and safety performance.

The results presented in Table 4.9 support **Hypotheses 1, 2, 3 and 5**, but do not support **Hypothesis 4**. At p-value of 0.05, the results support Hypothesis 1 ($t=2.06$, Sig.=0.041); Hypothesis 2 ($t=3.97$, Sig.=0.00); Hypothesis 3 ($t=3.13$, Sig. =0.02) and Hypothesis 5 ($t=4.58$, Sig= 0.00). **Hypothesis 1, 2, 3 and 5** are thus accepted at p-value of 0.05, while **Hypothesis 4** ($t=0.18$, Sig.= 0.98) is rejected at p-value of 0.05.

4.6 Discussion of Findings

The study found that employee's commitment and participation in health and safety activities is positively related to health and safety performance. This means that improvement in employee's commitment and participation in health and safety activities would lead to improvement in health and safety performance. Burton (2010) indicates that a key factor of a successful occupational programme is the commitment and active involvement of employees and their representatives who are directly affected by a safety programme. Thus employees should be meaningfully involved every stage of a safety programme: planning, implementation and evaluation. Employee participation was also identified by Alli (2008) as a main requirement for enhancing health and safety performance. In view of this, employees, as well as their representatives go beyond being informed or consulted about a safety programme to actively participating in the programme. The need to be involved actively, and the views need to be sought on setting health and safety performance goals as well as being part of the activities and processes aimed at achieving those goals. In fact, employees should be made to own a health and safety program and constantly develop ways to improve upon health and safety performance.

The second hypothesis predicts a positive relationship between education and training in health and safety, and health and safety performance. Alli (2008) points out that continuous improvement in health and safety performance is made possible with regulation education of all personnel in an organisation. Zakaria, Mansor and Abullah (2012) found that a significant relationship exists between workplace accidents and training procedures at p-value of 0.01 (Pearson Correlation=0.428). The authors concluded that there was a moderate to substantial association between workplace accidents and training procedures. The positive relationship between education and

training and health and safety performance is supported by Asumeng and Nyarko (2015) and Lu and Yang (2011) that safety training correlated significantly and positively with safety performance.

Also, the study found that there is a positive relationship between enforcement of health and safety rules, and performance of health and safety. Burton (2010) indicated that having the requisite health and safety regulations in place is one thing, and enforcing them is another. In other words, in order to achieve the goals of safety regulations, one important consideration related to their enforcement. This means that adequate enforcement of health and safety regulations is essential to and would contribute positively employee's health and safety, and thereby lead to improved health and safety performance of an organisation.

As far as the fourth hypothesis is concerned, results of the regression analysis presented in Table 4.9, however, did not find management commitment to health and safety programme as having a significant relationship with health and safety performance. A similar finding was made by Asumeng and Nyarko (2015) that Management value for safety independently did not predict workers' safety conduct relating to safety compliance and participation. Management, in the view of Asumeng and Nyarko (2015), were often concerned with developing new policies or guidelines, and did not involve themselves in directly enforcing such policies at the lower level where work really gets done. Therefore, a formally declaring the rules for safety is inadequate to bring about positive safety-related pattern of behaviour of workers. Visible practical actions, according to Alli (2008) are required of management to stimulate the appropriate safety-related behaviour of workers.

On the other hand, the European Agency for Health and Safety (2012) stated that management could offer support in improving health and safety performance by being committed to preventing safety and health risks at work, and embracing safety as a business establishment's core value and communicating such a value to all workers. The fifth hypothesis predicted that design of the workplace has a positive relationship with health and safety performance. This finding is supported by Favergo (2009) that organisational factors largely determine the rate of safety events. Favergo (2009) explained that repetitive and fragmented tasks, short cycle times, irregular and long working hours, and inadequate relaxation or rest create situations which predisposes workers to accidents. Many material aspects of workplace are found to create safety risks if not suitably adjusted to workers' mental physical and capacities (Payne, 2001). The author further points out that at times the wrong notion is that accidents are associated ultimately with the operation of machines and using of toxic materials. The author concludes that workplace layout and other physical features form part of the workplace design and have effect on health and safety performance.

The first research question sought to establish the level of performance of NGRL in terms of preventive approach to managing health and safety in its projects. The results indicated that most respondents rated the level of health and safety performance of the company as high. A scale of 1 to 5, where 5 was the maximum score, the overall evaluation score for the level of health and safety performance was 4.15. In 2016, the company received an award as a leader in ensuring health and safety in the mining sector in Ghana. However, Nzuve (2012) found a low level of performance of health and safety in a number of firms carrying out projects in the extractive industry in Kenya. This was blamed on the low level of workplace inspection. Even though health and safety performance of the company is described by majority of the respondents as good, the

company cannot afford to rest be complacent. This is because its own safety reports displayed by Table 4.3 indicates that safety events had been part of the company's project activities, and in the year 2014, one fatal accident, which resulted in the death of one of its employees, was recorded. In addition, there were other forms of safety events such as first-aid cases recorded by the company.

The second research question was to determine the health and safety elements incorporated into the safety programmes of NGRL. The study found that the health and safety programme of NGRL has many elements. Most respondents agreed that effective communication of accident investigation reports to employees, adequate health and safety rules and adequate level of employee commitment and participation in health and safety activities, were important elements of the health and safety system of the company. However, most of the respondents did not agree that there were clearly defined emergency procedures at the project site, as the mean score for the statement 'There are clearly defined emergency procedures at the project site' recorded a mean score of 2.01. An average mean score of 4.15 suggest that most of the respondents were of the view that most of the health and safety elements presented to them were part of the health and safety systems in the company. The observation made is that NGRL health and safety programme is very extensive, as respondents from both the company itself and its business partner companies rated nearly all the safety elements presented as being part of the health and safety programme of the company as a whole. Though most of the respondents agreed that there were procedures for reporting safety events, it was found that employees were reluctant in reporting near misses to their superiors for fear of being reprimanded, victimised or be made to go through the distressing process of case investigation.

The third research question was concerned with identifying the factors which affect the performance of health and safety in projects undertaken by NGRL. The health and safety performance of NGRL was found to be affected by many factors.

Table 4. 7 indicates that most of the respondents rated six of the factors as having ‘good’ effect on the health and safety performance of NGRL. These were adequacy of material resources support for health and safety; good attitude and behaviour of workers to health and safety; adequate human resources for managing safety and the company’s positioning of health and safety as a strategic function. The other factors which were considered as having a positive effect on the health and safety performance are effective operations and preventive approach to maintenance of equipment and other infrastructure in the company. However, most of the respondents did not see dissemination of health and safety information as having ‘good’ effect on safety performance. This may probably relate to upward flow of information regarding safety issues, as reported by some of the respondents indicated that they did not feel comfortable to reports certain minor safety events or near misses so as to avoid disciplinary action from the superiors.

The fourth research question identified the major causes of accidents in the project activities of NGRL. In the respondents’ assessment, unsafe conditions at work place; unsafe acts of personnel and stress and fatigue among workers came up as the three most significant causes of accidents in the company. Failure of equipment and workers negligence were also rate as other causes of accidents in the company. It is important to note that natural occurrences or disasters were rated as the least important cause of accident at the company. This means that most of most of the accidents emanate from people, machine, and the design of the workplace. Similar findings were made by Trimpop *et. al.* (2010) and Dobson (1999). Trimpop *et al.* (2010) found that fatigue and

job stress has significant effect on accidents at workplace. In other words, increase in the level of stress and fatigue in employees would increase the number of accidents among employees. Dobson (1999) stated that there is a close association between stress and getting involved in a motor vehicle accident. It may be a requirement that employees meet some targets, and in their determination to meet such targets, they may compromise on safety precautions.

Most of the respondents rated all the causal factors of accidents presented to them as „low’ The results to a large extent is in support a similar finding of Thisigold (2014) that accidents mining projects in South Africa were due to a wide range of causes. The two main causes of most injuries were related to unsafe condition at the mine (falls of ground) and-machinery or equipment. This study found unsafe condition at work as a major cause of accidents in the project delivery processes of NGRL.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings and conclusions drawn based on the findings of the study. Captured in the chapter are the recommendations for improving health and safety systems in NGRL, and in general, other business organization which are into mining-related projects.

5.2 Summary of Findings

This section presents the summary of findings for the study, in the light of the objectives and formulated for the study.

5.2.1 The level of performance of NGRL in terms of preventive approach to managing health and safety in its projects

One of the findings of the research is that the level of performance of NGRL in terms of preventive approach to managing health and safety could be described as good. A mean score of 4.5, on a scale of 1 to 5, was recorded as the overall level of performance of NGRL in preventive approach to managing health and safety. The mean score indicates that most of the respondents (193 in number), representing 94% of the total, believe that health and safety performance of NGRL could be described generally as at least „good.’ Despite this positive description of the safety and health management approach of the company, the company has not been able to prevent the occurrence of safety events all together. Over a six-year period, from 2011 to 2017, 114 safety events were recorded. Out of this number, there was one case of fatal accident which led to the death of one employee.

5.2.2 Health and safety elements incorporated into the safety programmes of NGRL

The study found that the health and safety programme of NGRL has many elements which are preventive nature in managing health and safety. Most respondents agreed that effective communication of accident investigation reports to employees, adequate health and safety rules and adequate level of employee commitment and participation in health and safety activities, were important elements of the health and safety system of the company. An average mean score of 4.15 suggest that most of the respondents were of the view that most of the health and safety elements presented to them were part of the health and safety systems in the company. The observation made is that NGRL health and safety programme is very extensive, as respondents from both the company itself and its business partner companies rated nearly all the safety elements presented as being part of the health and safety programme of the company as a whole.

5.2.3 Major factors which affect the performance of health and safety in projects undertaken by NGRL

The health and safety performance of NGRL was found to be affected by many factors. Most of the respondents rated six of the factors as having „good’ effect on the health and safety performance of NGRL. These were adequacy of material resources support for health and safety; good attitude and behaviour of workers to health and safety; adequate human resources for managing safety and the company’s positioning of health and safety as a strategic function. The other factors which were considered as having a positive effect on the health and safety performance are effective operations and preventive approach to maintenance of equipment and other infrastructure in the company has been viewed has a critical factor of improved health and safety performance.

5.2.4 The main causes of accidents in the project delivery activities of NGRL

In the respondents' assessment, unsafe conditions at work place; unsafe acts of personnel and stress and fatigue among workers came up as the three most significant causes of accidents in the company. Failure of equipment and workers negligence were also rate as other causes of accidents in the company. It is important to note that natural occurrences or disasters were rated as the least important cause of accident at the company. This means that most of most of the accidents emanate from people, machine, and the design of the workplace.

5.3 Conclusions

There are many factors that have to be taken into account for managing health and safety using a preventive approach. The study found that employees' commitment and active participation in all stages of planning, implementing and evaluating a programme of health and safety in a project organization is indispensable. Besides, existence of clearly defined health and safety rules and regulations, coupled with adequate enforcement, makes positive contribution to preventing or significantly minimizing the occurrence of accidents. Also, education and training of employees in the best health and safety practices makes positive contribution to health and safety performance. Furthermore, a well-designed workplace contributes significantly to improved health and safety performance in mining projects. Design of the workplace includes how project activities are structured. Repetitive and fragmented tasks, short cycle times, irregular and long working hours, and inadequate relaxation or rest create situations which predispose workers to safety events.

Even though management commitment to health and safety programme was found to have insignificant effect on health and safety performance, it is necessary for management to lead the way by showing adequate support for health and safety programmes in the company.

5.4 Recommendations for the Study

Based on the finding of the study, the following recommendations are made:

- Though the level of performance of NGR in terms of preventive approach to managing health and safety in its project activities could be described as good, the company still had not been able to achieve „zero accident’ target for a year. Medical treatment cases, first aid cases and other categories of safety events are recorded, though at a decreasing rate. It seems both management and workers are inadvertently accommodating the notion that safety events are part of parcel of every project, especially in mining. The researcher recommends that the company should regularly undertake continuous improvement projects in safety programmes and other project activities to drive it towards the goal of zero harm per year in its project activities.
- The study recommends that the company develop clearly defined emergency procedures at its project site for each all the units of the company.
- Communication was found to be one of the integral elements of the safety programme of the company. It was however found that not all safety events, especially, near-miss ones, were not reported by employees for investigation. This means the underlying causes or root causes remained unknown. It is recommended that supervisors are trained on how best to handle reported cases

of safety events without subjecting the victims to ill-treatment in the process of investigation.

- In the respondents' assessment, unsafe conditions at work place; unsafe acts of personnel and stress and fatigue among workers came up as the three most significant causes of accidents in the company. Consequently, the study recommends that the management of the company need to institute training programmes for employees on the need to avoid engaging in unsafe acts. Similarly, management need part of safety monitoring team to gathering firsthand information on regular basis on conditions which puts the health and safety of all persons at risk, develop collective strategies for eliminating such risks.
- To reduce stress and fatigue among workers, the company should organize recreational activities such as games for workers, and build recreational facilities for worker to use to help them reduce the level of stress and fatigue experienced at the workplace.
- It is also recommended that the company adopts proactive approach to maintenance of its equipment and infrastructure so that accident emanating from the use of faulty equipment and machinery could be avoided.

5.5 Suggestion for Further Research

In place of relying on opinions of respondents using survey strategy, further research should employ qualitative research approach in order to obtain deeper understanding of health and safety management practices in the project activities of NGRL.

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APPENDICES

APPENDIX I

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

Name of Researcher: Sarpong Atta Boaitey Snr.

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Introduction

This questionnaire is for a study in fulfillment of a requirement for a degree (MSc. Project Management). Therefore, any information provided is to be used for academic purposes only. The identity of respondents and the information they provide will be kept confidential. In as much as participation in this task is voluntarily, I would be grateful for having you taking part in this research survey.

NOTE: NGRL represents Newmont Golden Ridge Limited or the Company

Section A: Basic Information

Date of completion of the questionnaire.....

1. Level of Education: *(Please Tick in the brackets):*

JHS/Middle School [] Secondary [] Tertiary []

Other *(Please specify)*.....

2. Please indicate the section of the Company you are working for: *(Pleas tick in the brackets):*

Newmont Company [] Business Partner Company []

3. Please, indicate how long you have been working in the company

5 years or less [] 6-10 years [] 11-15 years [] 16-20 years []
20+ years []

Section B: Research Questions

4. Health and Safety Performance of Newmont Golden Ridge Ltd.

Please, rate your evaluation of Health and Safety Performance of the company on a scale of 1-5, where 1=Very Poor, 2=Poor, 3=Not Sure, 4= Good, 5= Very Good

4.1	Indicate your overall evaluation of the Health and Safety performance of Newmont Golden Ridge Ltd in terms of prevention of accidents, injuries and work-related illnesses.	RESPONSE				
		1	2	3	4	5

(Please, tick in the appropriate box)

Please, you are to rate your response to each of the following items on health and safety elements on a scale of 1 to 5, from „strongly disagree’ to „strongly agree’ where:

1=Strongly Disagree, 2=Disagree, 3=Not Sure, 4=Agree, 5= Strongly agree

Place the check mark ‘✓’ in the appropriate box. Please, place only one check mark for each item.

5A. Health and Safety Elements Safety Programme of NGRL

	Health and Safety Elements	RESPONSE				
5.1	There are well-defined health and safety rules for all workers	1	2	3	4	5
5.2	There is Joint Workplace Health and Safety Committee	1	2	3	4	5
5.3	Employees are committed to and participate fully in all health and safety activities	1	2	3	4	5
5.4	There is regular Employee orientation and Training in Health and Safety	1	2	3	4	5
5.5	The processes for reporting injuries are not cumbersome for workers	1	2	3	4	5
5.6	There is prompt investigation of accidents and other safety events	1	2	3	4	5
5.7	Reports from accident investigations are communicated to all employees to serve as lessons and for training purposes	1	2	3	4	5
5.8	Employees who ignore safety precautions are sanctioned appropriately	1	2	3	4	5
5.9	Obeying health and safety rules is compulsory, and not	1	2	3	4	5

	optional					
5.10	There is regular workplace inspection to ensure compliance with established safety, health and environmental procedures.	1	2	3	4	5
5.11	All employees are made aware of potential hazards in the workplace	1	2	3	4	5
5.12	There is register of hazard associated with each task in the work environment	1	2	3	4	5
5.13	Employees are mandated to wear protective personal clothing and equipment	1	2	3	4	5
5.14	There is hazard identification system in place to recognize, evaluate, and control hazards in the workplace.	1	2	3	4	5
5.15	Supervisors and workers continually conduct job hazard analysis (JHA) as part of their job responsibilities	1	2	3	4	5
5.16	Employees are made to undergo periodic medical check-ups to address any work-related illness.	1	2	3	4	5
5.17	First aid service is available within the project site	1	2	3	4	5
5.18	There is regular Planned Task Observation (PTO)	1	2	3	4	5
5.19	There are Correctly defined work and Emergency procedures	1	2	3	4	5
5.20	The project site's design helps to prevent safety events	1	2	3	4	5

5B. Write any health and safety element(s) that you at least agree is part of the safety programme but is not listed in the preceding table with heading „Health and Safety Elements’.

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.....

5C. If there are any comments or explanations you wish to give about any of the company's health and safety elements, please, write them in the space provide below:

.....

.....

.....

.....

Please, rate your evaluation of how each of the following factors contributes to health and safety performance of NGRL, on a scale of 1-5, where 1=Very Poor, 2=Poor, 3=Not Sure, 4= Good, 5= Very Good

6. Factors affecting health and Safety performance

	FACTORS	RESPONSE				
6.1	Attitude and behaviour of personnel to health and safety	1	2	3	4	5
6.2	Adequacy of material resource support for health and safety	1	2	3	4	5
6.3	Effective dissemination of health and safety information	1	2	3	4	5
6.4	Value place on health and safety as a strategic function	1	2	3	4	5
6.5	Adequacy of human resource for managing health and safety	1	2	3	4	5
6.6	Management Attention to safety needs of all units in the company	1	2	3	4	5
6.7	Effectiveness of operation and preventive maintenance of machinery	1	2	3	4	5

Please, if there is any other factors which affect the performance of health and safety of the company, please state them in the space provided below:

.....

.....

.....

.....

7. Causes of Accidents at the workplace

Please, you are to rate your response to each of the following items on a scale of 1 to 5, from „Very Low to Very High where: **Very Low=1, Low =2, Not Sure=3,**

High=4, Very High=5

Please indicate your choice by placing the check mark '✓' in the appropriate box.

Please, place only one check mark for each item.

	ITEM	RESPONSE				
9.1	Unsafe Acts	1	2	3	4	5
9.2	Unsafe condition	1	2	3	4	5
9.3	Fatigue and Stress	1	2	3	4	5
9.4	Equipment Failure	1	2	3	4	5
9.5	Inexperience of Workers	1	2	3	4	5
9.6	Negligence of Workers	1	2	3	4	5
9.7	Substandard workplace design	1	2	3	4	5
9.8	Unqualified personnel	1	2	3	4	5
9.9	Unhealthy competition among workers	1	2	3	4	5
9.10	Complacency on the part of workers	1	2	3	4	5
9.11	Requirement to meet unrealistic targets.	1	2	3	4	5
9.12	Natural disaster	1	2	3	4	5

If there are other cause(s) of accident(s) in the workplace, which are not listed above, list and rate them by the appropriate number against it at the end of each cause you state.

Note: Very Low=1, Low =2, Not Sure=3 High=4, Very High=5.

.....

APPENDIX II

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.587 ^a	.387	.369	.51084